

# SILICON VALLEY CHEMIST



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## Celebrating Black History Month 2024



***Through the Window and into the Mirror: Narratives of African American STEM Professionals: A Career Conversation Series.*** National Museum of African American History & Culture.

“Through the Window and into the Mirror is a video conversation series about the experiences of African American STEM professionals today. Students will peer into the ‘windows’ of the speakers’ lives, learn from their lived experiences as STEM professionals, and find parts of their culture and lifestyle ‘mirrored’ in the speakers’ lessons of their youth and greatest challenges and accomplishments. *Through the Window and into the Mirror* aims to inform, inspire, and be a starting point for students as they take steps towards having careers in STEM.” See the National Museum of African American History & Culture’s page about [Celebrating Black History Month 2024](#)

*continued on page 11*

## Mosher Award Ceremony

January 25, 2024



Natalie McClure presents the Mosher Award to Dr. Cynthia Maryanoff and to Dr. Bruce Maryanoff

The 2023 Harry and Carol Mosher Award was presented to Drs. Cynthia and Bruce Maryanoff at an awards ceremony and reception on January 25, 2024 at the Stanford Sapp Science Teaching and Learning Center. The Maryanoff’s have both had successful careers as chemists at Johnson and Johnson (J&J). Dr. Bruce Maryanoff was a Distinguished Research Fellow and worked as a medicinal chemist. He was one of the key contributors in the discovery of Topomax (topiramate), a significant drug in the treatment of epilepsy and migraine. He currently is affiliated with the Scripps Research Institute and is a Distinguished Professor at Baruch S. Blumberg Institute. Dr. Cynthia

*continued on next page*

*Mosher Award Ceremony, continued from front page*

Maryanoff had a distinguished career at J&J also as a Distinguished Research Fellow in Process Chemistry. In retirement, the Maryanoffs have become coffee farmers on the island of Hawaii.

Dr P. Andrew Evans, the 2020 Mosher award recipient, gave the introductions for the Maryanoffs' talks. Dr. Bruce Maryanoff then discussed the challenges associated with the development of a new drug, using topiramate as his example. Dr. Cynthia Maryanoff gave a presentation on coffee, including the factors that are important for growing the coffee cherries, to roasting and the use of supercritical CO<sub>2</sub> for decaffeination.

There were 6 Mosher award recipients in the audience: Cynthia and Bruce Maryanoff (2023), Richard Zare (2022), P. Andrew Evans (2020) and Sally and Howard Peters (2009).



*Present and past Mosher Awardees in attendance at the award presentation and reception: Richard Zare, Cynthia Maryanoff, P. Andrew Evans, Bruce Maryanoff, Howard Peters, and Sally Peters*



*Moshers Award Winner Cynthia Maryanoff and Award Presenter Natalie McClure*

## Judges Needed for Local 2024 Science Fairs

by Susan Hines

While chocolates and flowers are high on many people's Valentine list, how about a gift that keeps on giving? How about encouraging middle and high school students to participate in the world of STEM – science, engineering, math, and science? It takes just one day of your time to judge at a local science fair – and all but two (Golden Gate and San Mateo STEM Fairs) are in person. The following science fairs need category awards judges, especially in the areas of programming, biosciences, environmental science, engineering and math. All of them are qualifiers for the California State Science Fair and for either the Broadcom Masters (middle school) or the International Science and Engineering Fair, ISEF (high school).

**To join our Silicon Valley ACS special award team of dedicated chemists for the Synopsys Championship science fair on March 14, 2024, contact Susan Hines at [svseidr@gmail.com](mailto:svseidr@gmail.com).**

No matter which fair(s) you choose, please volunteer now!

- **Santa Cruz County STEAM Expo, March 9, 2024**, Santa Cruz County Fairgrounds
- **San Mateo County Office of Education STEM Fair, March 9, 2024**, virtual format
- **Synopsys Championship, March 14, 2024**, San Jose Convention Center
- **Alameda County Science and Engineering Fair, March 16, 2024**, Chabot College, Hayward Campus
- **Golden Gate STEM Fair, March 18, 2024**, virtual format



*Professor P. Andrew Evans, previous Mosher Awardee, introduces the speakers*

## ACS National Spring Meeting 2024 Many Flavors of Chemistry

<https://www.acs.org/meetings/acs-meetings/spring.html>

**New Orleans, Louisiana & Hybrid, March 17-21, 2024**

<a href="#">Registration &amp; Pricing</a>	<a href="#">Schedule Overview</a>
<a href="#">Hotels   Hotel Map</a>	<a href="#">Keynote Events</a>
<a href="#">Travel   Ways to Attend</a>	<a href="#">Career Development</a>
<a href="#">Attendee Resources   Presenter Tips</a>	<a href="#">Industry Programming</a>
<a href="#">Frequently Asked Questions   Policies</a>	<a href="#">Student Programming</a>
<a href="#">Expo Floor Plan</a>	<a href="#">Teacher Programming</a>
<a href="#">Registration Statistics   Demographics</a>	<a href="#">Technical Program   Symposia Topics</a>

**New for ACS Spring 2024** – Global Virtual Symposia is a new programming opportunity for presenters and audiences to participate in ACS Meetings & Expositions virtually and across many time zones. While in-person participants and general programming will be set to local time in New Orleans, LA (CT, GMT-5), select symposia will be set to daytime hours in Asia, Africa, Europe, the Middle East, and Latin America. Global Reach, Local Time.

[Learn more](#)

# CALENDAR OF EVENTS

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

## - February 2024 -

- Feb 7** **ORCID Workshop for Researchers**  
Sponsored by Lyrisis  
11 am-Noon, Online via Zoom, Free, [Registration required](#)
- Feb 8** **Better Ion Transport Through Polymer Chemistry: Polymer Electrolytes and Ion-conducting Membranes**  
Sponsored by ACS Webinars and ACS Polymer Chemistry Division  
11 am-Noon, Online via Zoom, Free, [Registration required](#)
- Feb 10** **Toxic Beauty: The Effects Of Phthalates And Bisphenols On Human Stem Cells And Embryo Development**  
Dr. Sonya Schuh, Saint Mary's College of California  
Sponsored by Women Chemists Committee, California ACS Section  
10:30-Noon, Online via Zoom, Free, [Registration required](#) | [View flyer](#)
- Feb 10** **Kid Makers: Pop Up Hands-on Chemistry for Middle School Scientists**  
Sponsored by ACS Silicon Valley and Redwood City Public Library (RCPL)  
2:00-2:30 pm, RCPL Downtown Location, 1044 Middlefield Road, Redwood City, Free, [Learn more](#)
- Feb 14** **See What's New in CAS SciFinder-n**  
Sponsored by CAS  
11 am-Noon, Online via Zoom, Free, [Registration required](#)
- Feb 15** **Eating Dangerously: How a Chemist's "Poison Squad" Won the Battle for Food Safety in the US**  
Sponsored by ACS Webinars and ACS History of Chemistry Division  
11 am-Noon, Online via Zoom, Free, [Registration required](#)
- Feb 21** **Immuno-oncology: Big Data Insights in the Quest to Cure Cancer**  
Sponsored by ACS Webinars and CAS  
11 am-Noon, Online via Zoom, Free, [Registration required](#)
- Feb 22** **Twists in the Tale: 2D Superlattices for Electrochemistry and Magnetism**  
Asst. Prof. Daniel Kwabena Bediako, UC Berkeley College of Chemistry  
Sponsored by Southern California Local Section ACS  
2:00-3:00 pm, Online via Zoom, Free, [Registration required](#)
- Feb 22** **Toward the Precise Synthesis of Nitrogen-rich Polymers as Next-generation Soft Materials: From Antibacterial Agents to Recyclable Plastics**  
Prof. Quentin Michaudel, Department of Chemistry & Department of Materials Science & Engineering, Texas A&M University  
Sponsored by the Golden Gate Polymer Forum  
6:00-7:00 pm, Online via Zoom, Free/\$5 donation  
[Registration required](#) by 1PM February 21

- Feb 27** **IUPAC Global Women's Breakfast (GWB): Catalyzing Diversity in Science**  
Sponsored by California ACS Section  
Online via Zoom (5:00-6:00 pm) and Emeryville Public Market (6:30-8:00 pm), 5959 Shellmound St., Emeryville, CA, [Registration required](#) | Learn more about GWB: [ACS website](#), [IUPAC website](#)

## - March 2024 and Beyond -

- Mar 3** **Empowering Academic Researchers to Strengthen Safety Culture (ACS CHAS Peer-Led Workshop)**  
Sponsored by the ACS Division of Chemical Health & Safety (CHAS)  
11:00 am-2:30 pm, Online via Zoom, \$25/person, [Registration required](#)
- Mar 7** **LinkedIn Profiles for Chemists (ACS Virtual Office Hours)**  
Sponsored by ACS Career Services  
9:00-10:30 am, Online via Zoom, Free, [Registration required](#)
- Mar 9** **P.I.E.F.E.S.T. 3rd Annual Pasifika STEM Fair**  
Sponsored by Pacific Islanders Encouraging Fun, Engineering, Science and Technology (P.I.E.F.E.S.T.)  
1:00-5:00 pm, Redwood City, [Save the date](#)
- Mar 17-21** **ACS Spring 2024 National Meeting: Many Flavors of Chemistry**  
New Orleans, Louisiana & Hybrid, [Registration & Housing Reservations are open](#)
- Apr 4** **Kid Makers: Celebrate Earth Day!**  
Sponsored by ACS Silicon Valley and Redwood City Public Library (RCPL)  
2:00-3:00 pm, RCPL Downtown Location, 1044 Middlefield Road, Redwood City, Free, [Learn more](#)
- Apr 10** **See What's New in CAS SciFinder-n**  
Sponsored by CAS  
11 am-Noon, Online via Zoom, Free, [Registration required](#)
- Jun 3-5** **28th Annual Green Chemistry and Engineering Conference**  
Atlanta, Georgia  
Sponsored by the ACS Green Chemistry Institute  
Theme: AI-Enabled Green Chemistry.  
Key Dates: February 12: Abstract Submission Closes  
February 14: Registration and Housing Opens  
April 30: Early Registration Closes. [Learn more](#)

## New Funding Landscape Report for Green Chemistry

[Download the Report \(PDF\)](#) | [About New Report! The Funding Landscape of Green and Sustainable Chemistry](#)

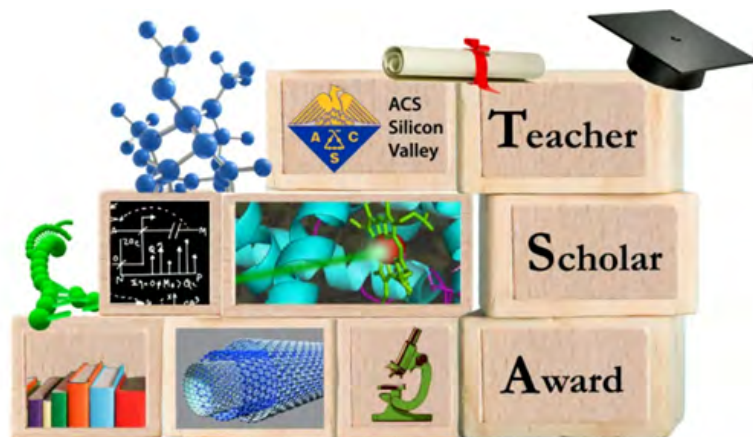
The Project had three objectives:

- Convene funding organizations to share information about current and near-future funding interests.
- Analyze emerging areas of research anticipated to have a catalytic impact on green chemistry and UN SDGs by developing a hierarchical neural network approach.
- Prioritize and analyze emerging areas of research



## Call for nominations Community College Teacher-Scholar Award

Deadline: March 1, 2024



*Recognizing Community College science teachers who go above and beyond to inspire and support their students to pursue a career in science.*

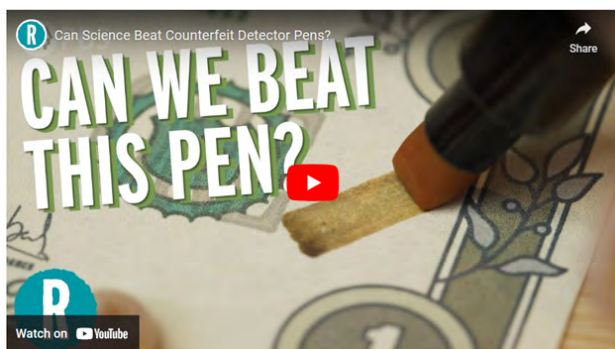
The Silicon Valley ACS Teacher-Scholar Award honors community college faculty who demonstrate excellence in teaching, mentoring and scholarship or who make impactful contributions to their communities through outstanding leadership and service.

The annual SVACS Teacher-Scholar Award spotlights the impactful contribution that California community colleges make to furthering the future of chemistry by supporting our next generation of scientists. Almost 51 percent of graduates of the California State University system and 29 percent of the University of California system transferred from a California community college. The majority of these students come from economically disadvantaged backgrounds, for whom effective instruction is essential.

Initiated in 2008, the SVACS Teacher-Scholar Award was the first award of its kind to recognize specifically community college science educators. The rarity of an award in this category and the abundance of qualified candidates catalyzed our expanding eligibility beyond our immediate region to include chemistry faculty from any of the 116 California community colleges. We are soliciting nominations through March 1, 2024, and encourage all readers to identify and nominate qualified community college faculty.

More information and an online nomination form can be found on the [Silicon Valley ACS Teacher-Scholar Award](#) page.

## Can Science Beat Counterfeit Detector Pens?



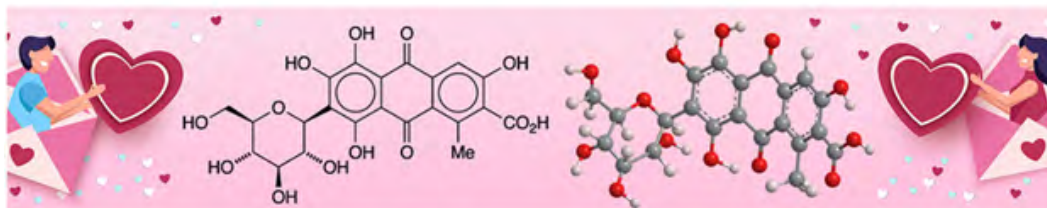
[Watch video on YouTube](#) | [Read associated article](#)

“Counterfeiting money is wrong. Obviously. But if you wanted to take your totally not real money and fool a counterfeit detecting pen, could you do it? We try a number of chemistry tricks to fool the iodine-starch reaction central to these pens, and of course learn a little chemistry along the way.” (Reactions Science Video, posted January 25, 2024)

CHEMISTRY

# Quiz

I'll have you seeing red on Valentine's Day. What molecule am I?



Answer



# Chemical Structure Association Trust

## Recent Grant Recipients



<https://csa-trust.org/awards-and-grants/>

The Chemical Structure Association (CSA) Trust is an internationally recognized organization established to promote the critical importance of chemical information to advances in chemical research. In support of its charter, the Trust has created a unique Grant Program and is now inviting the submission of grant applications for 2024.

### Deadline for Applications:

The deadline for the 2024 Grant applications is April 12, 2024. Successful applicants will be notified no later than May 21, 2024.

### Purpose of the Grants:

The Grant Program has been created to provide funding for the career development of young

researchers who have demonstrated excellence in their education, research or development activities that are related to the systems and methods used to store, process, and retrieve information about chemical structures, reactions and compounds. One or more Grants will be awarded annually up to a total combined maximum of ten thousand U.S. dollars (\$10,000). Grantees have the option of payments being made in U.S. dollars or in British Pounds equivalent to the U.S. dollar amount. Grants are awarded for specific purposes, and within one year each grantee is required to submit a brief written report detailing how the grant funds were allocated. Grantees are also requested to recognize the support of the Trust in any paper or

presentation that is given because of that support.

### Who is Eligible?

Applicant(s) in the early stages of their career who have demonstrated excellence in their chemical information related research and who are developing careers that have the potential to have a positive impact on the utility of chemical information relevant to chemical structures, reactions, and compounds, are invited to submit applications. Applicants must be within five years of obtaining their PhD. Note that proposals from those who have not received a Grant in the past will be given preference. While the primary focus of the Grant Program is the career development of young researchers, additional bursaries may be made available at the discretion of the Trust. All requests must follow the application procedures and will be weighed against the same criteria.

### Which Activities are Eligible?

Grants may be awarded to acquire the experience and education necessary to support research activities, e.g., for travel to collaborate with research groups, to attend a conference relevant to one's area of research (including the presentation of an already-accepted research paper), to gain access to special computational facilities, or to acquire unique research techniques in support of one's research. Grants will not be given for activities completed prior to the grant award date. Funding for 2024 will not be extended past December 31, 2024.

[Learn more and apply](#)

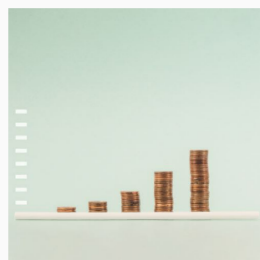


National Center for Science and Engineering Statistics

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Search



Analysis

## U.S. R&D Increased by \$72 Billion in 2021 to \$789 Billion; Estimate for 2022 Indicates Further Increase to \$886 Billion

January 22, 2024

Research and experimental development (R&D) performed in the United States totaled \$789.1 billion in 2021 and performer-reported expectations for 2022 are estimating a further rise to \$885.6 billion—a potential increase of \$96.5 billion. Businesses notably reported a projected \$84.1 billion increase in 2022 R&D performance above 2021.

[Read Analysis](#) →

[View Data Tables](#) →

Analysis

## Federal Science and Engineering Support to Higher Education Increased 10% in FY 2021

January 29, 2024

Data

## Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: Fiscal Year 2021

January 29, 2024

Analysis

## Federal Budget Authority for R&D Tops \$203 Billion in FY 2024 Proposed Budget

January 25, 2024

## EPA's Computational Toxicology and Exposure Online Resources

<https://www.epa.gov/comptox-tools>

"EPA's Safer Chemicals program produces a variety of computational tools to assist users in decision-making, researching, and evaluating chemical information. These tools offer a wealth of chemistry, toxicity, and exposure data that is publicly accessible.

**ChemExpo Knowledgebase:** The Chemical Exposure Knowledgebase (ChemExpo) is an interactive tool for exploring and searching information on how chemicals are used in commerce and in consumer products.

**Cheminformatics Modules:** Cheminformatics analysis modules provide high-quality chemical structures, experimental and predicted physicochemical properties, environmental fate and transport information, and linked toxicity data.

**CompTox Chemicals Dashboard:** The CompTox Chemicals Dashboard provides publicly-accessible chemistry, toxicity, and exposure information for over one million chemicals. This information includes physicochemical data, hazard data, and much more.

**GenRA Tool:** The Generalized Read-Across (GenRA) tool is an algorithmic approach to permit objective and reproducible read-across predictions of in vivo toxicity and in vitro bioactivity.

**ECOTOX Knowledgebase:** The Ecotoxicology (ECOTOX) Knowledgebase is a comprehensive database providing information on adverse effects of single chemical stressors to ecologically relevant aquatic and terrestrial species.

**SeqAPASS Tool:** The Sequence Alignment to Predict Across Species Susceptibility (SeqAPASS) tool is a fast, online screening tool that allows researchers and regulators to extrapolate toxicity information across species.

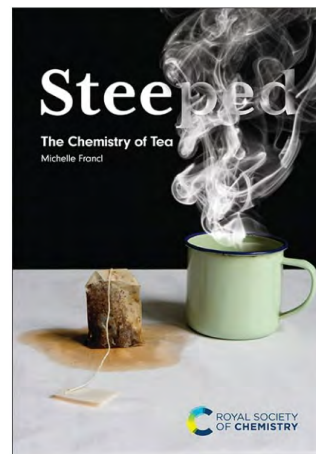
### CompTox Data and APIs

EPA's computational toxicology research efforts evaluate the potential health effects of thousands of chemicals. Types of available, open-source data include: high-throughput screening, rapid exposure and dose, animal toxicity, chemistry, and virtual tissues. Access and download computational toxicology and exposure data and application programming interfaces (APIs).

**New Approach Methods (NAMs) Training:** Need more guidance on using CompTox tools? Visit the [NAMs Training](#) page to access training videos, user guides, worksheets, and more."



## Chemistry of Tea Book Stirs Controversy



Francl, Michelle. *Steeped: The Chemistry of Tea*. Royal Society of Chemistry, 2024. <https://doi.org/10.1039/9781837670383>

"Tea is the world's most popular beverage. Dive into a cup of tea with a chemist and discover the rich molecular brew that can be extracted from the leaves of the *Camellia sinensis* plant. Tea contains over a hundred different chemical compounds which contribute to its colour, taste and scent – and its stimulating effects. The best-known is caffeine, but how does caffeine end up in tea and how can you get it out? Beginning with the leaves, *Steeped* explores the chemistry behind different styles of tea, from green teas to pu-erh. It tackles the age-old question of when, or even whether, to add milk. And it puts the chemistry to use with advice on how to brew a better cup." (Publisher's description)

Learn more about the author:

[Michelle Francl](#), [Frank B. Mallory](#) Professor of Chemistry, [Bryn Mawr](#) | [Personal website](#)

In the news:

- [Investigating the Molecular Basis for a Nice Cup of Tea](#) (Chemistry World, January 24, 2024)
- [After U.K. Hot Water, Michelle Francl Enjoys a Cuppa with Chemistry](#) (Bryn Mawr News, January 30, 2024)
- [How science can help you make a better cup of tea and why a Bryn Mawr scientist wrote a book about it](#) (Philadelphia Inquirer, January 19, 2024)
- [The Biggest British-American Tea Kerfuffle Since ... Well, You Know](#) (New York Times, January 24, 2024)
- [US scientist recommends adding salt to make perfect cup of tea](#) (BBC News, January 24, 2024)
- [There's a debate brewing over how to make tea](#) (Stuck at the Airport, January 24, 2024)

## 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 members - 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! To register as our guest for a catered event, [contact us](#) directly to receive complimentary admission for you and a friend.

We hope you will also join us for an outreach event, like judging a science fair, proctoring the high school Chemistry Olympiad or participating in a National Chemistry Week hands-on experiment event. The local section is a volunteer organization. Attend an event, volunteer to help, and get to know your local fellow chemists.

### New SVACS Members

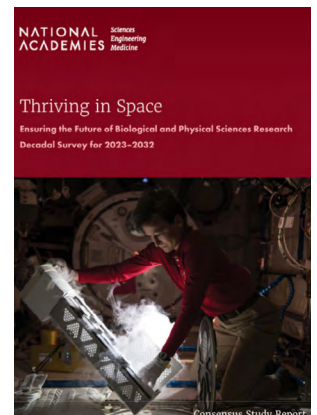
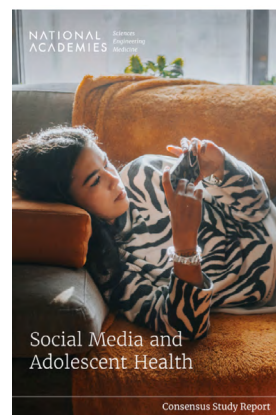
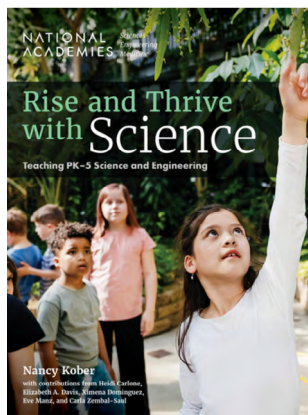
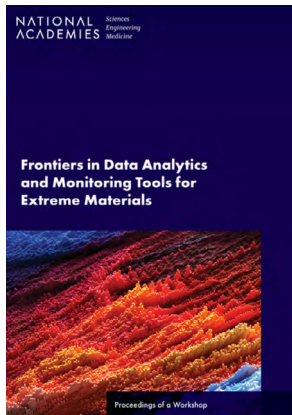
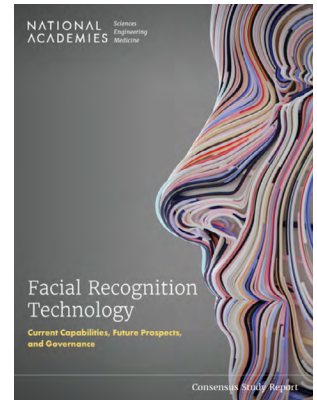
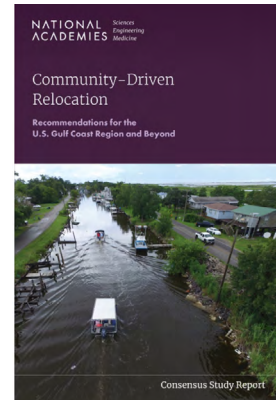
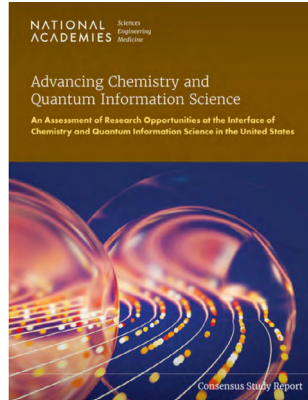
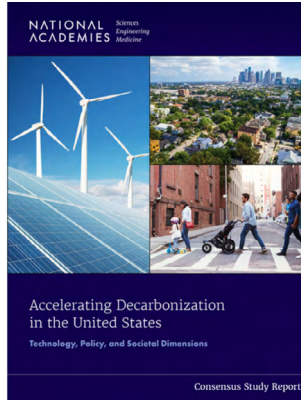
Sarah Alvarez  
Dylan Bomar  
Yan Cao  
Kyle Giesler  
Christoph Grohmann  
Jasper Hawkins

Else Holmfred  
Andrew Johnson  
Amanda Kalogrides  
Vijayalakshmi Kalyanaraman  
Kathy Palma

Philip Reilly  
Yunus Ross  
Karthik Veeravalli  
Jinping Yang  
Zijing Zhao

# New and Noteworthy: Free eBooks from the National Academies Press

The National Academies Press (NAP) produces the publications of the National Academies of Sciences, Engineering, and Medicine. More than 200 publications and proceedings each year on a wide range of topics in science, engineering, and medicine provide authoritative, independent advice on important matters in science and health policy.



## 2023 Nobel Prize Summit: Truth, Trust, and Hope: Proceedings of a Summit (2023)

“On May 24-26, 2023, the Nobel Prize Summit entitled Truth, Trust, and Hope was convened as a hybrid event to examine misinformation and disinformation in the context of the broader information ecosystem, looking at the global impact of information technologies in nature and society. The summit brought together Nobel laureates, leading scientists, business leaders, writers, artists, and young innovators to share insights, challenges, and solutions relating to trust and information. With a positive narrative and the accelerating prevalence of artificial intelligence, big data, and other emerging information technologies, the summit explored the challenges and opportunities of democratization of knowledge and information and the erosion of trust. Held in Washington, DC and virtually, the 3-day summit attracted more than 700 in-person attendees and more than 10,000 online participants from more than 70 countries. Eleven Nobel laureates were actively engaged in the summit, and 32 partner organizations were involved, including breakout sessions and solution sessions. This publication summarizes the presentations, activities, and discussion of the summit.” (Publisher’s description)

## Accelerating Decarbonization in the United States: Technology, Policy, and Societal Dimensions (2023)

“Addressing climate change is essential and possible, and it offers a host of benefits - from better public health to new economic opportunities. The United States has a historic opportunity to lead the way in decarbonization by transforming its current energy system to one with net-zero emissions of carbon dioxide. Recent legislation has set the nation on the path to reach its goal of net zero by 2050 in order to avoid the worst consequences of climate change. However, even if implemented as designed, current policy will get the United States only part of the way to its net-zero goal.” (Publisher’s description)

## Advancing Chemistry and Quantum Information Science: An Assessment of Research Opportunities at the Interface of Chemistry and Quantum Information Science in the United States (2023)

“The field of quantum information science (QIS) has witnessed a dramatic rise in scientific research activities in the 21st century as excitement has grown about its potential to revolutionize communications and computing, strengthen encryption, and enhance quantum sensing, among other applications. While,

historically, QIS research has been dominated by the field of physics and computer engineering, this report explores how chemistry - in particular the use of molecular qubits - could advance QIS. In turn, researchers are also examining how QIS could be used to solve problems in chemistry, for example, to facilitate new drug and material designs, health and environmental monitoring tools, and more sustainable energy production.” (Publisher’s description)

## Community-Driven Relocation: Recommendations for the U.S. Gulf Coast Region and Beyond (2024)

“Between 1980 and mid-2023, 232 billion-dollar disasters occurred in the U.S. Gulf Coast region, with the number of disasters doubling annually since 2018. The variety and frequency of storms have exacerbated historic inequalities and led to cycles of displacement and chronic stress for communities across the region. While disaster displacement is not a new phenomenon, the rapid escalation of climate-related disasters in the Gulf increases the urgency to develop pre-disaster policies to mitigate displacement and decrease suffering. Yet, neither the region nor the nation has a consistent and inclusionary process to address risks, raise awareness, or explore options for relocating communities away from environmental

*continued on next page*

risks while seeking out and honoring their values and priorities.” (Publisher’s description)

**Facial Recognition Technology: Current Capabilities, Future Prospects, and Governance** (2024)

“Facial recognition technology is increasingly used for identity verification and identification, from aiding law enforcement investigations to identifying potential security threats at large venues. However, advances in this technology have outpaced laws and regulations, raising significant concerns related to equity, privacy, and civil liberties.” (Publisher’s description)

**Frontiers in Data Analytics and Monitoring Tools for Extreme Materials: Proceedings of a Workshop** (2023)

“One of the major challenges in materials science today is developing materials that can survive and function in extreme environments, such as the high-radiation environments found in a fission or fusion reactor or the ultra-high temperature experienced by a hypervelocity vessel or a spacecraft traveling through Earth’s atmosphere on its return to the planet’s surface. What is needed to discover such materials was the topic of a 2-day workshop held at the National Academies of Sciences, Engineering, and Medicine on October 5-6, 2022. That workshop, titled Materials in Extreme Environments: New Monitoring Tools and Data-Driven Approaches, brought together an international collection of experts on the testing and measurement of materials in extreme environments and on discovering and developing new materials. This Proceedings of a Workshop recaps the presentations and discussions that took place during the 2 days of the workshop.” (Publisher’s

description)

**Health Risks of Indoor Exposure to Fine Particulate Matter and Practical Mitigation Solutions** (2024)

“Schools, workplaces, businesses, and even homes are places where someone could be subjected to particulate matter (PM)—a mixture of solid particles and liquid droplets found in the air. PM is a ubiquitous pollutant comprising a complex and ever-changing combination of chemicals, dust, and biologic materials such as allergens. Of special concern is fine particulate matter (PM<sub>2.5</sub>), PM with a diameter of 2.5 microns (<0.0001 inch) or smaller. Fine PM is small enough to penetrate deep into the respiratory system, and the smallest fraction of it, ultrafine particles (UFPs), or particles with diameters less than 0.1 micron, can exert neurotoxic effects on the brain. Overwhelming evidence exists that exposure to PM<sub>2.5</sub> of outdoor origin is associated with a range of adverse health effects, including cardiovascular, pulmonary, neurological and psychiatric, and endocrine disorders as well as poor birth outcomes, with the burden of these effects falling more heavily on underserved and marginalized communities.” (Publisher’s description)

**Rise and Thrive with Science: Teaching PK-5 Science and Engineering** (2023)

“Research shows that that children learn science and engineering subjects best by engaging from an early age in the kinds of practices used by real scientists and engineers. By doing science and engineering, children not only develop and refine their understanding of the core ideas and crosscutting concepts of these disciplines but can also be empowered to use their growing understanding to make sense of questions and

problems relevant to them. This approach can make learning more meaningful, equitable, and lasting.” (Publisher’s description)

**Social Media and Adolescent Health** (2023)

“Social media has been fully integrated into the lives of most adolescents in the U.S., raising concerns among parents, physicians, public health officials, and others about its effect on mental and physical health. Over the past year, an ad hoc committee of the National Academies of Sciences, Engineering, and Medicine examined the research and produced this detailed report exploring that effect and laying out recommendations for policymakers, regulators, industry, and others in an effort to maximize the good and minimize the bad. Focus areas include platform design, transparency and accountability, digital media literacy among young people and adults, online harassment, and supporting researchers.” (Publisher’s description)

**Thriving in Space: Ensuring the Future of Biological and Physical Sciences Research: A Decadal Survey for 2023-2032** (2023)

“Research in biological and physical sciences in space provides the critical scientific and technological foundations that make space exploration possible. As humanity looks towards the Moon and Mars for future missions, this work is needed to help astronauts adapt and live in the harsh environments of space. Thriving in Space provides a roadmap for increasing national investment in biological and physical science research, from experiments to infrastructure to education. This report identifies key scientific questions, priorities, and ambitious research campaigns that will enable human space exploration and transform our understanding of how the universe works.” (Publisher’s description)

## Science Made Simple



[Visit website](#) | [View videos on YouTube](#)

“Dr. Darryl Boyd is a Polymer Chemist with a background in Inorganic Chemistry (Ph.D.) and Biochemistry (M.S.). He was inspired to build this site by several of his younger relatives who showed strong interest in science, and who were themselves inspired by Dr. Boyd’s scientific career. It is his hope that this site will serve as a fun, educational and inspiring tool for youths who are interested in science, while also serving as a thoughtful and thought-provoking resource for the broader scientific community (adults included).” Source: <https://www.drboydthechemist.com/about.html>



# Three New Green Chemistry Learning Modules Available for Free

<https://www.acs.org/greenchemistry/students-educators/learning-modules.html>

"The ACS Green Chemistry Institute has partnered with chemistry instructors from over 45 institutions to develop green and sustainable chemistry education resources for undergraduate students studying general and organic chemistry. These new resources address standard curricular topics through a systems thinking lens while integrating relevant green and sustainable chemistry concepts. In addition, the **U.N. Sustainable Development Goals** are referenced as appropriate to provide context and global relevance for students."

Each Module Contains:

- An overview document that serves as a guide to all module contents
- Presentations
- Printable activities for students

- Instructor materials
- Links to supplementary resources & articles

## Explore the Modules

### Systems Thinking in Chemistry

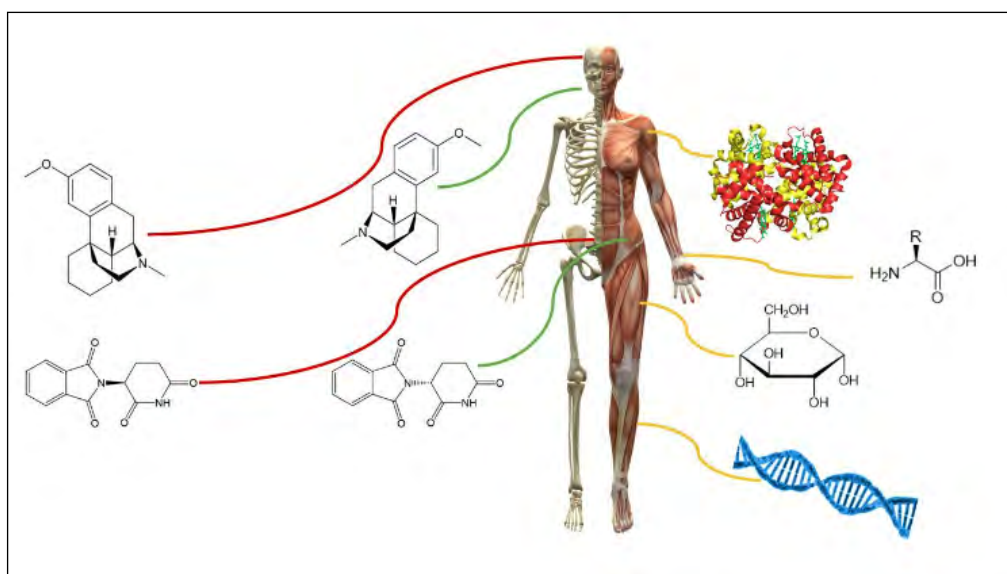
Learn about the fundamental concepts of systems thinking and how systems thinking is essential to the practice of green chemistry and key to solving the United Nations Sustainable Development Goals (UN SDGs).

### Stereochemistry: Introduction to Chirality

Explore chirality in stereochemistry through the lens of the World Health Organization's "Model List of Essential Medicines."

### Ideal Gases & the Nitrogen Cycle

Explore the anthropogenic N<sub>2</sub> cycle and ideal gas concepts to understand the environmental consequences, hazards, and risks of chemical reactions involving gas phase components.



Representation of chirality in **Stereochemistry** module

Learn more:

- **Empowering Educators, Inspiring Innovators: New Green Chemistry Learning Modules** (CGI Nexus Blog article by Ashley Baker, posted January 23, 2024).
- **ACS Green Chemistry Institute**

## Interesting and Cool Science in the News

**After U.K. Hot Water, Michelle Francl Enjoys a Cuppa with Chemistry** (Bryn Mawr News, January 30, 2024)

**Artificial 'power plants' harness energy from wind and rain** (ACS Press Release, January 17, 2024)

**Atomic dance gives rise to a magnet** (NSF Research News, January 11, 2024)

**Bacteria stitch exotic building blocks into novel proteins** (Science, January 11, 2024)

**Can autoimmune diseases be cured? Scientists see hope at last** (Nature News, January 23, 2024)

**Clusters of atmospheric rivers amp up California storm damages** (Stanford News, January 19, 2024)

**Combining cell types may lead to improved cardiac cell therapy following heart attack** (NSF Research News, January 18, 2024)

**'Diamond rain' on icy planets offers clues into magnetic field mysteries** (SLAC News, January 8, 2024)

**Drones capture new clues about how water shapes mountain ranges** (NSF Research News, January 23, 2024)

**Final supernova results from Dark Energy Survey offer unique insights into the expansion of the universe** (SLAC News, January 12, 2024)

**Forming ice: There's a fungal protein for that** (NSF Research News, January 16, 2024)

**The future of digital health** (podcast plus transcript) (Stanford Engineering, *continued on next page*)

*Interesting and Cool Science in the News, continued from previous page*

January 12, 2024)

[Gene therapies that let deaf children hear bring hope—and many questions](#) (Science News, January 26, 2024)

[Glowing COVID-19 diagnostic test prototype produces results in one minute](#) (ACS Press Release, January 17, 2024)

[Healthy eating and activity reverse aging marker in kids with obesity, Stanford Medicine-led study finds](#) (Stanford Medicine News, January 19, 2024)

[Investigating the molecular basis of a nice cup of tea](#) (Chemistry World, January 24, 2024)

[Ladies Who Lab: Lesser-Known Women in Science, 1920–1970](#) (Science History Institute Blog, January 11, 2024)

[Media literacy is more than spotting fake news. How one librarian gives teens the tools to decide what to trust](#) (CNN, January 22, 2024)

[Meteorite Analysis Shows Earth's Building Blocks Contained Water](#) (Caltech News, January 9, 2024)

[Microbes that gave rise to all plants and animals became multicellular 1.6 billion years ago, tiny fossils reveal](#) (Science News, January 24, 2024)

[Microplastics from natural fertilizers are blowing in the wind more often than once thought](#) (ACS Press Release, January 17, 2024)

[Molecular Self-Assembly Can “Think” Like a Neural Network](#) (Caltech News, January 18, 2024)

[A more eco-friendly facial sheet mask that moisturizes, even though it's packaged dry](#) (ACS Press Release, January 10, 2024)

[More kids are being hospitalized for eating disorders — researchers learned why](#) (Scope blog, Stanford Medicine, January 18, 2024)

[The movers and shakers of Stanford's earthquake center](#) (Stanford Report, January 19, 2024)

[New candidate for universal memory is fast, low-power, stable, and long-lasting](#) (Stanford News, January 22, 2024)

[New Covid-19 antiviral cuts symptoms by 1.5 days](#) (Chemistry World, January 25, 2024)

[New, portable antenna could help restore communication after disasters](#) (Stanford News, January 18, 2024)

[New research on microbes expands the known limits for life on Earth and beyond](#) (Stanford News, January 9, 2024)

[New study reveals genes that ‘don't play well together’ in swordtail fish hybrids, driving the development of distinct species](#) (Stanford Humanities & Sciences News, January 12, 2024)

[Next-generation batteries could go organic, cobalt-free for long-lasting power](#) (ACS Press Release, January 18, 2024)

[A non-allergenic wheat protein for growing better cultivated meat](#) (ACS Press Release, January 29, 2024)

[Obesity drugs have another superpower: taming inflammation](#) (Nature News, January 26, 2024)

[PFAS flow equally between Arctic Ocean and Atlantic Ocean, study finds](#) (ACS Press Release, January 10, 2024)

[‘Plug-and-play’ nanoparticles could make it easier to tackle various biological targets](#) (NSF Research News, January 16, 2024)

[Puffed-up MOFs for improved drug delivery](#) (ACS Press Release, January 29, 2024)

[Recent advances in medical applications of nanoparticles](#) (ACS Press Release, January 4, 2024)

[Researchers add a ‘twist’ to classical material design](#) (SLAC News, January 24, 2024)

[Researchers invent new way to stretch diamond for better quantum bits](#) (NSF Research News, January 23, 2024)

[Researchers release solar power data software to increase clean energy generation](#) (SLAC News, January 17, 2024)

[Rise in Chemical Accidents Should Augment Safety Board Response](#) (Bloomberg Law News, January 10, 2024)

[Scientists accidentally create world's tightest, smallest knot](#) (LiveScience, January 24, 2024)

[Scientists observe the formation and transformation of gas-phase ions as it occurs](#) (SLAC News, January 29, 2024)

[Seven technologies to watch in 2024](#) (Nature Technology Feature, January 22, 2024)

[Sick of being sick? As respiratory viruses roar back, experts offer guidance](#) (Scope blog, Stanford Medicine, January 23, 2024)

[Six Tips to Take the “Ack!” Out of Feedback](#) (Stanford Magazine, January 16, 2024)

[‘Smart speaker’ shows potential for better self-management of Type 2 diabetes](#) (Stanford Medicine News, January 19, 2024)

[Stanford study reveals mechanisms behind how growing cells maintain their mojo by scaling up biosynthesis](#) (Stanford News, January 22, 2024)

[Teaching Nature to Break Man-made Chemical Bonds](#) (Caltech News, January 25, 2024)

[This fast-living marsupial chooses sex over sleep — and dies young](#) (Nature News, January 25, 2024)

[Using magnetized neurons to treat Parkinson's disease symptoms](#) (ACS Press Release, January 18, 2024)

[Using NLP \[natural language processing\] to Detect Mental Health Crises](#) (Stanford Human Centered Artificial Intelligence, January 8, 2024)

[Visionary chemistry is making labs accessible to blind students and researchers](#) (Chemistry World, January 12, 2024)

[Watch a robot made of muscle and steel turn on a dime](#) (Science News, January 26, 2024)

[Water Batteries: Pumped storage hydropower plants can bank energy for times when wind and solar power fall short](#) (Science News, January 25, 2024)

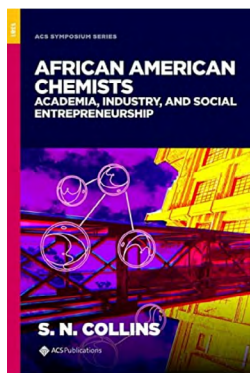
[What does your dog's tail wag really mean?](#) (Science News, January 16, 2024)

[‘Wildly weird’ RNA bits discovered infesting the microbes in our guts](#) (Nature News, January 29, 2024)

[Zoom In... or Out? Jonathan Levav on Why Face-to-Face Meetings Matter](#) (Insights by Stanford Business, January 24, 2024)



## Celebrating Black History Month 2024 - A Brief List of Resources (continued)



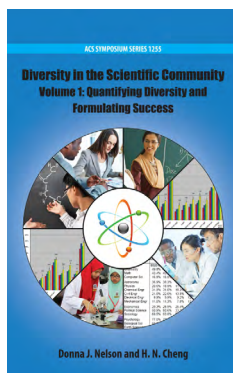
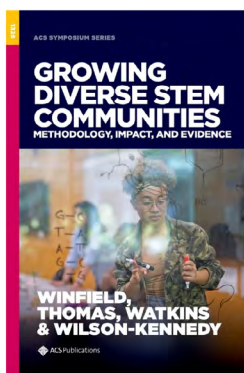
**African American Chemists: Academia, Industry, and Social Entrepreneurship.** Collins, S.N., Ed. ACS Publications, 2021. ACS Symposium Series 1831. DOI: <https://doi.org/10.1021/bk-2021-1381>

“This work highlights and celebrates the contributions African Americans in the chemical sciences have made, despite racial and gender barriers. Their contributions are often overlooked in media, textbooks, and, consequently, the classroom. By highlighting biographical narratives of African American chemists, this work serves as a tool to address diversity, equity, and inclusion in the classroom and beyond. Lessons plans accompany each chapter, enabling immediate incorporation of these stories into chemistry learning objectives. This work and these tools will help the next generation of chemists see diverse examples of success.” (Publisher’s description)

**Growing Diverse STEM Communities: Methodology, Impact, and Evidence.** Winfield, L. L.; Thomas, G.; Watkins, L. M.; Wilson-Kennedy, Z. S.; Eds. ACS Publications, 2019. ACS Symposium Series 1328. DOI: <https://doi.org/10.1021/bk-2019-1328>

“An Excellent Resource for STEM Faculty, Diversity Officers, and Academic Affairs Personnel. This work uses empirical studies to examine how institutions can better attract and support students from diverse backgrounds in STEM disciplines. Covering practical topics including recruitment and mentoring and inspiring examples of innovative course programming, this book showcases specific institutions with a track record for investing in the inclusion and success of underrepresented groups. This is a valuable resource for institutions seeking to implement effective strategies to acquire, train, mentor, and retain talented individuals from historically underrepresented social groups.” (Publisher’s description)

**Diversity in the Scientific Community.** 2 vols. Nelson, D. J.; Cheng, H. N.; Eds. ACS Publications, 2017. ACS Symposium Series 1255-1256. **Volume 1: Quantifying Diversity and Formulating Success.** DOI: <https://doi.org/10.1021/bk-2017-1255>.



**Volume 2: Perspectives and Exemplary Programs.** DOI: <https://doi.org/10.1021/bk-2017-1256>

“The two volumes of this book are partially based on three symposia held at the ACS Spring National Meeting in San Diego, March 2016. (1) Diversity-Quantification-Success? (2) How to Foster Diversity in the Chemical Sciences: Lessons Learned & Taught from the Stories of Recipients of the Stanley C. Israel Award (3) My Experience with & Advice for Improving Diversity in Chemistry. These symposia were part of the 2016 ACS activities relating to Diversity, which represented one of 2016 ACS President Donna Nelson’s presidential themes. The symposium speakers included scientists reporting original research on various aspects of diversity in science, ACS leaders, accomplished professionals, and past winners of the Stanley Israel diversity awards. Data were presented which pertained to science, technology, engineering, and mathematics (STEM), with a particular emphasis on chemistry. The symposia were very well attended and the comments from the audience very positive.” (Publisher’s description)



**We Have Been Here All Along. C&EN's 2021 Trailblazers issue,** curated by guest editor Paula Hammond, celebrates Black chemists and chemical engineers.

“Trailblazers 2021 guest editor Paula Hammond is the David H. Koch Chair Professor of Engineering and head of the Department of Chemical Engineering at the Massachusetts Institute of Technology. A pioneer in nanomaterials and drug delivery, she is also the cofounder of LayerBio, an associate editor at ACS Nano, and a member of all three National Academies (Sciences, Engineering, and Medicine). Hammond is also a member of C&EN’s advisory board.

It is with great excitement that I introduce this special issue on Black Trailblazers in the chemical sciences and engineering! This issue celebrates the work and legacy of Black chemists and chemical engineers at all career stages, throughout the US, in their own voices.”



**Black Scientists Then and Now: Celebrating Achievement in Chemistry.** inChemistry (ACS Student Magazine), Last updated 2/3/2022.

“In honor of Black History Month, this collection features historical giants, today’s trailblazers, and voices for change.”



Forney, J. **NOBCChE celebrates 50 years.** C&EN, 101 (33), October 9, 2023.

“At its annual meeting, the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers highlights its past while looking ahead to future progress.” Learn more about **NOBCChE**

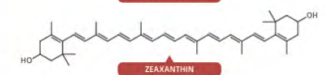
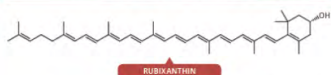


**Black Inventors Hall of Fame**

“Every year we induct extraordinary Black inventors into the Black Inventor’s Hall of Fame to permanently recognize their innovative contributions to society. This website serves as a platform telling the story of talented African American innovators. We include and highlight notable advancements and projects from academia, manufacturing, and agriculture to advancements in medicine and the sciences. Our goal is to identify entrepreneurial leaders who have invented and produced groundbreaking technological advancements that improve the quality of life around the world.” See also: **National Inventors Hall of Fame**

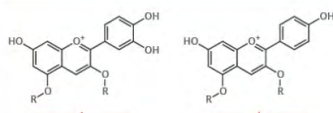
# THE COLOUR AND AROMA OF ROSES

## THE COLOURS OF ROSES



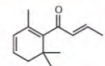
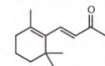
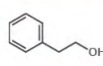
Other carotenoids include lutein, lycopen, beta-carotene, luteoxanthin, and mesoxanthin

Roses come in a variety of colours, and different chemical pigments are responsible for the different shades. A large variety of carotenoids (above) give yellow and orange hues, while a smaller number of anthocyanins (below) give the more typical reds. Combinations of compounds from the two classes of pigments give the variety of different shades of these colours.

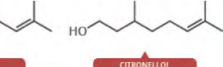
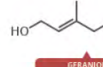
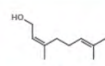
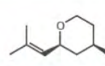
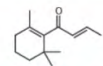


R groups = glucose (in both molecules)

## THE AROMA OF ROSES



The aroma of roses is contributed to by a number of different chemical compounds; some key contributors are shown here. Their contribution to the aroma varies and isn't tied to their concentrations; in fact a number of them have very low concentrations! Important contributors are rose ketones (including damascenones, damascones, and ionones) and (-)-cis-rose oxide.



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