ACS Chemistry for Life®

SCALACS

A Publication of the Southern California Section of the American Chemical Society

VOLUME LXXX/No. 2 MARCH 2025

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You are invited to our
LSAC DEIR Grant Virtual Seminar
"Longevity on Your Plate: The Role of Diet in Aging and Healthspan"
Monday, 17 March • 4 to 5 pm
Presented by **Dr. Cristal M. Hill, USC**
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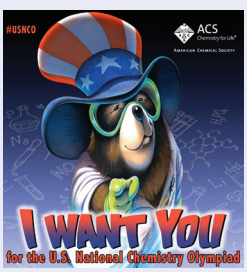

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GLACIERS
HOT TOPIC COOL CHEMISTRY

CHEMISTS CELEBRATE EARTH WEEK
April 20-26, 2025
#CCEW

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Volume LXXX MARCH 2025 Number 2

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CHAIR'S MESSAGE

Dear SCALACS members,

This January has presented significant challenges for Southern California. The unprecedented wildfires, including the Eaton and the Palisades fires, have deeply affected our community, causing displacement and disruption for many, including members of our own Pasadena City College family, as well as faculty, staff, and students across the region.

I personally understand the difficulties of evacuation, and my heart goes out to all who have been impacted. The coverage in C&EN has highlighted the strain these events have placed on research labs and R1 institutions, underscoring the widespread effect of these fires.

Now, more than ever, we need to extend support and understanding to one another. I urge you to reach out to colleagues, friends, and students who have been affected, offering assistance and a listening ear. We must allow ourselves time to collectively breathe and heal from these challenging circumstances.

In the midst of this adversity, chemistry has become an integral part of our community's dialogue. We are discussing the nuances of ash versus soot, the presence of benzene and VOCs in our water, and the complex process of soil remediation. Furthermore, the chemical analysis of environmental samples is playing a crucial role in understanding the aftermath of these fires.

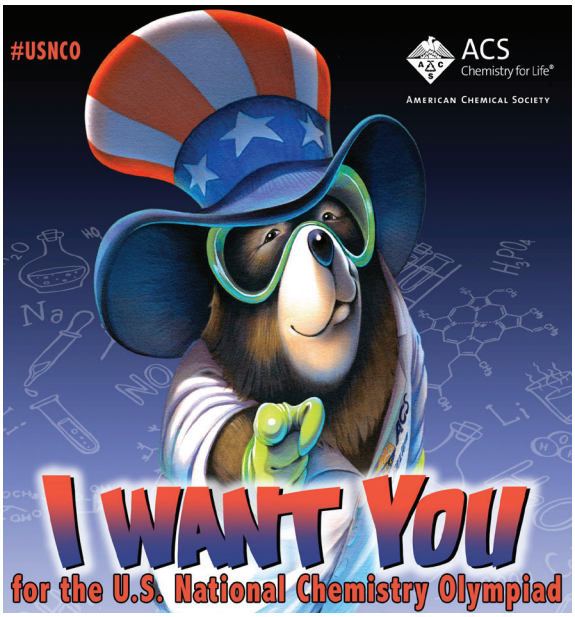
Looking ahead, we have several important events on the horizon. The ACS Spring National Meeting in San Diego, themed "Pushing Boundaries: Solving Global Challenges," will take place March 23-27, 2025. SCALACS will be presenting at the Sci-Mix Poster session on Monday, March 24th. Please stop by and say hello if you are attending the meeting.

We are also excited to announce the themes for this year's Chemists Celebrate Earth Week (CCEW) and National Chemistry Week (NCW). CCEW (April 20-26, 2025) will focus on "Glaciers: Hot Topic, Cool Chemistry," while NCW (October 19-25) will explore "The Hidden Life of Spices." Your involvement would be greatly appreciated. To express your interest in volunteering, please fill out this form: https://forms.gle/h3BRMxcoWbmSu5q58.

Finally, we are in the process of organizing a strategic planning workshop this spring to ensure SCALACS continues to thrive and effectively serve our membership. We would like to extend an invitation to all members to participate in this important initiative. If you are interested in contributing to the strategic direction of SCALACS, please sign up here: https://forms.gle/JW221ohKzL7fkxG78.

Thank you for your continued engagement and support. We are a resilient community, and together, we will navigate these challenges and move forward.

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



2025 US NATIONAL CHEMISTRY OLYMPIAD

We are proud to announce we have about **450 registered students** from **33 schools** around Southern California registered for the local exam.

The Southern California Section Exam for the 2025 US National Chemistry Olympiad is set for March 19-20, 2025.

By now teachers and students should have been notified regarding the local exam Teachers of participating schools must return their Scantrons to Gerald Delker, the local section Olympiad Coordinator, by March 21.

PREPARE FOR THE EXAMS

Students and teachers can find more information on the ACS website including exam preparation and past years exam questions and solutions.

https://www.acs.org/education/students/highschool/olympiad.html
https://www.acs.org/education/students/highschool/olympiad/prepare-for-exams.html

Top students will be selected to move forward to the National Exam and SCALACS will send notitications to the teachers regarding this. The time and venue for this national exam will be determined soon. Good luck to all students and thank you to all the teachers who coordinated and proctor the exams.

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

March 19-20, 2025	**Local Section Exam for SCALACS**
April 5-13, 2025	**National Exam**
June 1-14, 2025	**Study Camp**
July 5-14, 2025	**2025 International Chemistry Olympiad**

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

SUMMARY REPORT ON PROJECT SEED STUDENTS RESEARCH SYMPOSIUM

Date: February 9, 2025
Time: 10 am to 1:00 pm PST
Funding: LSAC DEIR grant to SCALACS/NYACS/Nigerian Affiliate of ACS
Attendees: 25
Judges: Kat Bay and Emma Kuczkowski (Schrödinger, New York)
Lee Hoffman, Drexel University, PA (National SCC member)
Clarita Sunhwa Joung, Pacifica Christian HS, Santa Monica, CA (SCALACS member)

ACS Committee Members:

Dr. Ping Furlan, Past Chair, NYACS (Moderator of the Symposium)
Dr. Krishna Kallury, Alternate Councilor, SCALACS & SCC National Member
Dr. Mary Virginia Orna (National ACS SCC Executive Committee Member)

Jose Marti STEM Academy Staff & Faculty Members:

Dr. Nadia Maker, Supervisor
Dr. Mina Armani, Faculty
Ms. Jennifer Donnely, Faculty
Ms. Rina Rosales, Faculty

Participating Students:

David Rivera	Ruby Li	Axel Perez	Leilani Duran
Helen Claus	Darla Murillo	Jesly Arias	Lizzie Laurzardo
Merisha Fernando	Valerie Duran	Jocelyn Pacio	Jade Castillo

Award Winners:

Ruby Li Darla Murillo Jesly Arias Merisha Fernando Valerie Duran

Jose Marti STEM Academy (JMSA) is located in Union City, New Jersey. It is one of two high schools in the Union City School District. It caters to 664 students through Grades 9 to 12. Students have opportunity to take AP Courses and 52% of students take these. The total minority enrollment is 98% and 76% of the students are economically disadvantaged. These statistics precisely match the focus points of our LSAC/DEIR Grant Proposal in which encouragement of STEM education and research amongst minority students at the high school level is the main objective. JMSA has received multiple awards, including Blue Ribbon Schools of Excellence Lighthouse Award and the College Board's AP Computer Science Female Diversity Award.

YouTube links to presentations:

https://www.youtube.com/watch?v=ycLGMalBmrA
https://www.youtube.com/watch?v=-XLFKDvQSWI

Proceedings (Summary) of the Symposium: (Top 5 presentations marked by ★)

DAVID RIVERA
Title: Microplastics Transport and Deposition in Porous Media

His presentation was on experiments to study removal of microplastics (using polyethylene as model) from water sources. Silicon dioxide was used as a column chromatographic material through which the polymer microparticles were passed. The eluate was studied by

Participating students and their faculty members at the Jose Marti STEM Academy school in Union City, NJ.

fluorescence spectrophotometry. His results indicated complete removal of the 106 micron polyethylene microparticles. His future studies will focus on testing particles of different sizes using different sorbents.

RUBY LI

Title: Reducing Plastic Waste Using Biodegradable Plastics Derived from Milk

Ruby described her investigation of the milk protein Casein as a substitute for other biodegradable synthetic polymers like PET (polyethylene terephthalate) which forms methane (a greenhouse gas) upon biodegradation. She isolated Casein by treating boiling milk with vinegar and filtering on cheese cloth and washing with ethanol. She found that whole milk yields twice the amount of Casein, as does 1% milk. A sample of Casein spread on a plate of 6.8 – 8.5 cm diameter can hold up to 550g of mass. Increasing the diameter to 27.5 cm enables the protein to hold around 2150g of mass. She is currently studying generation of Casein with other acids to make the process economical and enhance the stability of the Casein by coating with a biodegradable material like thermoplastic starch.

AXEL PEREZ

Title: The Development of a Novel Organoboron Building Block for the Preparation of Biologically Important Compounds

The synthesis of VCPDB (Vinylcyclopropyldiboron) was carried out by Axel under the supervision of Dr. Abhishek Sharma of Stevens Institute of Technology, NJ. The objective is to develop boron containing compounds as analogues of the FDA approved drug Bortezomab. Boron containing reagents have high specificity, reduced complexity, cost less and regioselective synthesis potential. Continuation of this reagent synthesis will be to study the difluoro analog of TDB (trans dibromo-butene) used to synthesize VCPDB.

LEILANI DURAN
Title: Separation of Microplastics in Water Using Magnetic Carbon Nanotube Ferrofluid

Leilani worked with her mentor Dr. Bumjung Kim of New Jersey City University on the removal of Polyethylene and Polyethylene terephthalate microplastic particles from aqueous media using magnetic carbon nanotubes. She described the preparation of these nanotubes from carbon nanotubes by coating with a ferrofluid solution and magnetizing with Neodymium magnet. Their capacity to remove microplastics was studied by Scanning Electron Microscopy and excellent results were obtained.

HELEN CLAUS
Title: PVDF-TrFE Electrospun Scaffolds for Facilitating Recovery from Spinal Cord Injuries

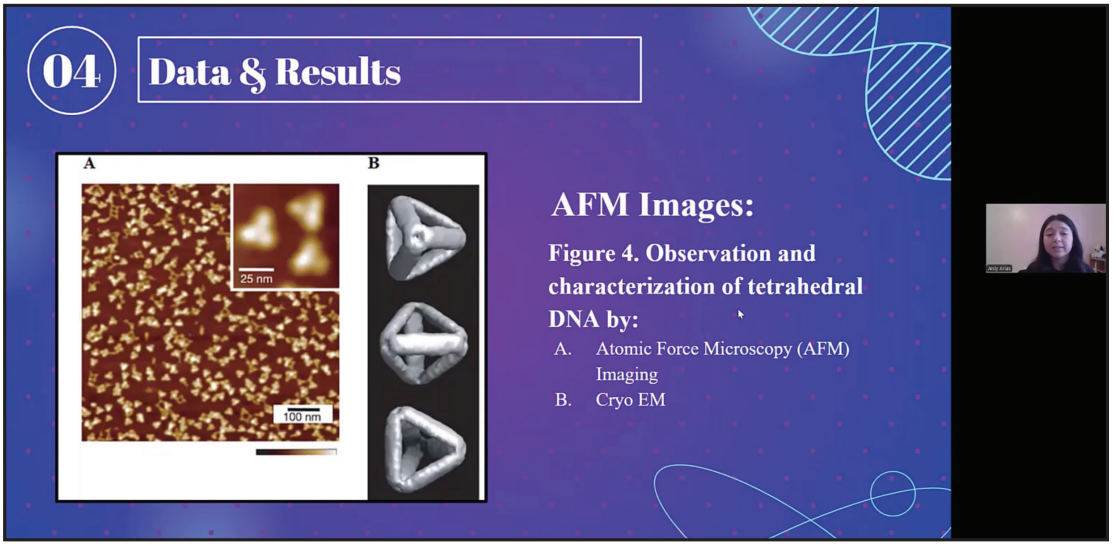
Under the mentoring of Dr. Treena Arinzeh of Columbia University, Helen generated ultrathin of Polyvinylidene fluoride (PVDF)/ Trifluoroethylene (TrFE) polymer. This material is ferroelectric, biocompatible and produces piezoelectric films and was used by Helen to generate a weblike nanofibrous scaffold. This scaffold was used as a platform for culturing Dorsal Root Ganglia (DRG) neuronal cells for treating spinal cord injuries. In the USA, around 305,000 people were reported to suffer such injuries and these polymer scaffolds revolutionize the spinal cord injury treatment by promoting neuronal regeneration and offer support for cell attachment, proliferation and tissue repair.

DARLA MURILLO ★
Title: Axonal Injury and Astroglial Responses in a Mouse Model of Repeated Mild Traumatic Brain Injury

Every year 42 million people around the world experience a “mild Traumatic Brain Injury (mTBI)” exhibiting cognitive and sensory systems. Astrocytes (glial cells in central nervous system in brain and spinal cord) become reactive after TBI and with time grow larger and proliferate causing astrogliosis. Using 5-weak old Swiss Webster mice as test species, their behavior (motor, sensory deficits, anxiety and depression) with time after EAE injections (Experimental Autoimmune Encephalomyelitis) were investigated. Their brain segments were immunostained for imaging of ADK/GFAP (Adenosine Kinase/ Glial Fibrillary Acidic Protein) and analysis. The TBI affected group showed lower ADK levels compared to controls. It was concluded that therapeutic strategies targeting astrocyte reactivity and ADK regulation will help in treating mild traumatic brain injury patients. Future studies will focus on quantifying ADK activity, Longitudinal mTBI studies with real world parameters and clinical translation.

LIZZIE LAURZARDO
Title: Comparative Optimization of Caspase 1 Expression in E.Coli and Enzyme Kinetics for Anti-inflammation

Working under the supervision of Dr. Yufeng Wei of New Jersey City University, Lizzie studied the release of Caspase-1 during the inflammation process using E. Coli as an example. Inflammation involves complex biological processes, each as activators of immune cells and release of chemical mediators to eliminate harmful stimuli and initiate healing. She studied the enzyme kinetics during the production of Caspase1. She employed two conditions for cultivation of E. Coli, one named “Terrific Broth” (TB) and the other :Lysogeny Broth” (LB). The processes were followed by chromatography, UV absorption and Gel Expression. Concentrated fractions of the bacteria from Gel Expression were investigated for enzyme kinetic studies using p-nitrophenyl acetate as substrate. The LB conditions were found to be the best for the growth of Caspace1. Further studies on optimization are planned.



Presentation by Jesly Arias, Jose Marti STEM Academy and Project SEED student. She was invited to the White House in recognition of her outstanding contribution to science.

JESLY ARIAS ★
Title: Structural DNA Nanotechnology: Using Nucleic Acids as Ideal Building Blocks for Systemic Drug Delivery Nanostructures

Jesly investigated the formation of tetrahedral DNA nanostructures (TDNs) and their characterization by Atomic Force Microscopy (AFM) and Gel Electrophoresis (GE). These TDNs were projected to protect drugs from enzymatic degradation, enable better controlled release of drugs and reduce toxicity of drugs and enhance biocompatibility. TDNs are formed from four single strand DNA chains by Watson-Crick pairing. Their robustness was demonstrated for Aptamers. Future work planned include testing biocompatibility with different drugs and improving the tetrahedral structure for successful drug delivery.

VALERIE DURAN ★
Title: Investigating GABA Receptors in Autography of HEK293 Cells

Working with Dr. Reed Carroll of New Jersey City University, Valerie carried out research on understanding the role of autophagy in regulating GABARs(gamma)2 in Human Embryonic Kidney293 (HEK293) cells to evaluate whether or not GABARAP connects GABARs to autophagy. Autophagy is a natural degradation process in which cells discard damaged or unneeded organelles and proteins to maintain hemostasis and promote cellular survival. GABA receptor (GABARe) is the main inhibitory neurotransmitter of the CNS system. Binding of GABA to the receptor decreases cell neuronal activity and prevents transmission of chemical messages from one neuron to another. Disruption of autophagy and GABAergic processes can be linked to neurodegenerative disorders such as Alzheimer's disease, the 5th leading cause of death around the world.

It is hypothesized that within the autophagy process, GABAARs are specifically targeted and engulfed by autophagosomes for degradation. GABARAP (GABA receptor Associated Protein) is responsible for directing the receptors into autophagosomes for continuous autophagy. To validate this theory, Valerie used a three step protocol – (1) transfection to introduce plasmid GABAA R(gamma)2 DNA into HEK293 cells containing a green fluorescent tag; (2) these HEK293 cells were subjected to different treatments – control, starvation, starvation/Chloroquine and just Chloroquine; and (3) using immunochemistry to insert and bind a specific

antibody GABARAP or LC and observe localization with a CY3 secondary antibody which exhibits a red fluorescence. ANOVA test and graphs suggest GABARAP regulates GABARs during autophagy and this link is strengthened when lysosomal degradation is blocked. Starvation/Chloroquine treatment was found to be most effective. Transportation of GABARAP and associated GABARs occus in a process opposite to LC3 dependent autophagosomes. These findings may lead to treatment methods for Alzheimers and other diseases.

MERISHA FERNANDO ★
Title: Evaluating the Effects of Maternal Inflammation on Fetal Neurodevelopmentand Autism Spectrum Disorder

Autism affects 1 in 36 children (2020 studies) causing difficulties in communication, sensory aversions and repetitive behavior. These can be traced to the occurrence of the cytokine IL-6 released in the maternal immune system in response to infection or injury. This IL-6 is transported to the fetus through the placenta and then to the fetus's brain affecting its neural development. IL-6 increases the production of the Calcium-binding protein Calretinin in the cerebral cortex, which regulates the sensory, motor and cognitive functions. Merisha studied the effects of IL-6 production increase in pregnant mice. During their 17-19th week of their pregnancy (corresponding to the 3rd semester in humans), IL-6 was injected. Using a cryostat, 2.64mm tissue segments from their brain (their Hilus from Hippocampus region) were cut and the Calretinin generated was estimated by immunofluorescence microscope. Higher concentrations of Calretinin were noticed. This observation presents a treatment strategy for ASD by reducing IL-6 production. Studies in progress (and in future) will focus on Nestin, a protein expressed during brain development, which controls the Calretinin recombinase genes utilizing the fluorescent protein TD tomato.

JOCELYN PACCIO
Title: Canopy Transportation in Different Tree Species and Their Response to Soil Moisture in a Changing Climate

Working with Dr. Karina Schafer of Rutgers University, NJ, Jocelyn studied the movement of water from trees to the atmosphere and the phenomenon of Canopy Transport (Sap flow). Her objective was to calculate and analyze rate of sap flow by measuring sap flex density and sapwood area. Black Walnut and Sugar Maple were chosen as test species. Effect of soil moisture and the amount of water transported in a specific time period were the studied parameters. Woods studied include Kauffman, Research, Peninsula and Hay Barn. The methodology followed consisted of Sap Flow and area measurements and threshold response in soil moisture. Sensors were installed in the tree sap/wood and a data logger provides the readings. Sugar maple has small pores and low hydraulic conductivity, while Black Walnut has small and large pores and high hydraulic density. Climate change (increased temperature) soil moisture is reduced and leads to higher sap flow rates, which in turn increases water stress.

Future studies will involve more site locations and different species of trees as well as soil moisture and carbon recycling.

JADE CASTILLO
Title: Innovative Antimicrobial Composite Materials – Development, Testing, and Performance Analysis

Jade worked with Dr. Li on bacterial contamination and its impact on health, food safety and every day products using E. Coli and Staphylococcus aureus as test species. The capacity of Zinc pyrithione (ZPT), a known potent antibacterial, was investigated by growth comparisons in agar media and epoxy and polyolefin plates containing ZPT. Significant growth inhibition of the two bacteria was recorded in the ZPT infused plates.

Summary report written by Krishna Kallury.

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

Monday, 17 March, 2025
4 to 5 pm
Presented by:
Cristal M. Hill, PhD
Assistant Professor of Gerontology
USC Leonard Davis School of Gerontology

SCALACS is proud to present this virtual seminar made possible with the support of LSAC DEIR grant.

Join us for a virtual presentation by **Dr. Cristal Hill** of the USC Leonard Davis School of Gerontology, specializing in nutrition, metabolism, and the mechanisms of aging on **Monday, 17 March,** from **4 to 5 pm** titled **"Longevity on Your Plate: The Role of Diet in Aging and Healthspan."**

This event is free to all. Register here to get the event link:

Here is the registration link: https://us06web.zoom.us/meeting/register/a6stOCXcQ36_BxWauXZl3w

Abstract:

Emerging research emphasizes the impact of caloric intake, macronutrient composition, and dietary patterns on aging and longevity. Caloric restriction and intermittent fasting have been associated with extended lifespan and delayed onset of age-related diseases by promoting cellular repair mechanisms and metabolic efficiency. Additionally, diets rich in plant-based foods, healthy fats, and lean proteins—such as the Mediterranean and Blue Zone diets—have been linked to improved longevity and reduced risk of chronic conditions like cardiovascular disease, diabetes, and neurodegenerative disorders. Conversely, diets high in processed foods, refined sugars, and unhealthy fats contribute to inflammation, oxidative stress, and shortened lifespan. This talk with review established mechanisms through which diet influences aging, including molecular pathways and metabolic regulation to extend lifespan. Understanding the relationship between nutrition and longevity can inform dietary recommendations and interventions aimed at promoting healthier aging and extended lifespan.

About the Speaker:

Cristal M. Hill, PhD grew up in Birmingham, Alabama, with ambitions in veterinary medicine, but a strong interest in endocrine diseases developed while working at a local veterinary clinic during high school.

She earned her PhD in Molecular Biology from Southern Illinois University School of Medicine in 2016, focusing on the biology of aging under the mentorship of Dr.

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Continued from page 8.

Andrzej Bartke. Prior to that, she obtained both her BS and MS in Animal Sciences from Tuskegee University under the mentorship of Dr. Michelle Corley, with her master's research centered inflammatory responses on cardiovascular disease during high-fat feeding in poultry models.

Currently, Dr. Hill's research centers on the unique effects of dietary protein on adipose tissue function, investigating how protein restriction can influence optimal health and lifespan. Her work aims to uncover adaptive responses in adipose tissue and their broader implications for metabolic and endocrine health during aging. Before joining USC, Dr. Hill served as a Postdoctoral Fellow at the Pennington Biomedical Research Center, where she was recognized as the 2022 Outstanding Postdoc of the Year. Her dedication to advancing aging research has also been acknowledged with the 2021 Dr. Norman Orentreich Award for a Young Investigator in Aging.

Most recent, Dr. Hill was honored with the Nathan Shock New Investigator Award by the Gerontological Society of America (GSA). Dr. Hill's research focuses on how dietary interventions influence cellular signaling pathways affecting health and aging. Notably, her work has explored the role of the hormone FGF21 in mediating the benefits of low-protein diets on longevity and metabolic health.

Beyond her research, Dr. Hill is committed to ensuring academic excellence in the scientific community. She intentionally mentors and inspire young individuals to pursue careers in science, aiming to cultivate the next generation of innovators in aging research. At USC, Dr. Hill collaborates with multidisciplinary faculty members to explore the intersections of nutrition, genetics, and aging, contributing to the school's mission of promoting healthy aging for diverse populations.

Chair Elect Dr. Edye Udell presented at the ACS 2025 Leadership Institute Conference

In late January, 2025, our current Chair Elect, Dr. Edye Udell, attended the ACS Leadership Institute in Houston, Texas, and presented the Local Section's activities regarding "Artificial Intelligence and Recent Technologies for Combating Climate Change." Dr. Udell described the section's plethora of in-person and virtual SCALACS seminars ranging from "AI and Green Chemistry: Crafting a Sustainable Tomorrow," to "Stories from STEM – Know your Power." All the virtual seminars from 2024 are still available on the SCALACS website for anyone interested in viewing them. In addition to presenting information on many of the section's activities, Dr. Udell also attended sessions on ideas for new activities to bring to the local section and ways to enhance membership experiences within SCALACS.

The ACS Leadership Institute is an annual invitation-only conference where ACS leaders come together to learn both management and leadership skills to enable them to be successful leaders within the American Chemical Society. The ACS Leadership Institute promotes ongoing learning, development, and training for ACS volunteer leaders throughout the year.

The 2025 Western Regional Meeting is coming to San Jose this fall (October 25th – 28th, 2025), and the California and Silicon Valley sections are currently conducting a call for symposium proposals! This meeting's theme is "Building Bridges" and we cordially invite those interested, to submit their proposals via our website:

https://wrm2025.org/index.php/program/

The deadline for symposium proposals is March 21st, 2025 so don't miss out on the opportunity to share knowledge and engage in excellent discussions. Hope to see you there!

BY

KEITH ORSO
Irell & Manella LLP
KOrso@irell.com

The previous edition of this column explored two concerns associated with obviousness-type double patenting, which is essentially when a patent issues for an obvious variation of an invention already claimed in an earlier patent. The column explored the concerns in the context of the hypothetical invention of a revolutionary new cough syrup formulation. The inventor first obtains a patent on the basic formulation and then later seeks patents on variations of the formulation with added flavors and colors to make the treatment more palatable and attractive. The first concern is that this extends patent protection for the formulation beyond a single patent term—at least with respect to patents that expire 17 years after issuance—without requiring any further inventive activity, given that making an obvious variation is not inventive. The second concern is that two patents claiming essentially the same thing can be used in the hands of separate parties to harass potential infringers and potentially extract double royalties from the same entity.

The inventor in the hypothetical can address both concerns—and avoid the consequences of obviousness-type double patenting—by filing with the United States Patent Office a document called a "terminal disclaimer." As its name implies, a terminal disclaimer generally disclaims the terminal or end part of the statutory term of a second patent that would extend beyond the expiration date of the earlier patent. So if the first patent expires on October 23, 2025 and the second patent expires on February 7, 2027, the terminal disclaimer would disclaim the period between October 23, 2025 and February 7, 2027, effectively making the second patent expire on October 23, 2025 along with the first patent. Accordingly, after the terminal disclaimer is filed, the term of the second patent no longer extends beyond the term of the first patent, thereby addressing the first concern.

Additionally, the terminal disclaimer must state that the second patent will be enforceable only for and during the period that it and the first patent are commonly owned. This addresses the second concern by preventing different entities from acquiring the patents and asserting them in parallel or series against the same entity.

An inventor can file a terminal disclaimer during the process of obtaining a patent—e.g., to overcome a patent office rejection on obviousness-type double patenting grounds—or after the patent issues up until expiration of the earlier patent on which the obviousness-type double patenting is based. In the former case, the terminal disclaimer must state that it runs with any patent granted on the application being examined and is to be binding upon the grantee, its successors, or assigns.

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.

The **ACS Spring 2025 Meeting & Expo** with the theme "Pushing Boundaries: Solving Global Challenges" will be held in **San Diego** from **March 23 to 27**. This will be an in-person and a virtual event.

There will be many various presentations and courses, networking opportunities, and an expo. Get ready to learn and network with industry and academia in San Diego or join us the digital meeting.

SCALACS will be presenting at the **Sci-Mix Poster session** on **Monday, March 24**. Come by and meet SCALACS representative(s) when you are at the meeting.

Register today so you don't miss out this major ACS event, happening right here in SoCal. Visit this link for more info and registration: **https://brnw.ch/21wQKFK**

2025 Engaging Girls in STEM

Date: March 29, 2025
Location: Los Angeles Zoo
Come and meet us at the SCALACS booth. See what fun activities that SCALACS has in store for all.

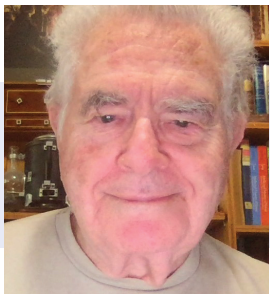
With the support of LA County Office of Education, Engaging Girls in STEM program offers middle school and high school girls opportunities to meet with a network of Ambassadors - women working in STEM - in order to learn about STEM careers and be inspired to pursue STEM fields of study. Learn more:

www.engaginggirlsinstem.com

THIS MONTH IN CHEMICAL HISTORY

BY

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



As has become my custom I begin the new year (Happy New Year to my readers) by 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. I start with inorganic chemistry.

The reporter for 1925 has eased my task by highlighting the most significant discoveries of the year. They include: the formation of compounds of helium; the production of helium in discharge tubes; the production of gold by electric discharges in mercury vapor (shades of alchemy!); the variation of the atomic weight of boron with its source; proof that carbon can be melted; isolation of pure tin hydride; new nitrogen compounds; sulfur sesquioxide; two new elements of the manganese group.

In an electric glow discharge mercury and helium combine to form $HgHe_{10}$, mercury helide; this comparatively stable substance is decomposed at bright red heat. Bombardment by electric discharge of the nitrides of magnesium and aluminium in a tube containing oxygen produces helium, hydrogen, and neon. At temperatures below 24°C xenon forms a crystalline hydrate containing 6 or 7 molecules of H_2O – the most stable hydrate of the noble gases.

Pure mercury, shown to be free from gold, after prolonged use in a mercury vapor lamp now contains traces of gold that the authors believe was produced by atomic breakdown of mercury.

Boron from California has an atomic mass determined as 10.840; from Tuscany 10.825; and from Asia Minor 10.818. These variations far exceed experimental uncertainty and are ascribed to variations in the abundance of the 11B isotope, possibly due to the mode of formation of borates by volatilization.

Pure carbon can be melted at atmospheric pressure. The experiment "observed by means of a kinematograph camera" involved passing an increasing electric current through a carbon rod with a constriction, in an argon atmosphere. At the narrowest part an arc formed, the rod parted and small globules of pure carbon formed. The estimated temperature, taken as the melting point, was 3800K.

99.7% pure tin hydride, SnH_4, was prepared by electrolysis with lead electrodes of a solution of tin sulfate containing 0.5% of colloidal dextrin. The evolved gas is mostly hydrogen, but it contains about 0.01% of tin hydride that was trapped in a liquid air cooled vessel. The solid hydride melts at -150°C. It is fairly stable at room temperature in clean glass vessels but decomposes rapidly when heated.

Action of oxygen on NO at -185°C forms a green solid that turns blue as it warms. This is a new oxide of nitrogen, N_6O_8, probably containing a peroxide link and formulated as ON-NO-ON-O-O-NO-NO-NO. This unstable peroxide rapidly decomposes as it warms producing nitrogen trioxide. Mixtures of almost anhydrous nitric acid and perchloric acid deposit crystals of nitronium perchlorate, $(H_2NO_3)ClO_4$, and nitronium diperchlorate, $(H_3NO_3)(ClO_4)_2$. Nitrogen tetraselenide is formed when ammonia is passed through a solution of selenium monochloride in

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. Save the date and gather your friends and family and check out SCALACS booth at this event!

Continued from page 12.

carbon disulfide. Cryoscopic determination of its molecular weight in glacial acetic acid leads to a formulation as N_4Se_4. Tetranitrogen tetrasulfide can be prepared by a similar method. These compounds are of undetermined structures. Bromine vapor reacts with silver azide to give bromoazide BrN_3, a very unstable compound decomposing explosively even at -200°C.

When pure sulfur is added to sulfur trioxide a violent reaction occurs and a bluish-green solid is formed. The resulting mixture can be vacuum distilled at room temperature and an unstable product of sulfur sesquioxide, S_2O_3, can be isolated. Selenium monochloride and monobromide can be readily prepared by dissolving selenium dioxide in the appropriate halogen acid and adding the stoichiometric amount of elemental selenium. When concentrated sulfuric acid is added to this mixture the selenium monohalide precipitates as an oil in 90% yield.

There is uncertainty about the claims that two new elements in Group VII have been discovered. Somewhat inconclusive X-ray spectra of traces in platinum ores have been claimed as evidence of their containing about 0.5% of element 43 (Mendeleev's eka manganese) and as much as 5% of element number 75. The names masurium and rhenium are proposed for these elements.

In the past 100 years some of these claims have been disproved, but there is still a great deal of chemistry of the main group elements that remains unexplored – including some of the compounds and reactions reported above. This is an unfashionable but important part of chemistry.

In my next column I will turn to other areas of chemistry to look at what was new one hundred years ago.

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)!

UPCOMING 2025 EVENTS

March 17, 4-5pm	"Longevity on Your Plate: The Role of Diet in Aging and Healthspan" Virtual Seminar by Dr. Cristal Hill, USC
March 19 & 20	USNCO Local Section Exam for SCALACS
March 23 - 27	ACS Spring 2025, San Diego
March 29	LA County Office of Education's Engaging Girls in STEM, LA Zoo
April 12	City of STEM + LA Maker Faire, Exposition Park, LA
April 20-26	Chemists Celebrate Earth Week *Glaciers: Hot Topic, Cool Chemistry*
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 (TBD)	SCALACS Virtual Seminar on "Wearable Biosensors"
June (TBD)	SCALACS Students Research Poster Session on "Nutritional contributions of natural materials in health promotion"
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) *Hidden Life of Spices*
October 23	Mole Day
October 25 - 28	ACS Western Regiional 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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