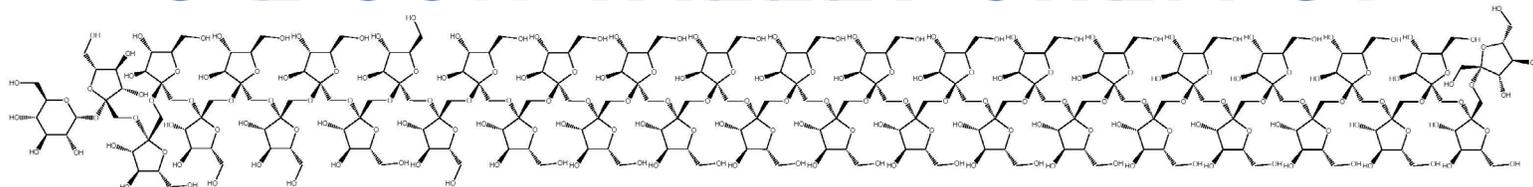


# SILICON VALLEY CHEMIST



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## Silicon Valley ACS 2025 Annual Picnic & Awards

Saturday, July 12, 2025, 4-7pm

A family-friendly event, please join us for our annual picnic and awards ceremony!

- **Date & time:** Saturday, July 12, 2025, 4-7pm  
4:00-5:00 pm: Wine-tasting with hors d'oeuvres  
5:00 pm: Awards and Recognitions – **SVACS Ottenberg Award** and celebrating 50-, 60- and 70-year ACS members who live in our region  
Dinner will immediately follow Awards & Recognitions, catered by Armadillo Willy's
- **Location:** Cuesta Park Group BBQ Areas #1-2, Mountain View, CA ([view map](#), [get directions](#))
- **Cost:** \$10.00/person. Children: free. Payment by cash or check at the door. Make checks out to "Silicon Valley ACS."

**Registration required by July 8th**

See flyer on the next page. [Download flyer.](#)

*Continued on next page*

## Join the 2026 Silicon Valley ACS Section's Leadership Group

We know you want to do more to support our section but don't know how or what you can do. Every fall we elect members of the Silicon Valley Local ACS Section Executive Committee. This is the leadership group that represents our section at the National level and governs our local section.

We want you to run for a position! We have six open positions this year:

- Chair-Elect to run the rotation through Chair and then immediate past Chair
- Treasurer with a 2-year term
- Councilors (two positions)
- Alternate-Councilors (two positions)

On behalf of the current Silicon Valley ACS Executive Committee, the Nominations Committee is pleased to request any and all interested candidates to make yourselves known.

**Learn more about the duties for each position**

Email [chair@siliconvalleyacs.org](mailto:chair@siliconvalleyacs.org) if you want to run for one of these positions. Thank you!



## Silicon Valley ACS Annual Picnic & Awards

Come celebrate together with  
wine-tasting, good food & awards

**Saturday, 12 July 2025**

**4-7 pm**

**Cuesta Park Group BBQ  
Areas #1 & #2, Mountain View**



For information go to  
<https://www.siliconvalleyacs.org/event/2025-annual-bbq-picnic-and-awards-ceremony/>  
Registration (deadline 8 July 2025) is required to make sure there is plenty of food  
catered by Armadillo Willy's.

[Download flyer](#)

## Silicon Valley ACS Members with 50+ Years of ACS Membership

ACS Members celebrating fifty or more years of ACS membership in 2025  
received certificates of recognition from the ACS Board of Directors  
in grateful recognition of their long-standing support and involvement in the in the American Chemical Society.

### 50-Year Members

Mr. James Edward Blessing  
Dr. Steven G. Boxer  
Dr. Mark Kevin Dickson  
Dr. Martin S. Edelstein  
Dr. Eric Robert Evitt  
Mr. David Van Norm Goeddel  
Mr. William Joseph Guilford  
Ms. Susan Hines  
Dr. Albert S. Hirschon  
Mr. Mark A. Kent

### Dr. Zlata Kovac

Mr. John Charles Levine  
Dr. John H. Musser  
Dr. Stephen Saul Rosenblum  
Dr. James Robert Swartz  
Dr. Francis Louis Tanzella  
Dr. Chih Yuan Chari Ting  
Dr. Sorab R. Vatcha  
Dr. Carl E. Ward  
Dr. C. Joseph Weber, III



### 60-Year Members

Dr. John Pauling McCormick  
Dr. Peter Frederick Rusch  
Dr. Chong Kuang Shaw  
Dr. Jagadish C. Sircar  
Dr. Katie Arenson Thornburg  
Dr. Thomas Kempe



### 70-Year Members

Dr. Lawrence Fook Eng  
Dr. Takeo Hokama



ACS  
FALL  
2025

Get ready for the meeting!

[Registration & Pricing](#)

[Hotels](#)

[Tips for Presenters](#)

[Symposia Topics](#)

[Visa info for International Presenters](#) [Image Resources](#)

## ACS Fall 2025 National Meeting

Washington, DC & Digital | August 17-21

Theme: Innovations in Chemistry

Register by July 16 and save up to \$100 on your registration fee! [Learn more and register](#)

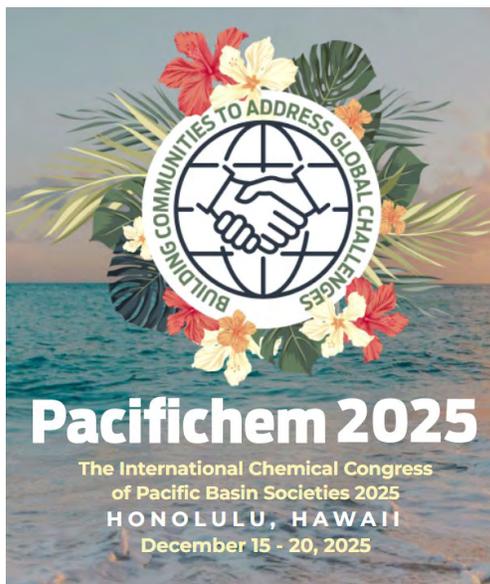
## CALENDAR OF EVENTS

<https://www.siliconvalleyacs.org/events/>

All Times Given are Pacific Time Zone

- July 2025 -

- |   |   |
|---|---|
| <p><b>July 3</b> <b>ACS Virtual Office Hours: Academia vs Industry</b><br/>Sponsored by ACS Careers<br/>9:00-10:30 am, Online, Free, <a href="#">Registration required</a></p>  | <p><b>July 12</b> <b>2025 Silicon Valley ACS' Annual Picnic and Awards</b><br/>Cuesta Park, Group BBQ Areas #1-2, Mountain View, California<br/>4:00-7:00 pm, In-person, \$10/person (children free).<br/><a href="#">Register by July 8, 2025</a></p>                          |
| <p><b>July 7</b> <b>Silicon Valley ACS Executive Committee Meeting</b><br/>Sponsored by the Silicon Valley ACS local section<br/>7:00-8:30 pm, Hybrid Event, Free<br/>Guests welcome: contact <a href="#">Chair</a> to attend</p>   | <p><b>July 16</b> <b>Working for Yourself: Your Idea, Business, and Marketing Strategy: ACS Careers Pathway Virtual Workshop</b><br/>Sponsored by ACS Careers<br/>9:00-10:30 am, Online, Free, <a href="#">Registration required</a></p>  |
| <p><b>July 8</b> <b>AI for science: Real world applications of cutting-edge research powered by artificial intelligence</b><br/>Sponsored by CAS<br/>7:00-8:00 am, Online, Free, <a href="#">Registration required</a></p>  | <p><b>July 17</b> <b>How to use AI to Supercharge your Research and Communication</b><br/>Sponsored by ACS Webinars and ACS Committee on Public Relations and Communications<br/>11:00 am-12:15 pm, Online, Free, <a href="#">Registration required</a></p>                     |
| <p><b>July 9</b> <b>Different Minds, Shared Goals: Building Supportive Mentoring Relationships for Neurodivergent Students in Grad School</b><br/>Sponsored by ACS Webinars and ACS Chemists with Disabilities Committee<br/>11:00 am-Noon, Online, Free, <a href="#">Registration required</a></p> | <p><b>July 17</b> <b>Glassy Gels via Ionic Liquids</b><br/>Prof. Michael D. Dickey, North Carolina State University<br/>Webinar sponsored by the Golden Gate Polymer Forum<br/>5:00-6:00 pm, Online, Free/\$5 donation, <a href="#">Register by July 15 at 1:00 pm</a></p>      |
| <p><b>July 9</b> <b>Tech Trek: STEM-Focused Summer Camp for Middle School Girls</b><br/>Sponsored by American Association of University Women (AAUW) and Silicon Valley ACS<br/>6:00-9:00 pm, In-person at Santa Clara University, <a href="#">Learn more</a></p>                                   | <p><b>July 19</b> <b>Kid Makers: Pop Up Chemistry</b><br/>Sponsored by Silicon Valley ACS &amp; Redwood City Public Library (RCPL)<br/>2:00-3:00 pm, In-person for ages 8-12, RCPL Downtown Location, 1044 Middlefield Road, Redwood City, Free, <a href="#">Learn more</a></p> |
| <p><b>July 10</b> <b>Some Polymers Like It Hot: Tuning Thermal Transport in 2D Polymers and COFs</b><br/>Sponsored by ACS Webinars and ACS Division of Polymer Chemistry<br/>11:00 am-12:30 pm, Online, Free, <a href="#">Registration required</a></p>   | <p><b>July 21</b> <b>ACS Western Regional Meeting Deadline for Submitting Abstracts</b><br/><a href="#">Learn more</a></p>  |
|   | <p><b>July 31</b> <b>Working Worlds Apart: How to be Successful on Global Teams</b><br/>Sponsored by ACS Webinars and ACS Industry Member Programs<br/>8:00-9:15 am, Online, Free, <a href="#">Registration required</a></p>  |



## Register for Pacifichem 2025 in Hawaii

Registration and housing for Pacifichem 2025 are now open! The meeting will be held from December 15-20, 2025, in Honolulu, Hawaii. Attendees can register to access all scientific sessions, the Plenary Lecture, Opening Ceremony, and more. Housing reservations are available through the official housing bureau, SPARGO, Inc., offering special rates at nearby hotels. Early registration and booking are recommended to secure preferred accommodations and rates. Visit the [Pacifichem website](#) to register and reserve your hotel room today. Don't miss this opportunity to join leading scientists from around the world in beautiful Hawaii!



## SVACS Selected as a Finalist for Two 2025 ACS ChemLuminary Awards

Come to the Award Event on Sunday, August 17 at the ACS National Meeting in Washington. No Signup Needed to Attend – Please Join Us!

The ACS is thrilled to announce that the Silicon Valley ACS Section has been selected as a finalist for two 2025 *ACS ChemLuminary Awards* in the following categories:

- **Local Section Partnership Award/Marinda Li Wu Award:** This award recognizes an outstanding example of a local section forming an alliance with another group that results in successful activity. This award is presented jointly by Local Section Activities Committee and former ACS President Marinda Li Wu.
- **Outstanding or Creative Local Section Younger Chemists Committee Event:** This award is given by the Younger Chemists Committee and recognizes a local section YCC or divisional event that had the greatest impact on younger chemists (career development, outreach, membership recruitment/retention, or social event, etc.).

The winners will be revealed during the ACS Fall 2025 event in Washington, DC, on Sunday, August 17, at the Walter E. Washington Convention Center, Ballroom A/B, Level 3.

This year's ceremony will feature a keynote address by Brian Gibney, honoring Professor Pat Redden, the recipient of the 2025 Award for Volunteer Service to the American Chemical Society. Following the keynote, awards will be presented by 21 committees of the Society, celebrating the invaluable contributions of volunteers to improve all people's lives through the power of chemistry.

The ACS invites award nominees to participate in a one-hour poster session prior to the ceremony, showcasing the activities that led to the finalist selection. This is a wonderful opportunity to share exemplary work and engage with others in the ACS community.

### EVENT SCHEDULE:

#### Sunday, August 17

- 2:00 PM–3:00 PM: Poster Session, outside Ballroom A/B Walter E. Washington Convention Center
- 3:30 PM: Ballroom Doors Open
- 4:00 PM–6:30 PM: ACS Board Open Session and ChemLuminary Awards, Ballroom A/B, Level 3
- 6:30 PM–8:30 PM: ACS Connect Reception with dance social, Hall A, Level C (Concourse)

Congratulations to SVACS on this remarkable achievement! The ACS eagerly anticipates celebrating at the ACS ChemLuminary Awards ceremony.

Sincerely,

*Dorothy J. Phillips*

Dorothy J. Phillips, Ph.D.

President, American Chemical Society

## NASA Scientists are Monitoring and Predicting Wildfires from Space

"Climate change has brought forth extreme fire events, like the Palisade and Eaton fires in Los Angeles, which devastated communities in Altadena and the Pacific Palisades in the beginning of 2025. And it's becoming harder to not wonder: Is this just the world we live in now? Under the constant threat of catastrophic fires? Fortunately, we have the perfect guests to answer that question. We traveled to NASA's Goddard Space Flight Center and spoke with two of their scientists who study fires from space."

[Listen to this podcast on YouTube](#)

[Learn more about Tiny Matters podcasts](#)

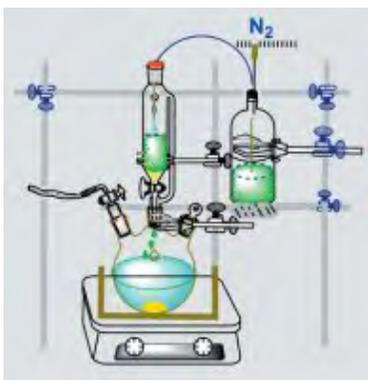
[Learn more about NASA's climate change activity.](#)



View [Fire Information for Resource Management System](#)  
Also View [FireMap.Live](#) | Learn more about [FireSense Technology](#)

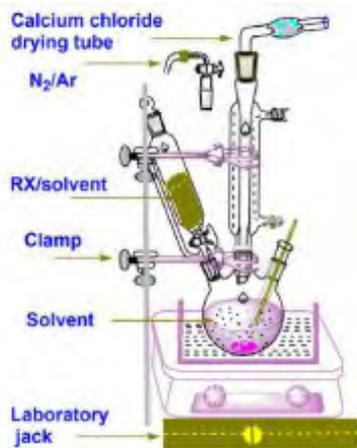
# Laboratory Reaction Safety Summaries

The ACS Committee on Chemical Safety (CCS) is publishing a series of *short, topical guides* to help those who work in laboratories better understand the general aspects of laboratory and chemical safety. These documents are intended to provide basic guidelines for best laboratory practices, including risk management and accident prevention. Please contact [safety@acs.org](mailto:safety@acs.org) with any questions or comments regarding these resources.



## Lithiation Reaction

Lithiation reactions are among the more hazardous reactions routinely performed in both research and teaching laboratories. This Laboratory Reaction Safety Summary (LRSS) guides the reader through the use of the RAMP process to Recognize hazards, Assess risks, Minimize risks, and Prepare for emergencies associated with these reactions. (Unlike a Laboratory Chemical Safety Summary (LCSS) or Safety Data Sheet (SDS), which are written specifically for laboratory chemicals, an LRSS is focused on reactions.) [Download Lithiation Laboratory Reaction Safety Summary](#)



## Grignard Reaction

Inadequate control of reaction kinetics, spill and fire risks, and runaway reactions are major safety concerns for Grignard reactions. Risk increases with an increase in scale, and any

# Bubble Grant Recipient Scotts Valley Middle School

Scotts Valley Middle School received a 2024 Silicon Valley ACS BUBBLE Grant to purchase equipment for their science classes.

The \$1,000 award acquired four LED binocular compound lab microscopes for the school's living-labs curriculum.

Science teacher Chandler Mikles leads activity that involves the microscopes such as examining pond water for different forms of life and subsequent discussion of drinking water purification methods, projects with cellular statins to show the presence or lack of a nucleus for comparing bacteria and eukaryotic cells, and inspecting plant matter for chloroplasts.

Congratulations Mr. Mikles and Scotts Valley Middle School! Your students are the real winners.

The SVACS BUBBLE Grant supports K-12 teachers with funds to facilitate teaching science.

[Apply for a 2025 BUBBLE Grant](#). Share this article with a K-12 teacher whose classroom would benefit from additional science teaching resources.

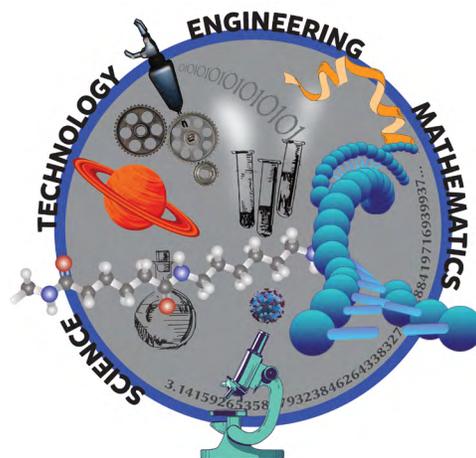


Photo credits: Chuck Wade



largescale procedures should be checked for adequate thermal control and have an explicit plan for activation or initiation. [Download Grignard Reaction Laboratory Reaction Safety Summary](#)

**More tipsheets and guides:**

- [The Basics of Laboratory Ventilation \(PDF\)](#)
- [Laboratory Ventilation Terms & Definitions \(PDF\)](#)

- [Recommendations for Sharing, Cleaning, & Disinfecting Chemical Splash Goggles & Glasses \(PDF\)](#)





**Call for Abstracts & Registration Now Open**  
**2025 Western Regional Meeting**  
 October 25-28, 2025 | San Jose, CA

[Submit an Abstract](#) | [Register Now](#) | [Book a Hotel Room](#)

The deadline to submit an abstract for an oral or poster presentation is **Monday, July 21**. Early Bird Registration ends September 25. Book your conference hotel room at the special rate before October 1!

[Program](#) | [Highlights](#) | [Download Schedule \(PDF\)](#)

Abstract submission is open for the Western Regional Meeting 2025 (WRM 2025). WRM 2025 will be held from Saturday to Tuesday, October 25-28, 2025, and will be hosted by the American Chemical Society California Local Section and Silicon Valley Local Section.

The theme of the meeting is “Building Bridges,” which represents the process of fostering cooperation and collaboration. WRM 2025 is excited to feature 3 plenary lectures. There will also be two poster sessions, an exposition, The Art and Science of Brewing Beer dinner, Trivia Night, as well as Careers in Industry and Academia panel discussions.

WRM 2025 plenary speakers include William Tarpeh on Electrochemical Wastewater Refining: Building Bridges Across Length Scales, Judith Giordan on Where has the Trust Gone: Changing Attitudes in America’s Trust in Science and Scientists, and Christopher Sarko on Overcoming the Challenges of Drug Discovery in Global Health: Novel Approaches to Malaria and Cryptosporidiosis. Keynote speakers for the Women Chemists Luncheon are Dorothy Phillips on Journey of an Industrial Chemist and Trailblazer and Marinda Li Wu on Evolving role of women in the chemistry enterprise. Bill Carroll will speak at the Senior Chemists Breakfast on Skydiving Into Retirement: Enjoy the Ride and Land Softly, and Richard N. Zare will present at the Awards Dinner on Could “Microlightning” Have Sparked the Building Blocks of Life on Earth?? Memorial Symposia will honor John I. Brauman, Robert H. Grubbs, Attila Pavlath, Neal Byington, and Harry Mosher. [Learn more.](#)

Additionally, WRM 2025 will offer a series of [student-focused](#) and [professional development workshops](#). Registration for these workshops can be found on the [WRM 2025 registration site](#).

[Visit the website](#) to find a list of the programming divisions and planned symposia open for submissions, as well as the [conference schedule](#).

The venue for the WRM 2025 will be the Signia by Hilton in downtown

San Jose, CA, close to the San Jose Tech Museum and the San Jose Museum of Art, with many restaurants nearby and easy access to light rail transit. Book now with the ACS discounted rate before Wednesday, October 1.



**Call for Award Nominations**

[Learn More and Nominate](#)

The American Chemical Society (ACS) is proud to honor individuals who make exceptional contributions to the chemical sciences—from lifelong researchers to dedicated educators and volunteers. The ACS Western Region is pleased to recognize the outstanding achievements of our members and partners across the chemical enterprise.

Award recipients will be celebrated at the **2025 ACS Western Regional Awards Dinner on Monday, October 27, in San Jose, CA.**

See individual awards for nomination and eligibility details. Download the Call for Nominations [here](#).

- **Stanley C. Israel Regional Award for Advancing Diversity in the Chemical Sciences** recognizes individuals and/or institutions that have advanced diversity in the chemical sciences and significantly stimulated or fostered activities that promote inclusiveness within the region.  
**Deadline: August 1**
- **Regional Award for Excellence in High School Teaching** recognizes a high school teacher within the region who excels in the classroom and beyond.  
**Deadline: August 1**
- **E. Ann Nalley Award for Volunteer Service to the American Chemical Society** recognizes the volunteer efforts of individuals who have served the American Chemical Society, contributing significantly to the goals and objectives of the Society through their regional activities.  
**Deadline: August 15**
- **Partners for Progress and Prosperity (P3) Western Region Award** encourages and recognizes successful and exemplary partnerships between industry, academia, government, small business and/or other organizations, including ACS local sections with other organizations which result in impactful outcomes supporting the chemical enterprise.  
**Deadline: August 15**



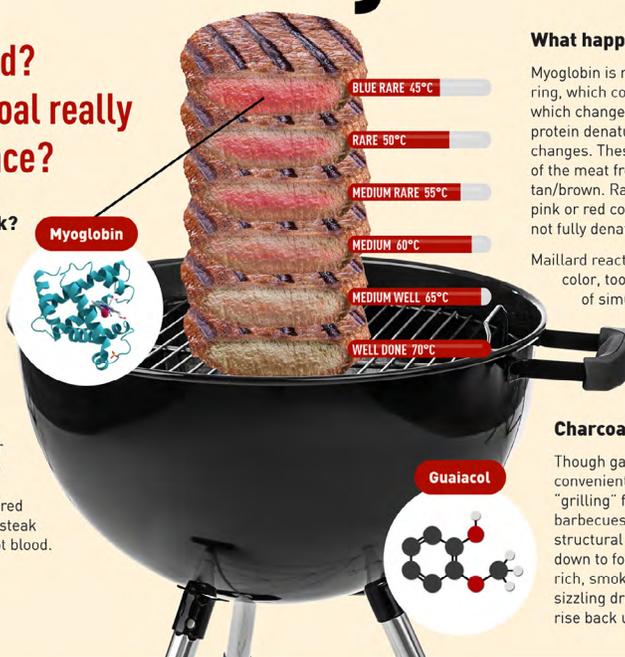
# The Chemistry of Grilling

## Why is steak red? And does charcoal really make a difference?

### Is that blood in your steak? No.

Steak's color comes from a protein called **myoglobin**, which has a pronounced red color. Myoglobin is found in muscle cells, where it stores oxygen to help provide energy.

Steak comes from slow-twitch cow muscle. These muscles are used for extended activity, rather than short bursts, so they have a lot of myoglobin to meet that continuous energy demand. Any red fluid you see coming out of your steak is likely water and myoglobin, not blood.



### What happens when you cook meat?

Myoglobin is made of a protein and a heme ring, which contains an iron atom, both of which change when meat is cooked: The protein denatures, and the state of the iron changes. These transformations shift the color of the meat from purplish/pinkish/reddish to tan/brown. Rare or medium-rare meats retain pink or red color because the myoglobin has not fully denatured.

Maillard reactions contribute to cooked meat's color, too—and its flavor. This complex set of simultaneous reactions between amino acids and sugars imparts a golden brown color and hundreds of flavor compounds.

### Charcoal vs. gas

Though gas grilling might be more convenient, it doesn't give you that classic "grilling" flavor that charcoal and woodchip barbecues do. For example, lignin—a structural molecule in woodchips—breaks down to form **guaiacol**, which helps impart a rich, smoky flavor. And in charcoal grills, sizzling drippings from the meat can fall and rise back up as different flavor molecules.

Sources:  
<https://www.exploratorium.edu/cooking/meat/INT-what-meat-color.html>  
<https://cen.acs.org/articles/90/140/Maillard-Reaction-Turns-100.html>  
<https://genuineideas.com/Articles/index/srmeatmyoglobin.html>  
<https://www.wired.com/2013/07/charcoal-grilling-is-objectively-scientifically-better-than-gas-2/>  
[https://www.beefresearch.org/CMDocs/BeefResearch/PE\\_Fact\\_Sheets/Color\\_Changes\\_in\\_Cooked\\_Beef.pdf](https://www.beefresearch.org/CMDocs/BeefResearch/PE_Fact_Sheets/Color_Changes_in_Cooked_Beef.pdf)

Don't char your grilled meats!

For more information, visit [bit.ly/grilling-chemistry](http://bit.ly/grilling-chemistry)



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## Welcome to the Silicon Valley Section of ACS



Each month, our Silicon Valley local ACS section receives a spreadsheet from national ACS with the names of members new to our section. The members are either new to ACS, have transferred in from other areas, or are the newest chemists - students. As a welcoming gesture, the SVACS Executive Committee offers new members free attendance at a catered SVACS event. Come join us at our in-person gatherings, like the **annual SVACS picnic on Saturday, July 12, 2025 in Mountain View**. To register as our guest for a catered event, **contact us** directly to receive complimentary admission for you and a friend.

Join us for an outreach activity, like judging a science fair, proctoring the high school Chemistry Olympiad, or participating in National Chemistry Week hands-on experiments. The upcoming ACS Western Regional Meeting in San Jose in October 2025 is particularly eager for you to volunteer. The local section is a volunteer organization. Attend an event, volunteer to help, and get to know your local fellow chemists!

### New SVACS Members

Fufei An  
Saket Bhargava  
Debarati Dasgupta  
Abdullah Kahraman

Ryan Kenny  
Colum O'Leary  
Benjamin I. Poulter

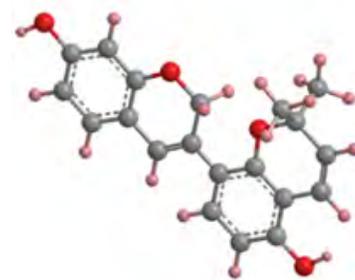
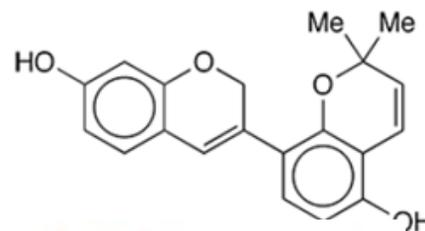
Gavin Pour  
Jancrizto Aguilar Ruidas  
Nikita Sengar

Olivia Shade  
Xiujing Xing  
Meng Zhang

CHEMISTRY

## Quiz

I'm a natural product that has good and bad properties. What molecule am I?



Answer

## ACS Membership Referral Program

Refer a peer to ACS. Get rewarded.



You earn points to use towards your membership dues, and your peer saves 10% when they join.

Members and Society Affiliates with a Standard or Premium benefits package can refer colleagues and earn exclusive rewards. If you

have a basic package, [upgrade today](#) to unlock this benefit!

How it works: Login > Get your unique link > Share your link > Earn points. [Get Started](#)  
[Learn more](#)

## Pyro Drone Shows The Future of July 4th Fireworks?



[Watch video on YouTube](#)

“Pyro drones are transforming July 4th fireworks shows by launching pyrotechnics in intricate patterns with millisecond accuracy. These high-tech displays require extensive engineering, choreographed flight plans with 3D animation software and sophisticated GPS systems. But these massive shows aren’t without risks as crashing drones can be a real concern. The Wall Street Journal explores the technology behind how the quadcopter fleets are changing aerial displays.”

## Interesting Science News from ACS Axial

Discover the latest stories, news and science in the ACS Publications Blog, [ACS Axial](#). Below are four recent stories that we thought you might find interesting.



### Scientists Refine Recipe for 3D-Printed, Plant-Based Calamari

“3D-printed food might not seem like the most appealing option for sustenance, but with a growing population and increasing pressure on our food systems, harnessing chemistry to recreate animal proteins could be the key to feeding our future. Learn how one team is tackling this challenge with a sustainable seafood alternative.” [Read the article](#)



### Molecular Fingerprinting: A Broad-Spectrum Technique for Cancer Detection

“New work explores whether electric-field molecular fingerprinting

could overcome current challenges in modern omics and enable simpler workflows for cancer detection.” [Read the article](#)



### PFAS in Your Pint? How Water Quality May Be Affecting Your Beer

“Beer is more than 90% water—so what happens when that water is contaminated? A recent study traces “forever chemicals” from tap water into the beers brewed with it, raising new concerns for brewers and consumers alike.” [Read the article](#)



### Beyond the Spice Rack: Exploring the Functional Power of Cinnamon

“Cinnamon is proving to be more than just a pantry staple. Enjoy a selection of recent research articles uncovering the spice’s surprising versatility across food, textiles, and sustainable packaging.” [Read the article](#)

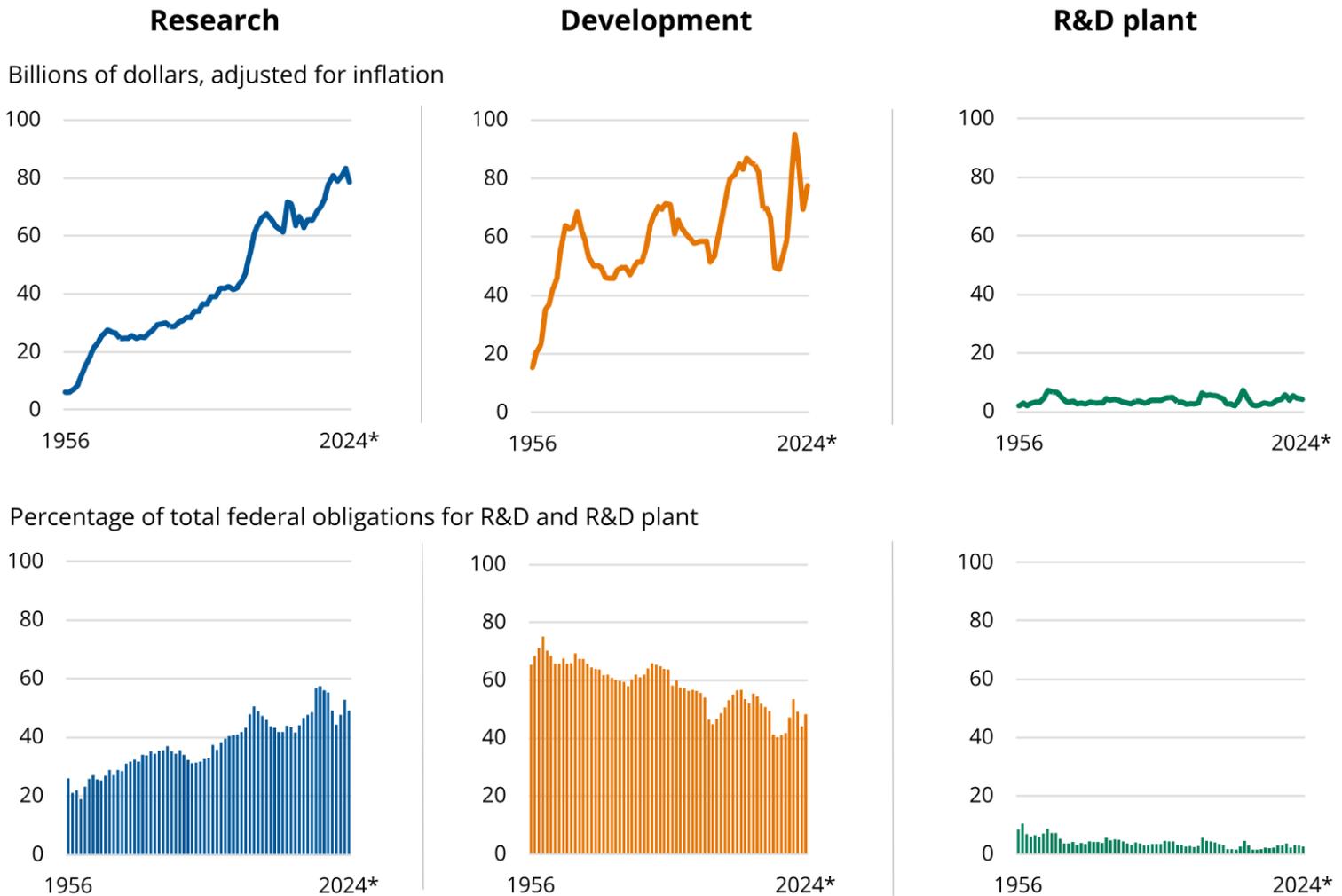
# Since the 1950s, Federal R&D Funding Has Shifted from Development to Research

Inflation-adjusted federal obligations for FYs 1956 to 2024 show:

- research (basic and applied) increased from \$6.1 billion to \$78.7 billion
  - development increased from \$15.2 billion to \$77.4 billion
  - research and development (R&D) plant which is the physical infrastructure and facilities used for R&D activities increased from \$2.0 billion to \$4.2 billion
- Obligations represent the amount for orders placed, contracts awarded, services received, and similar transactions.

Source: National Center for Science and Engineering Statistics (NCSES). 2025. *Since the 1950s, Federal R&D Funding Has Shifted from Development to Research*. NSF 25-344. Alexandria, VA: U.S. National Science Foundation. Available at <https://ncses.nsf.gov/pubs/nsf25344>

**Figure 1. Federal obligations for research, development, and R&D plant: FYs 1956–2024**



\* Data for FY 2024 are preliminary.

**Note(s):**

Because of rounding, detail may not add to total. The federal fiscal year cycle changed for FY 1977, from 1 July–30 June to the current 1 October–30 September cycle; no data were collected for the 3-month transition period of July–September 1976. FYs 2009 and 2010 obligations include additional funding provided by the American Recovery and Reinvestment Act. Beginning with FY 2016, the totals reported for development obligations represent a refinement to this category by more narrowly defining it to be "experimental development." Therefore, the data are not directly comparable with totals reported in previous years. FYs 2020–22 obligations include additional funding provided by supplemental COVID-19 pandemic-related appropriations.

**Source(s):**

National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development.



## ACS Reactions: Chemistry Science Videos The Unsolved Mystery of Static Electricity

[Watch video on YouTube](#) | [Read sources](#)

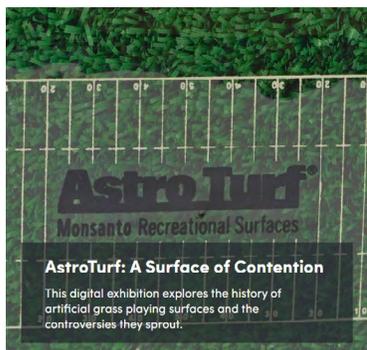
“If you rub two identical balloons together, they both pick up a static charge. This behavior is strange and unexpected, but it’s been documented in the scientific literature. When our host George tries the experiment, he stumbles into something that — to the best of his knowledge — has never been reported in the literature.”

## Digital Exhibits from the Science History Institute

The Science History Institute explores the diverse and surprising histories behind the science that shapes our world. Below are selected *digital exhibits* from their website.



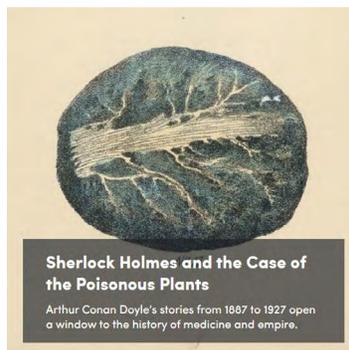
**Lunchtime: The History of Science on the School Food Tray**



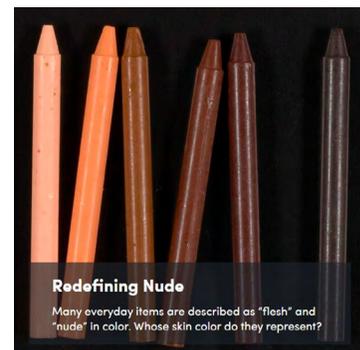
**AstroTurf: A Surface of Contention**



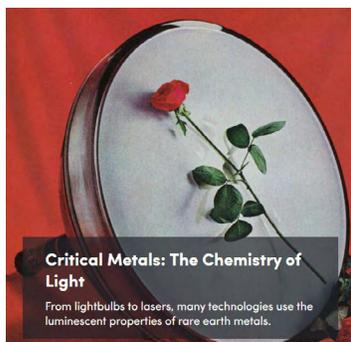
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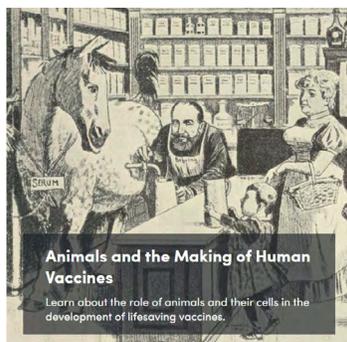
**Sherlock Holmes and the Case of the Poisonous Plants**



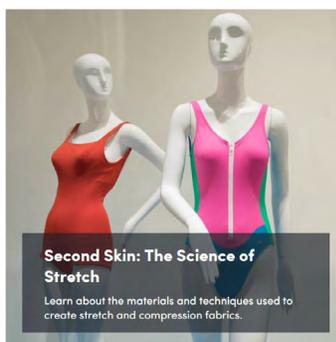
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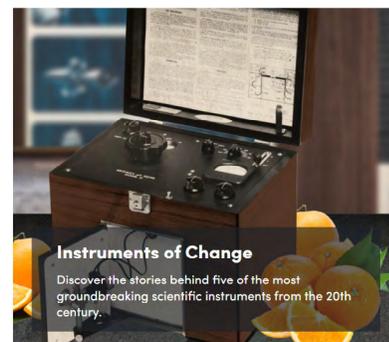
**Critical Metals: The Chemistry of Light**



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# A brief guide to the types and uses of solvents



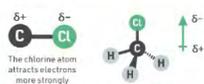
There are as many solvents as there are uses for them: from cosmetics to the textile industry, through pharmaceutical manufacturing to oil production. Solvent properties and strengths determine how they are used in industry. Here we look at the different types of solvent and some of their uses.

## Polar and non-polar solvents

Key ● Carbon ● Oxygen ● Chlorine ● Hydrogen



Solvents can be categorised as polar or non-polar. Atoms of different elements vary in how strongly they attract electrons in bonds. Charge differences across molecules make them polar, affecting how they interact with other molecules.



Polar bond      Polar molecule

"Like dissolves like" is a common phrase about solvents. Polar solvents dissolve polar substances due to the attraction between opposite charges. Non-polar solvents dissolve non-polar substances.

## Inorganic solvents

Solvents that do not contain carbon in their structure, such as water or ammonia.

## Organic solvents

These solvents have carbon-based structures. They also contain hydrogen atoms and sometimes those of other elements.

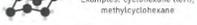
### Hydrocarbons

Non-polar solvents, often derived from petroleum. Contain only carbon and hydrogen.

**Aliphatic hydrocarbons** have open chain structures. They are used in organic synthesis, industrial cleaning products and fuel production.



**Alicyclic hydrocarbons** have non-aromatic carbon rings in their structures. They are used in fuel production and cleaning products.



**Aromatic hydrocarbons** have aromatic carbon rings in their structures. They are used in the manufacture of perfumes, pharmaceuticals and dyes.



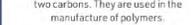
### Oxygenated

Derived from hydrocarbons and always contain oxygen. Usually polar solvents.

**Alcohols** contain the OH group. They are used in cosmetics and cleaning products.



**Ketones** contain the C=O group bonded to two carbons. They are used in the manufacture of polymers.



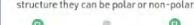
**Esters** contain an ester link, -COO. They are used in perfumes for their pleasant smells.



### Halogenated

Contain halogen atoms (fluorine, chlorine, bromine or iodine) bonded to carbon atoms.

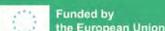
Often used in medicines for anaesthetic and antimicrobial properties. Depending on their structure they can be polar or non-polar.



**Ethers** contain an oxygen atom between two alkyl groups. They are used in inks and paints.



**Glycols** contain two OH groups bonded to different carbons. They are used in antifreeze.



Funded by the European Union

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