

SILICON VALLEY CHEMIST

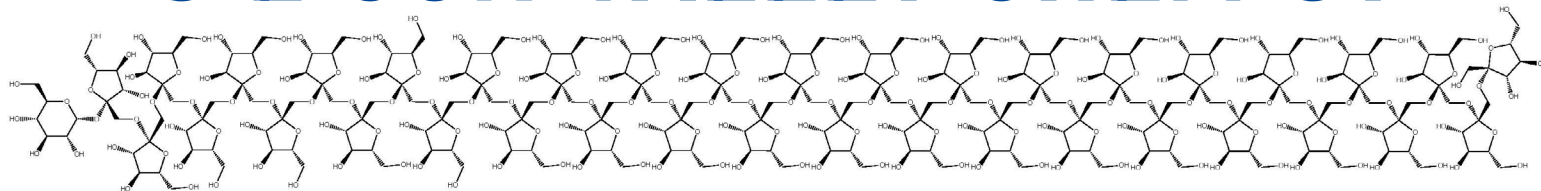


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November 5, 2021

Bay Area Chemistry Symposium



BACS



BAY AREA CHEMISTRY SYMPOSIUM
connecting industry + academia

an ACS
sponsored
event



The 2nd annual *Bay Area Chemistry Symposium*, co-sponsored by the Silicon Valley and California local ACS sections, is scheduled for **November 5, 2021**.

This symposium, unique in the SF Bay area, provides an ideal forum to meet and exchange ideas covering themes in chemical biology, synthesis, and computational chemistry among

students, postdocs, and industrial chemists.

The symposium features:

- Keynote seminars
- Industrial chemistry seminars
- Graduate student and postdoc short talks
- Poster presentations by graduate students, postdocs, and industrial chemists from renowned institutions and companies around the Bay Area
- Networking opportunities

Please join this network of local chemists and learn about cutting-edge chemistry happening across the Bay area's outstanding academic institutions and biotechnology and pharmaceutical companies.

This 2021 Bay Area Chemistry Symposium is being hosted virtually

continued on next page



Chair's Message

Jigisha Shah

Happy November! This is my favorite time of year...perhaps my cheerfulness has something to do with a much-needed procession of rain showers, cooler temperatures, a promise of more time with family and friends, and memorable holidays! So much has happened since the last chair message. Pioneers of asymmetric organocatalysis, Benjamin List and David W. C. MacMillan, have won the **2021**



Nobel Prize in Chemistry. Californian physicians, David Julius and Ardem Patapoutian, have won the **2021 Nobel Prize in Physiology or Medicine** for their work on understanding how, at the molecular level, stimuli can be converted into nerve signals. Hopefully, we will have one of these brilliant scientists speak at a SVACS in-person dinner meeting.

The SVACS local elections are still ongoing.

SVACS members should have received an email with ballot information on October 22. The elections will remain open until November 14, so please cast your ballot!

Upcoming events include: Bay Area Chemistry Symposium on November 5th, SVACS' slightly late National Chemistry Week event on 'Fast or Slow, Chemistry Makes it Go' on November 13th, and Charles Rand's talk from Checkerspot on 7 December. Checkerspot is a materials company applying genomics at the nexus of biology, chemistry, materials fabrication

continued on next page

Bay Area Chemistry Symposium, continued from front page

by Gilead Sciences of Foster City, CA.

For more information and to register:
<https://www.bayareachemistrysymposium.com/>
For questions, e-mail us:
bayareachemistrysymposium@gmail.com



Chair's Message, continued from front page

and big data to arrive at novel materials to address some of humanity's current challenges of climate change, supply chain sustainability and alternatives to toxic chemicals. This is going to be an exciting talk! Registration links for all these events are included in this newsletter's Upcoming Events column.

In the last few days, I have been reminiscing about my time with our section. I stumbled into SVACS in late 2016, after moving to the SF Bay area. I had just defended my thesis and remember feeling a mixture of desperation and rage at the impossible task of building a career whilst raising a very active 2 year old. I needed to feel a sense of belonging; instead, I found myself in a place that seemed to tell me in a myriad of ways, from the very beginnings of my career, that I didn't belong. SVACS became my HOME and the members of the section became my chemistry network, connections, and my FAMILY. I have met so many passionate and driven individuals that I now call lifelong friends. Our team is full of exceptional leaders with diverse voices and I am privileged to still learn from them every time we see each other. I get to network and learn about applications of chemistry from gifted and persistent scientists who are just as passionate about science as I am. SVACS provides many opportunities to give back to my community and inspire the next generation of scientists. I am looking forward to seeing what the SVACS can achieve over the next 10 years and beyond.

As many of you understand, all of the work we do is actualized by the hard work of our volunteers. We are always looking for new volunteers to help make our programming better than ever. I hope I have convinced you of great personal & professional networking opportunities, chances to meet new friends and socialize through SVACS. Besides, volunteer work is a superb conversation starter in interviews. Please get in touch with me or any of the section leadership team if you would like to find out more about opportunities with us.



Discover the Challenges Driving the Future of Catalysis



"This year's **National Chemistry Week** celebration focuses on themes related to catalysis, the process of accelerating chemical reactions. Catalysis is all about change, so it's no surprise that the editors of **ACS Catalysis** often think about the future of chemistry and their role in accelerating discoveries in the field.

In honor of National Chemistry Week, the

editors of the journal were asked, 'If chemists are catalysts for positive change in communities across the world, which scientific challenges in your field will be interesting for chemists to tackle in the next 10-20 years?' **Read the rest of this ACS Axial article** written by Rhea Williams to discover their answers" (published October 18, 2021).



Death and Decomposition (video)

Are human burial practices messing up Earth's ecosystems?



"Life depends on death — living things die, decompose and eventually become nutrients for other life. But when humans die, we're often embalmed and buried or cremated. So, are we breaking the circle of life?" Watch this **video** (7:42 minutes).

Reactions is a video series produced by the American Chemical Society and PBS Digital Studios. Subscribe to Reactions at <http://bit.ly/ACSReactions> and follow us on Twitter [@ACSReactions](https://twitter.com/ACSReactions).

Source: **ACS Press Release, published October 18, 2021.**

CHEMISTRY

Quiz

You might get a whiff of us on Thanksgiving Day. What molecules are we?



Answer

UPCOMING EVENTS

- Nov 5** **2nd Annual Bay Area Chemistry Symposium (BACS)**
Sponsored by the ACS California and ACS Silicon Valley Sections
8:30am-4:30pm, Online only, [Learn more and register](#)
- Nov 7** **Chemical Health and Safety Workshop: RAMP in the Research Lab**
Sponsored by the ACS Division of Chemical Health & Safety (CHAS)
10am-1pm PT, Online via Zoom, \$25, [Registration required](#)
- Nov 10** **Sustainability Through Innovation: A Conversation with Industry Experts**
Lee Ellen Drechsler, Procter & Gamble; and Rick Hemond, Dupont
Sponsored by ACS Webinars
11am-Noon PT, Online via Zoom, Free, [Registration required](#)
- Nov 11** **Bringing Systems Thinking into the Classroom**
Katherine Aubrecht, Stony Brook University; and John Randazzo, North Park University
Sponsored by ACS Webinars
11am-Noon PT, Online via Zoom, Free, [Registration required](#)
- Nov 13** **A Career Journey in the Field of Environmental Toxicology**
Dr. Alicia A. Taylor, California Department of Toxic Substances Control
Sponsored by the ACS California Section
10:30am-Noon, Online via Zoom, Free, [Registration required](#)
- Nov 17** **New Polymers in Space: Long-Term Exploration Beyond Our Planet**
Stephanie Vivod, NASA John H. Glenn Research Center, and Christopher Wohl, NASA Langley Research Center
Sponsored by ACS Webinars
11am-12:30pm PT, Online via Zoom, Free, [Registration required](#)
- Dec 7** **Checkerspot: From Molecule to Material to Mountain & Beyond**
Dr. Charles Rand, Manager of Materials Science, [Checkerspot](#)
Sponsored by the ACS Silicon Valley Section
7-8pm, Online via Zoom, Free, [Registration required](#)
- Dec 8** **Plastic Upcycling in the BOTTLE™ Consortium**
Dr. Kat Knauer, Research Program Manager, National Renewable Energy Laboratory and The BOTTLE Consortium
Sponsored by the Golden Gate Polymer Forum
6:30-7:30pm, Online via Zoom, \$5 donation/free, [Registration required](#) by Dec. 6th at 1pm
- Dec 16-21** **Pacifichem 2021: A Creative Vision for the Future**
Sponsored by the International Chemical Congress of Pacific Basin Societies
Hybrid event: Honolulu, Hawaii and virtual
Advanced registration rate available through October 20th.
[Learn more and register](#)

Sunsetting the ACS Periodic Table Blanket

Join the ACS before December 31, 2021 and get a periodic table blanket!

The periodic table blanket is a perk of an ACS membership promotion that sunsets in December 2021. January 2022 marks the launch of a [new ACS membership structure](#) featuring several different participation and payment levels.

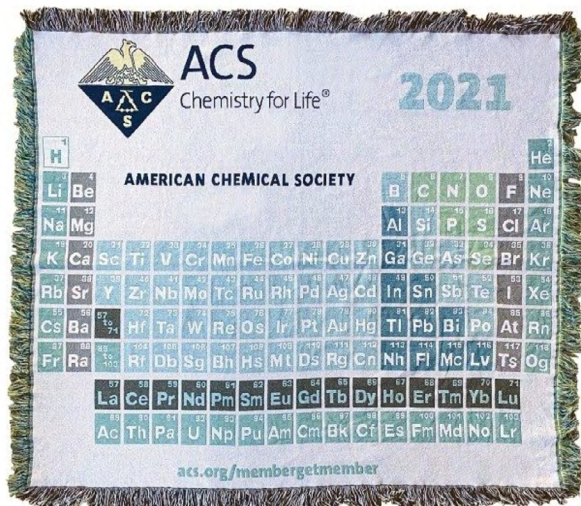
The periodic table blanket offer is available only to new members (or long lapsed members). Download [this form](#) and follow its directions.

Please keep in mind that getting a periodic

table blanket by joining before December 30, 2021 requires paying full dues. On January 1, 2022, dues in the new membership structure will be lower and refunds will not be given.



2021 MGM Periodic Table of the Elements Blanket



All 118 elements laid out over a 50" x 60", 100% cotton blanket. Shades of soft aqua, grey, green, and light blues on a background of cream.

Council Meeting at the Fall 2021 ACS National Meeting

This article contains selected “talking points” from the ACS Council meeting. A [more complete version](#) of the talking points is posted in the news section of the Silicon Valley’s website.



Actions of the Council

Council Special Discussion

President Cheng introduced and led a special discussion on ideas to increase involvement and membership from business and industry. For the last 5 years there has been a steady decrease in industry members. This can be attributed to a variety of factors, and there have been ongoing efforts to decrease the cost-related attrition while increasing member value.

To address value, ACS has a variety of offerings available to members to advance, discover, connect, and share. To address cost, actions were taken by the Council this past spring in the schedule of membership for 2022 that will provide industry members with flexibility as to membership options. Councilor input was then requested on the following two questions:

1. How can we improve the value that ACS provides to its industrial and business members?
2. How can we encourage academic inventors and entrepreneurs and support start-ups?

Highlights from Committee Reports

Budget and Finance

The Society’s 2021 financial performance through June 30 yielded a Net Surplus from Operations of \$55.0 million, which is \$33.6 million favorable to budget and almost \$6 million greater than the same period in 2020. These mid-year results are based on total revenues of \$324.4 million that are 4.3% favorable to budget, and total expenses of \$269.4 million, or 7% below budget, with unrestricted net assets estimated at \$645 million.

Committee on Committees (ConC)

ConC will again conduct a Committee Census (formerly called the Committee Demographic Survey) of all Society Committee personnel, including the members of committees elected by Council, in February 2022. This census gives ConC a snapshot of where the committee demographic picture stands as they look toward future recruitment and retention. To assist ACS in advancing its core values of Diversity, Equity, Inclusion and Respect, ConC would like to encourage all committee members and ACS leaders to take the two-hour course entitled “Leading Inclusively: Beyond Lip Service” developed by La’Wana Harris, a Certified Diversity Executive, International Coaching Federation (ICF) Credentialed Coach, and global leadership development professional. Go to <https://learning.acs.org/course/view.php?id=996> to register.

Meetings & Expositions

The Fall 2021 Meeting was held live from August 22-26, and on-demand from August 30 – September 30. As of August 25, there were 8,205 registrations (1,895 hybrid and 6,310 virtual). Of the approximately 1,200 oral sessions held, 71 were only in-person, 244 were hybrid, and 855 were held virtually.



Actions of the Board of Directors

Actions of the Board of Directors - Executive Session

The ACS Board of Directors met virtually in Executive Session on August 20 and 28, 2021 and considered a number of key strategic issues and responded with several actions. The Board opened its session with a reflection on Diversity, Equity, Inclusion and Respect (DEIR).

The Board’s Committees

The Board received and discussed reports from its committees on Budget and Finance, Executive Compensation, Professional and Member Relations, Public Affairs and Public Relations, the Advisory Board for the Green Chemistry Institute, the Governing Board for the American Association of Chemistry Teachers, and the Society committees on Education and Publications. The committees requested and obtained Board action on one or more items, as follows.

- On recommendation of the Society Committee on Publications, the Board voted to approve the reappointments of Editors-in-Chief for several ACS journals. Those appointments will be announced in C&EN once the individuals have been notified and appropriate arrangements for their continued service have been made.
- On recommendation of the Committee on Professional and Member Relations, the Board approved a Society nominee for the 2022 National Science Board Public Service Award.
- On the recommendation of the Committee on Budget and Finance, the Board approved the ACS 2022 Spring and Fall Meetings in-person/hybrid member registration fee at \$399 and the virtual member registration fee at \$199, both within a range of +/- 15%.
- On the recommendation of the Governing Board for the American Association of Chemistry Teachers (AACT), the Board approved amendments to the Board Regulations concerning the membership, appointment, and terms for the Governing Board for AACT.
- The Board received an extensive briefing and approved several recommendations from its Committee on Executive Compensation. The compensation of the Society’s executive staff continues to be reviewed regularly by the Board.

The Chief Executive Officer’s Report

The Board received an extensive report from the Chief Executive Officer on current issues relating to the Core Values of DEIR; COVID and the return to ACS Offices; Membership; Financials; and on upcoming events and activities. The Vice President for Philanthropy provided the presentation “Impact of COVID on Fundraising” during the report. The presidents of CAS and ACS Publications engaged in discussions with the Board on the activities, opportunities, and challenges of their respective divisions.

Other Society Business

The Board heard reports from the Presidential Succession on their current and planned activities for 2021 and 2022; received relevant updates on current legal issues from the ACS General Counsel; and had an initial debrief on the ACS Fall 2021 meeting, including a review of the format, technology, key events, and the presentations of science information at the meeting.

The Executive Vice President for Scientific Advancement provided an update on ACS efforts to address the United Nations Sustainable Development Goals.

Members of the Board Working Group on Board Structure and Representation sought input from their Board colleagues on possible models for international representation on the Board.

Confirmation of Council Actions

As required in the Standing Rules, the Board voted and confirmed the Council’s actions taken on August 25, 2021, to approve the Petition to Amend the Duties of the Committee on Minority Affairs; approved the continuation of the Committee on Environmental Improvement; and approved the ACS Professional Employment Guidelines (10th Edition).

SVACS Wins ChemLuminary Award!



Silicon Valley Local Section Won a ChemLuminary Award for the Most Creative & Innovative Use of the Chemists Celebrate Earth Week Theme

"The Silicon Valley Local Section collaborated with the Redwood City Library to host virtual hands-on experiments based on the Chemists Celebrate Earth Week (CCEW) 2020 theme of "Protecting Our Planet through Chemistry." The Section distributed activity materials around "earth-friendly plastics" and "(re)cycling water," created a video demonstrating the experiments, and hosted a Zoom session with 4th-7th graders to explain the science while students conducted experiments in the safety of their homes."

About this award:

Award Sponsor: Committee on Community Activities (CCA)

Description: The CCA-sponsored award recognizes local sections that have demonstrated exemplary performance in the development and implementation of outstanding activities in support of National Chemistry Week (NCW) and Chemists Celebrate Earth Week (CCEW).

[View other ChemLuminary Award winners](#)

View SVACS Pop Up Science videos on the [Outreach](#) page of the Silicon Valley ACS website!

Pop-Up Chemistry

Nominated for:

- Most Creative & Innovative Use of the CCEW Theme
- Most Innovative New Activity or Program
- Outstanding Virtual Event for CCEW or NCW

Silicon Valley ACS
in collaboration with
Redwood City Public Library

REDWOOD CITY PUBLIC LIBRARY AND
SILICON VALLEY ACS
PRESENT

POP UP CHEMISTRY

AGES 9 THROUGH 12

Every Thursday at 3:30 pm in October

SHOW EVERYONE WHAT YOU'VE GOT! GET THOSE
GLASS RODS STIRRING AND THOSE FLASKS
BUBBLING FOR THIS YEAR'S CHEMISTRY
EXTRAVAGANZA!

ACS
Chemistry for Life®

REDWOOD CITY PUBLIC
library

We love to do
SCIENCE!

Thank you Redwood
City Library and ACS!

Silicon Valley ACS &
Redwood City Library

POP UP CHEMISTRY

Hosted 5 sessions via Zoom, Distributed
240 kits with all materials needed to do the
experiments free!

2021 Nobel Prizes in Chemistry, Physics, and Physiology/Medicine

2021 NOBEL PRIZE IN CHEMISTRY

Awarded jointly to **Benjamin List** and **David W.C. MacMillan** for their development of a new type of catalysis, asymmetric organocatalysis, a precise new tool for molecular construction.

Molecules can exist in mirror image forms with different properties. To make medicines and other compounds we often want just one of these forms. Catalysts, substances that speed up reactions, can help. Nature's catalysts, enzymes, build specific mirror image molecules all the time, but have complicated structures. Metal catalysts can do the job but are sensitive to air and moisture, and sometimes harmful to the environment.

Mirror image molecules (enantiomers)

Benjamin List wondered if the single amino acids which build up enzymes could catalyse a reaction on their own. Knowing of previous research on the amino acid proline acting as a catalyst, he used it to catalyse an aldol reaction and found it was efficient – and also formed one mirror image of the product much more often than the other.

Aldol reaction

18% of product is this mirror image

Proline catalyst

Diels-Alder reaction

97% of product is this mirror image

Imidazolidinone catalyst

David MacMillan tried to develop alternatives to metal catalysts using organic molecules. He identified an imidazolidinone molecule which could catalyse a carbon-carbon bond forming reaction and produced mainly one mirror image of the product. He coined the term 'organocatalysis' for the concept of catalysing reactions using small organic molecules.

WHY DOES THIS RESEARCH MATTER?

The winners, along with other researchers, have since designed many more organic molecule catalysts. They are cheap, environmentally friendly, and can make specific mirror images of molecules. They can be used one after another for different reaction steps, improving the efficiency of molecule-making.

Chaper to use
Environmentally friendly
More efficient

Nobel Prize in Chemistry press release: <https://www.nobelprize.org/prizes/chemistry/2021/press-release/>

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The 2021 Nobel Prize in Chemistry: Using organic molecules as effective and environmentally friendly catalysts

[Enlarge image](#)

2021 NOBEL PRIZE IN PHYSICS

Awarded to **Syukuro Manabe** and **Klaus Hasselmann** for physical modelling of the Earth's climate, and to **Giorgio Parisi** for the discovery of the interplay of disorder and fluctuations in physical systems.

Predicting the behaviour of complex systems like Earth's climate is difficult. This year's prize-winning research allows scientists to describe and predict the long-term behaviour of these complicated and seemingly random systems.

Syukuro Manabe demonstrated how increasing the amount of carbon dioxide in Earth's atmosphere increases temperatures at the Earth's surface. His mathematical models of the Earth's climate informed the climate models used today.

Klaus Hasselmann incorporated the 'noise' of changeable weather data into climate modelling. His work also identified ways in which the impact of human and natural processes on Earth's climate could be identified and compared.

Giorgio Parisi showed that, in complex systems, things which appear random are still subject to hidden rules at a simple level. His work can explain phenomena from magnetic behaviour in complex metal alloys to patterns in starling murmurations.

Temperature change (°C)

150 ppm CO₂ → 300 ppm CO₂ → 450 ppm CO₂

+2.28°C → +2.36°C

Increase in temperature at the Earth's surface

Spin glass is one of the complex systems Parisi studied. It's an alloy with iron atoms in place of some copper atoms. The magnetic spins of the iron atoms align randomly, without a regular pattern.

WHY DOES THIS RESEARCH MATTER?

The work of this year's winners has helped us understand how humanity influences Earth's climate, and predict how it may change. It also helps us describe and predict the behaviour of other complex systems within and beyond physics.

Nobel Prize in Physics Press release: <https://www.nobelprize.org/prizes/physics/2021/press-release/>

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The 2021 Nobel Prize in Physiology/Medicine: The discovery of the receptors that let us sense temperature and touch

[Enlarge image](#)

2021 NOBEL PRIZE IN PHYSIOLOGY/MEDICINE

The Nobel Prize in Physiology or Medicine 2021 was awarded jointly to **David Julius** and **Ardem Patapoutian** for their discoveries of several receptors for temperature and touch.

How do our bodies sense changes in temperature, and what lets us know when we're touching something? The winners of this year's prize identified how nerve impulses that pass on this information are triggered by changes in temperature or pressure, allowing our bodies to sense our environment.

TRPV1 **PIEZO1**

TRPM8 **PIEZO2**

Gene for Piezo1 active

Gene for Piezo1 inactivated

David Julius identified a gene that made cells sensitive to capsaicin, the spicy compound in chili peppers. This gene codes for the TRPV1 receptor, an ion channel activated by temperatures above 43°C. Other temperature-sensing ion channels were discovered, including TRPM8 which is activated by cold temperatures and was identified using menthol, the cooling compound found in mint.

Ardem Patapoutian used cells which gave off a measurable electric signal when prodded to identify a gene which, when inactivated, stopped this signal. The gene codes for the Piezo1 receptor, a mechanosensitive ion channel. A similar channel, Piezo2, is essential for the sense of touch. Both receptors also have roles in regulation of blood pressure, respiration, and bladder control.

WHY DOES THIS RESEARCH MATTER?

This research explains some of the ways in which we sense our environment. Understanding how our bodies sense changes in temperature and pressure has also helped with the development of treatment for pain, some cancers, and asthma.

Nobel Prize in Physiology or Medicine Press release: <https://www.nobelprize.org/prizes/medicine/2021/press-release/>

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The 2021 Nobel Prize in Physics: Climate modelling and understanding complex systems

[Enlarge image](#)

Chemists With Disabilities Video Series



The **ACS Committee on Chemists with Disabilities** (CWD) helps many chemists that have disabilities advance their careers in the chemistry enterprise through its many products, services, and programs. This **CWD video series** shows how "Chemists with disabilities are outstanding chemists with unique abilities." As of November 2, 2021, ten videos are available:

- The ACS Committee on Chemists with Disabilities
- Service Dogs in the Chemistry Laboratory: Some Considerations
- Increasing Participation of Students with Disabilities in STEM
- Insights from Experience in Mentoring Graduate Students
- Expanding Biomedical Training to the Deaf/Hard-of-hearing Community
- The Dyslexic Advantage
- Hiring People with Disabilities: Competitive Advantage for the Savvy Manager
- Experiencing Graduate School in Chemistry as a Blind Student
- Pairing Chemistry with Blindness
- Designing for Accessibility in a Blended-Learning Course

Silicon Valley ACS December Event

Checkerspot: From Molecule to Material to Mountain & Beyond

Dr. Charles Rand, Ph.D., Manager of Materials Science, Checkerspot

Sponsored by the Silicon Valley ACS

December 7, 7-8pm, Online via Zoom, Free, [Registration required](#)

Abstract:

The world needs new, high-performance materials that are less toxic and safe for the environment. The field of materials science is running short of molecular building blocks, having exhausted the permutations available from petrochemical and commodity vegetable oil monomers. A wealth of alternatives, however, are available through pathways that nature has developed over billions of years.

Checkerspot is a materials company that creates new high-performance materials by leveraging biotechnology. They do this



by optimizing microbes to biomanufacture oils (and derivative fatty acids) that until now have not been accessible commercially. First materials applications that demonstrate their approach are next generation polyurethanes, designed for improved performance of skis and snowboards as animated through

the WNDR Alpine outdoor brand. Checkerspot's vision is one of empowerment: to deliver unique, inspiring technologies and materials into the creative hands of fabricators and designers, the makers that conceive the next generation of high-performance products. This talk will discuss

the structural organization of Checkerspot, the potential of Checkerspot's Molecular Foundry, and some of the challenges and approaches of animating Checkerspot's new materials into skis and snowboards through the WNDR Alpine outdoor brand.

Bio:

Dr. Charles Rand is the Manager of Material Science and Application Development for Checkerspot. The material science group at Checkerspot is focused on developing materials made from Checkerspot's algal oils including the algal-derived polyols used to make polyurethanes. This includes cast and rigid foam polyurethanes used in WNDR Alpine skis. Charles received his PhD in Polymer Science and Engineering from the University of Massachusetts, Amherst. After completing his PhD, Charles joined Rohm & Haas which was acquired by Dow Chemical. Charles has 13 granted patents and has developed materials for photovoltaic applications, roof coatings, concrete, and insulation binders for the construction industry as well as binders for the acquisition layer in diapers.

Plastic Upcycling in the BOTTLE™ Consortium Webinar

Wednesday, December 8, 6:30PM Pacific

Abstract

Bio-Optimized Technologies to keep Thermoplastics out of Landfills and the Environment (BOTTLE™) is a U.S. Department of Energy multi-organization consortium focused on developing new chemical upcycling strategies for today's plastics and redesigning tomorrow's plastics to be recyclable-by-design. This talk introduces the BOTTLE Consortium and presents several research highlights from efforts to date including:

- Catalytic hydrogenation of polyolefins
- Enzymatic hydrolysis of PET
- Upcycling PET monomers into new high-performance thermosets
- Circular, biodegradable polyhydroxyalkanoates

Techno-economic analysis, life cycle assessment, and supply chain modeling will also be highlighted as critical tools to facilitate the development of economical and sustainable approaches for recycling and redesigning plastics. Insight into consumer actions to grow the circular economy will be presented and discussed.

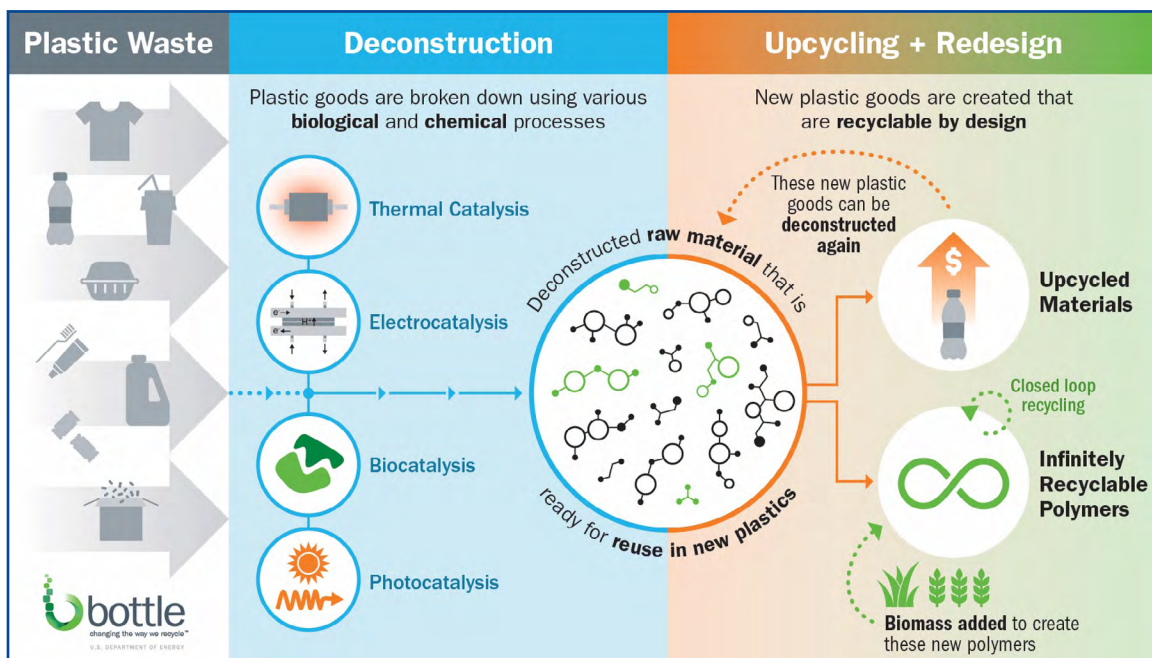
Speaker Bio

Dr. Kat Knauer is a polymer

scientist who has dedicated her scientific career to solving the plastic waste problem. She has a PhD in Polymer Science and Engineering from the University of Southern Mississippi. She completed the BASF Leadership Development Program (LDP) in 2018 and assumed a Senior Scientist role in BASF's Plastics Division. Her research efforts in advanced recycling technologies led her to leading the Materials Innovation R&D team at Novolop (formerly BioCollection), a San Francisco Bay

Area chemical recycling startup. At Novolop she helped develop a technology to convert post-consumer polyethylene waste into valuable chemical building blocks for upcycling into new high-performing polymer applications. Recently, Dr. Knauer joined the National Renewable Energy Laboratory (NREL) and the BOTTLE Consortium where she is developing sustainable technologies to chemically upcycle today's existing plastic waste streams and develop new plastics for the future that are recyclable by design.

Register by Monday, December 6 on the [GGPF website](#)



Announcing the Launch of ACS Publications' Research Data Policy

This is a *reprint of the article* written by Angie Hunter that was published in ACS Axial blog on September 29, 2021.

"ACS Publications is excited to announce a portfolio-wide Research Data Policy, effective September 30th, 2021. The policy, which was developed in partnership with ACS editors and outside experts, provides best practice recommendations for data citation, data availability statements, and the use of appropriate data repositories.

The launch of this policy represents a critical step toward ensuring that the results reported in our journals are verifiable, reproducible, and easily accessible to researchers. For authors publishing in ACS journals, making their data available and citable offers a greater opportunity for the research to be recognized and assists in meeting various funders' requirements. For readers and the research community, having data available for review allows researchers to reproduce and compare reported results. It can also create efficiencies in the research process, providing greater potential for scientific and economic development.

The Research Data Policy will be shared on the [ACS Publishing Center](#) on September 30, 2021. Though the policy outlines four possible levels of

compliance (see figure below), all ACS journals will start at level one, in which authors are encouraged – but not required – to share their data.

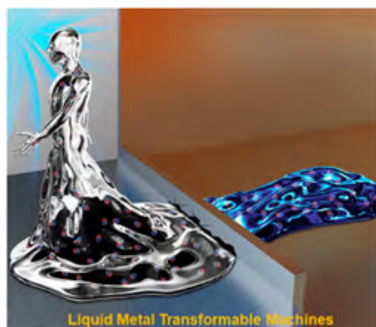
POLICY LEVEL	Level 1	Level 2	Level 3	Level 4
Encourages Data Sharing	X	X	X	X
Encourages Data Availability Statement	X	X	X	X
Requires Data Availability Statement		X	X	X
Requires Data Sharing			X	X
Requires Peer Review of Data				X

"I'm thrilled to promote open science through the broad adoption of the ACS Research Data Policy. This critical activity plays an important role in maintaining ACS Publications' reputation as the most read, most cited, and most trusted publisher in science", says Dr. Sarah Tegen, Senior Vice President, Journals Publishing Group. As data trends evolve, ACS plans to update this policy based on feedback from the scholarly publishing community.

To learn more about our new Research Data Policy, please visit the [ACS Publishing Center](#).

Liquid Metal Transformable Machines

New Editor's Choice (open access) article published in *Accounts of Materials Research*



Hongzhang Wang, Sen Chen, Bo Yuan, Jing Liu, and Xuyang Sun

Accounts of Materials Research Article ASAP

DOI: [10.1021/accountsmr.1c00182](https://doi.org/10.1021/accountsmr.1c00182)

Abstract: Conventional robots can accomplish defined tasks but often encounter troubles when handling irregular objects under unstructured environments. Soft robots, with supercompliance, large transformation, and high environmental adaptability, hold big promise for delicate manipulations such as grasping soft objects or delivering precious biomedical samples. Even a step further, if soft robots are endowed with the extraordinary behaviors to freely transform among different morphologies and constructions just like those already existing in literature and science fiction films, more fantastic challenges can be tackled. Representing one of the most potential robotic soft materials, liquid metals have been given sufficient expectations on realizing the transformable machines that might fundamentally reform modern daily life. Accordingly, inspiring

Welcome to the Silicon Valley Section of ACS

Each month, the 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. To welcome you to the section and get to know you, the Executive Committee offers new members a free dinner at a monthly section seminar meeting, once we return to meeting in person! When you register for the event, make certain to mention that you are a new member and you and a friend will be our guests. The seminar meetings are held at several local venues. We hope you will also join us for an outreach event, like judging a science fair, proctoring the Chemistry Olympiad, or participating in a National Chemistry Week event in the autumn. The local section is a volunteer organization. Attend an event, volunteer to help, and get to know your local fellow chemists. Welcome!

NEW ACS MEMBERS

Robin Abu-Shumays
Ghada Ahmed
Tatiana Beck
Kristin Block
Rebecca Braslau
Heinrich Brinks
Jon Robert Brodie
Audrey L. Bryant
Mingpeng Chen
Somenath Chowdhury
Philip Thomas Dirlam
Jackson Dwelle

Hadley Davis Ellis
Cassandra Giffin
Cynthia Gonzalez
Pranav Gunda Naga
Ti-Hsuan Ku
Allison Kuan
Brent Lindquist-Kleissler
Kitty Ma
Colleen Marcadal
Bryant R. McLaughlin
Someet Narang
Sindhu S. Nathan

Teresa Nemeth
Gabriela Nerhood
Anais Nguyen
Akinori Okano
Rahul Parashar
Hollis Price
Chad Michael Reed
Andy Shabazian
Celia Fernanda Todd
Keely White
Mackenzie Whitman
Dennis W. Wolan

discoveries on controllable transformations of the liquid metal have been obtained surprisingly and tremendous efforts have been made over the past decade, indicating a significant step toward such a formidable dream. It is clear that the discovery of liquid metal-based large-scaled transformation with several hundred-fold fast change on the surface area opens a brand new direction of manufacturing future transformable machines. Even unusual findings on a self-fueled liquid metal with biological life-like behavior to freely explore the unknown space that solves the energy supply issue also came into being,

holding big promise for making bionic transformable robots. This Account aims to systematically sort out the developmental history of liquid metal transformable machines with special focus on the fundamental scientific discoveries, the underlying mechanisms, and the potential applied scenarios based on liquid metal enabled solid-liquid hybrids. The fantastic properties and unique transformation capabilities of liquid metals have built the basis for a new era of designing soft robotics and we believe that liquid metal transformable machines are evolving into new forms of soft robots.

Slashing Methane Emissions to Slow Climate Change

“Methane is the second most important greenhouse gas after carbon dioxide. Although some emissions are natural, most are driven by human activity, and rapidly slashing emissions could help slow global warming, experts say. So, scientists are hard at work finding ways to mitigate the greenhouse gas, according to a new cover story in *Chemical & Engineering News*, an independent news outlet of the American Chemical Society.” Read the full [press release](#) (published October 27, 2021) and [C&EN article](#) (volume 99, issue 39, published October 24, 2021).

Also see: [Global Methane Budget](#) page on the [Global Carbon Project](#) website.

Flexible Device Could Treat Hearing Loss Without Batteries

“Some people are born with hearing loss, while others acquire it with age, infections or long-term noise exposures. In many instances, the tiny hairs in the inner ear’s cochlea that allow the brain to recognize electrical pulses as sound are damaged. As a step toward an advanced artificial cochlea, researchers in *ACS Nano* report a conductive membrane, which translated sound waves into matching electrical signals when implanted inside a model ear, without requiring external power.” Read the [full-text of the press release](#) (published October 27, 2021).

“Acoustic Core-Shell Resonance Harvester for Application of Artificial Cochlea Based on the Piezo-Triboelectric Effect”

ACS Nano



Image: An electrically conductive membrane implanted inside a model ear simulates cochlear hairs by converting sound waves into electrical pulses; wiring connects the prototype to a device that collects the output current signal. *Credit: Adapted from ACS Nano 2021; DOI: 10.1021/acsnano.1c04242* [View larger image](#)

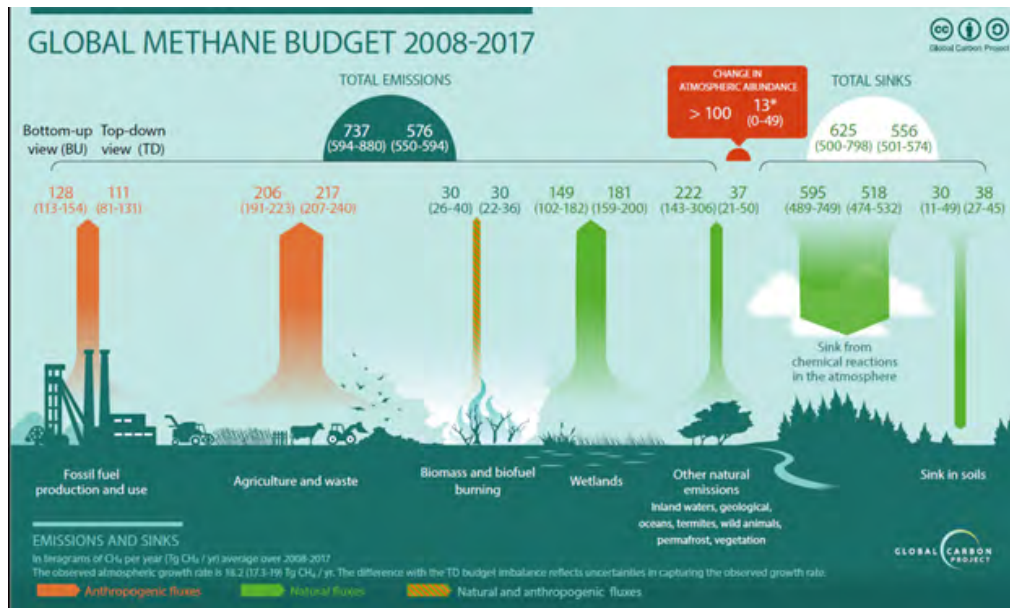


Image: [Global Methane Budget 2008-2017](#) (published July 15, 2020).



Image: [Carbon Mapper](#) (accessed 2 November 2021)

Chemical Inhibitors to RAS Oncoproteins

“This CAS whitepaper presents an analysis of the RAS inhibitor landscape, with views based on structural similarity, chemical properties, and patent assignees. See what the insights reveal.”



“Around one in every five human cancers have at least one form of RAS mutation (K-RAS, H-RAS, and N-RAS), making RAS the most frequently mutated gene family in human cancers. Historically, these elusive RAS proteins have been called “undruggable”, until a recent breakthrough from AmGen with the FDA’s approval of the anti-cancer drug sotorasib which targets a specific mutation, G12C, in the protein K-RAS.

Not surprisingly, there has been significant activity in this space recently and CAS provides a unique view into this landscape of emerging science in their latest whitepaper - [Chemical Inhibitors to RAS Oncoproteins: Current Landscape and Future Opportunities](#)” (published October 26, 2021).

Read the related CAS Blog - [Emerging trends in targeting “undruggable” RAS proteins for cancer treatment](#)

THE CHEMISTRY OF BREAD-MAKING

Baking bread may seem like a very simple process. It's a combination of only four different ingredients: flour, water, yeast, and salt. However, there's a lot of science in how these four ingredients interact, and how varying them varies the bread's characteristics.

1 MIX INGREDIENTS → **2 KNEAD THE DOUGH** → **3 LEAVE TO FERMENT** → **4 BAKE THE BREAD**

FLOUR, WATER & SALT
PROTEINS (Specifically glutenin and gliadin) + **WATER** → **GLUTEN** (Viscoelastic network that traps gas)
 Flour contains high levels of glutenin and gliadin proteins. These classes of proteins are collectively referred to as gluten. When water is added, these proteins form a network held together by hydrogen bonds & disulfide cross-links. Kneading uncovers gluten proteins, strengthening the network and the dough.

THE ROLE OF SALT
ADDS FLAVOUR TO BREAD
SLOWS DOUGH FERMENTATION
STRENGTHENS GLUTEN STRUCTURE
MAKES DOUGH MORE ELASTIC

STARCH & SUGAR
STARCH (Composed of many sugar molecules stuck together) → **ENZYMES** → **GLUCOSE** (Used by yeast for fermentation)
 Flour contains starch, long chains of connected sugar molecules. Amylase converts starch to maltose; maltase in yeast converts this to glucose. Along with other sugars, this can be used by the yeast for fermentation, and is also involved in the flavour-forming browning reactions that help to form the bread's crust.

YEAST & FERMENTATION
YEAST → **GLUCOSE** → **CARBON DIOXIDE** (Helps bread rise) + **ETHANOL** (Boils off during baking)
 Yeast are single-celled fungi that help convert sugars in the bread mix into carbon dioxide. The bubbles of carbon dioxide formed cause the bread to rise; kneading makes their size more uniform. Sour dough breads contain both bacteria and wild yeasts. The lactic acid produced by bacteria can sometimes give a sour taste.

OTHER INGREDIENTS

- FATS** (R-COOH): Weaken the gluten network, giving a softer bread. Also stabilise gas bubbles, increasing loaf volume.
- BAKING SODA** (NaHCO₃): Sodium bicarbonate. Combined with moisture and acidity, produces carbon dioxide, which can help bread rise. Can cause bitterness.
- BAKING POWDER** (NaHCO₃ + CREAM OF TARTAR): Also sodium bicarbonate, but with cream of tartar (potassium bitartrate), an acid ingredient that activates the bicarbonate.
- ASCORBIC ACID**: More commonly known as vitamin C, it helps to strengthen the dough's gluten network.
- XANTHAN GUM** (A POLYSACCHARIDE THAT IS PRODUCED BY THE BACTERIUM XANTHOMONAS GUMMISE): Used in the production of gluten-free breads.

SOUR DOUGH 100:1 BACTERIA:YEAST
 Both feed on sugars; yeasts in sour dough can't break down maltose, bacteria can.
LACTIC ACID

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The Chemistry of Bread-Making. [Enlarge image](#)

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