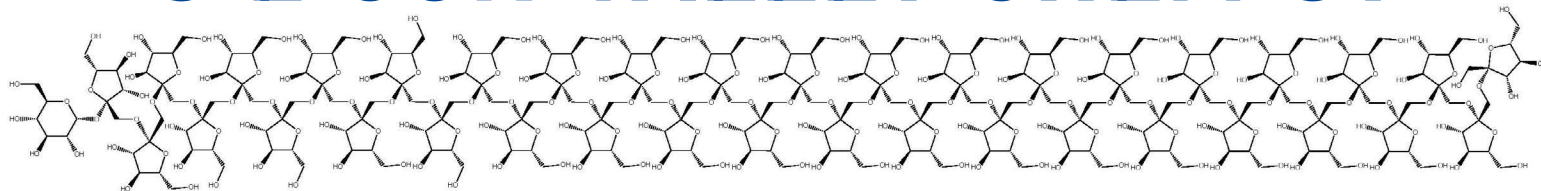


# SILICON VALLEY CHEMIST



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### Mosher Award 2020

## Stereoselective Construction of Challenging C - C Bonds: Total Synthesis of Complex Bioactive Agents

Professor P. Andrew Evans

Department of Chemistry, Queen's University, Kingston, Ontario, Canada

### Abstract

The central premise of the research in my group focuses on developing novel synthetic transformations that permit the expeditious total synthesis of complex bioactive natural products. A unique and striking feature of the program is the ability to access new chemical reactivity, which in conjunction with detailed mechanistic studies, permits the development of sophisticated multi-component processes for the stereoselective construction of complex molecular architectures.

One of the group's ongoing goals is developing allylic coupling reactions using rhodium-allyl electrophiles with an array of carbon and heteroatom pronucleophiles. Indeed, this process now represents a powerful and highly regio- and stereoselective  $sp^3$  cross-coupling reaction for target-directed synthesis. In recent work, we have focused on the alternative umpolung reaction paradigm, which probes the merit of the corresponding allylic metal anions in the context



of novel dynamic kinetic resolution reactions of  $\alpha,\beta$ -unsaturated aldehydes that function as both acyl anions and homoenolates in novel cross-coupling reactions.

In the context of total synthesis, we have recently developed a concise, efficient and scalable total synthesis of the complex bioactive sesquiterpene natural product, Thapsigargin. This agent was isolated from the Mediterranean plant *Thapsia garganica* L. and provided a highly selective subnanomolar inhibitor of intracellular calcium ion transport enzymes, which induces apoptosis, leading to cell death. Mipsagargin, a prodrug of Thapsigargin, is currently in the late-stage clinical trials to treat liver, brain, prostate and kidney cancer. The seminar will outline the evolution of these useful developments and their impact on synthetic and medicinal chemistry.

### Biography

P. Andrew Evans is the *Alfred R. Bader*

*continued on next page*

## Chair's Message

Jigisha Shah



*"It was the best of times, it was the worst of times,  
it was the age of wisdom, it was the age of foolishness,  
it was the epoch of belief, it was the epoch of incredulity,  
it was the season of light, it was the season of darkness, it  
was the spring of hope, it was the winter of despair."*

— Charles Dickens, *A Tale of Two Cities* —

Amidst all the hardship stemming from the pandemic, racial injustice, blackouts, wildfires, millions of kids studying from home and missing the much-needed school environment, we saw glimpses of hope, heroism and endurance. Let us all bid a not-so-fond farewell to a challenging and difficult 2020 and welcome with open arms the possibility of a better 2021.

For those of you who don't know me yet, I'm Jigisha Shah, the new chair

*continued on page 3*

## UPCOMING EVENTS

### Weekdays ACS Webinars

Broadcasts every weekday at 11am Pacific Time

[Join the ACS Webinars Mailing List](#)

### Jan 12 Executive Committee Meeting of Silicon Valley ACS

7:00-8:30pm, online via Zoom, Free, Contact the [Chair](#) to attend

### Jan 13 Reactivity-Directed Analysis - A Novel Approach for the Identification of Toxicants in Drinking Water [View flyer](#)

Carsten Prasse, PhD, Johns Hopkins University

Sponsored by the ACS California Section

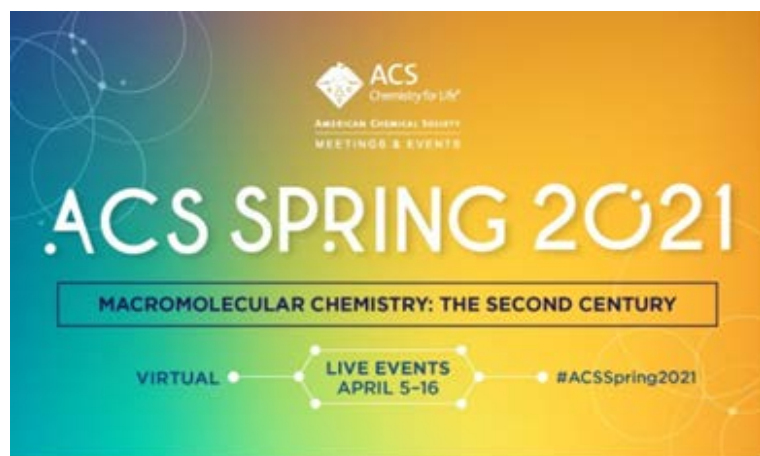
Noon-1:00pm, online via Zoom, Free, [Registration required](#)

*continued on next page*

Mosher Award 2020, continued from front page

Chair of Organic Chemistry and a Tier 1 Canada Research Chair in Organic and Organometallic Chemistry in the Department of Chemistry at Queen's University. He received a B.Sc. with honors in Applied Chemistry at Newcastle Polytechnic in 1987 and a Ph.D. at the University of Cambridge in 1991 under the supervision of Andrew B. Holmes, FRS. He then completed postdoctoral studies with Philip D. Magnus, FRS, at the University of Texas at Austin as a NATO Postdoctoral Fellow. In 1993, he initiated his independent career at the University of Delaware, where he rose through the ranks to Professor before moving to Indiana University in 2001. In 2006, he moved to the University of Liverpool, where he was the *Heath Harrison Chair of Organic Chemistry*, before moving to his current position in July 2012.

His research accomplishments have been globally recognized, including the *Changjiang Scholar Award*, *ACS Cope Scholar Award*, *ACS Fellow*, *RSC Pedler Award*, the *Royal Society Wolfson Research Merit Award*, *Pfizer Award for Creativity in Organic Chemistry*, *Johnson and Johnson Focused Giving Award*, *GlaxoWellcome Chemistry Scholar Award*, *Camille Dreyfus Teacher-Scholar Award*, *Eli Lilly Grantee Award* and *Zeneca Excellence in Chemistry Award*. He has also served on *ACS Division of Organic Chemistry as a Member-at-Large*, *National Organic Symposium Executive Officer*, *Councilor and Division Chair*. He currently serves as one of the co-chairs of the highly acclaimed *ACS-DOC Graduate Research Symposium*. Additionally, he is an *Associate Editor* for the Thieme journal, *Synthesis* and the *Editor-in-Chief for Organic Reactions*.



## Submit Your Oral & Poster Presentations to the ACS Spring 2021 National Meeting

Showcase your research during ACS Spring 2021 by submitting an abstract for oral and poster presentations by January 19, 2021.

ACS Spring 2021 will be held virtually April 5-16, with a meeting theme of Macromolecular Chemistry: The Second Century. The virtual program will include 10 weekdays of live sessions, followed by two weeks of on-demand content and networking opportunities.

Registration for the virtual meeting will open mid-January and will remain open through the end of the meeting.

ACS Spring 2021 Registration Rates

- \$149 for non-members
- \$99 for ACS members
- \$29 for students and teachers
- No cost for unemployed, retired, and 50-year emeritus members

Visit the [website](#) to find a list of all the programming divisions and planned symposia open for submissions. **The deadline to submit abstracts is January 19, 2021.**

## UPCOMING EVENTS (continued)

- Jan 16, 23, 25, or 30** **Silicon Valley ACS Book Club Discussion: *The Immortal Life of Henrietta Lacks***  
Complete [Doodle Poll](#) to indicate your preferred date and time. Sign up for email alerts at [svacs-book-club@googlegroups.com](mailto:svacs-book-club@googlegroups.com). For questions, contact [Greg Braggin](#) or [Natalie McClure](#)
- Jan 20** **Polymer Templates for Rapid, Large-Area Fabrication of Functional Films for Optical, Electronic, and Energy Devices**  
Professor Jim Watkins, University of Massachusetts at Amherst  
Webinar sponsored by the Golden Gate Polymer Forum (GGPF)  
6:30-8:00pm, online via Zoom, \$5 Donation/Free, [Registration required](#)
- Jan 20** **Multi-Electron and -Proton Chemistry: from Biology to Solar Fuels** [View flyer](#)  
Professor Louise Berben, University of California at Davis  
Sponsored by the California Section ACS  
6:00-7:00pm, online via Zoom, Free, [Registration required](#)
- Jan 21** **Stereoselective Construction of Challenging C-C Bonds: Total Synthesis of Complex Bioactive Agents - Harry and Carol Mosher Award presentation**  
Professor P. Andrew Evans, Queen's University Chemistry Department, Ontario Canada  
Sponsored by the Silicon Valley ACS  
7:00-8:30pm, online via Zoom, Free, [Registration required](#)
- Jan 25** **Energy Seminar: David Victor & Danny Cullenward**  
Sponsored by Stanford Precourt Institute for Energy  
4:00-4:50pm, online via Zoom, Free, [Registration link forthcoming](#)
- Jan 26** **Green Laboratories in Industry and Academia: Sustainability in Practice** [View flyer](#)  
Panel: Kristi Budzinski, PhD, Genentech; Quentin Gilly, MS, Harvard University; Wendy Goldsby, MS, Amyris, Inc.; Rachael Relph, PhD, My Green Lab  
Sponsored by the California Section ACS  
5:00-6:30pm, online via Zoom, Free, [Registration required](#)
- Jan 28** **Translational Opportunities in Glycoscience** [Learn more](#)  
Professor Carolyn Bertozzi, PhD, Stanford University  
Sponsored by Molecular Imaging Program at Stanford  
Noon-12:45pm, online via Zoom, Free, [Registration required](#)
- Feb 3** **Metal-Organic Frameworks: From Energy Storage to Drug Delivery** [View flyer](#)  
Professor Adam Matzger, University of Michigan  
Sponsored by the California and Huron Valley Sections of ACS  
Noon-1:15pm, online via Zoom, Free, [Registration required](#)
- Apr 5-16** **ACS Spring 2021 National Meeting**  
Macromolecular Chemistry: The Second Century  
Fully virtual event, [Learn more](#)
- Nov TBD** **2nd Annual Bay Area Chemistry Symposium** [Learn more](#)  
Sponsored by the California and Silicon Valley Sections ACS  
Location: Gilead Sciences, 333 Lakeside Drive, Foster City, CA

Chair's Message, continued from front page

of the ACS Silicon Valley Section. I work in the regulatory affairs department at Cytokinetics in South San Francisco and love every moment of it! I have been active in our local ACS section for the past five years and am so very proud of everything our section does. Our executive committee is remarkable in their dedication and support. I would like to first acknowledge Matt Greaney, our outgoing 2020 Chair, for his leadership and support throughout the past year. Under his leadership, we at Silicon Valley ACS were able to adapt to these unprecedented times and were still able to do good deeds in our community. I am also extremely grateful to Grace Baysinger for revamping our newsletter, the primary venue for reaching our membership. In collaboration with Jane Frommer, Grace is also working on our swanky new website. Do keep an eye out for the new-and-improved website, to be launched in early 2021. I want to give a huge shout-out to Natalie McClure for leading many of our outreach projects like Teach-the-Teachers and Pop-Up Chemistry with able support from Sogol Teschler and Avni Gandhi. I also want to thank Sally Peters for yet again flawlessly managing the Chemistry Olympiad process and Laura Yaeger for her wonderful job as secretary to the section.

We ended 2020 on a high note. Silicon Valley ACS was awarded two ChemLuminary Awards - the ACS 'academy awards' for service in chemistry - for the Bay Area Chemistry Symposium (BACS), a one-day lecture and networking event with technical presentations from Bay Area chemists in industry and academia. Recognizing its potential for recruiting local talent, it received strong industrial support and positive audience feedback. Matt and his group are busy organizing the second BACS for November, 2021. A ChemLuminary Award for outstanding student chapter was received by Linda Brunauer and her students at Santa Clara University.

I would like to welcome three new members to our SVACS leadership team: Stephanie Benight (Chair-Elect), Prasad Raut (Secretary) and Dipti Shingnapurkar (Alternate Councillor). We are so thrilled to have your fresh ideas and energy!

And now on to our program for 2021. We will kick off 2021 with a talk from the Mosher Award winner, Professor P. Andrew Evans of Queen's Uni-

versity. He will speak about stereoselective construction of challenging C-C bonds on January 21.

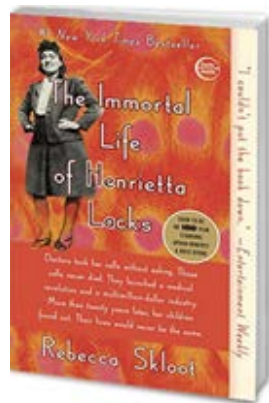
In subsequent 2021 monthly events, the membership of Silicon Valley ACS will display interests that extend beyond chemistry. We're also lovers of art, crafts, music, food and so much more. So, for the love of fun, this year we will feature talks focusing on chemistry that makes sensory experiences possible. Dr Steven Pollack, a material scientist and a lutherie, will talk about materials that influence the sounds of guitars in February. Professor Harry Klee will speak about the chemical and genetic make-up of "flavor" in fruits and vegetables. My goal is to have at least one talk every month. Hopefully in the second half of the year, we will be able to have some in-person events.

We will continue supporting our community of schools through programs like Teach-the-Teachers and Pop-Up Chemistry with an online twist. We will also be working on a water quality project where our aim is to provide small kits for students to collect data and map the quality of water in our region's watersheds. One goal is to inspire action to preserve the quality of water through involvement by citizen monitoring. We will also kick-start Paving the Path (PTP), a two-pronged program that aims to benefit both prospective transfer students attending community colleges and successful transfer students attending 4-year colleges and universities. This program will support first generation college students and students of underrepresented groups in science classes. The program has been made possible with generous support from the Diversity, Equity, and Inclusion Committee in the San Jose State University Department of Chemistry and from the ACS National Local Section Activities Committee (LSAC).

I'll continue to update our members through this forum of a monthly column in our newsletter, and I ask that you reach out to me and/or my fellow Councilors and Officers anytime you'd like. We all volunteered for these roles because this is what we love doing. There is always room for new ideas and volunteers, and there will always be open ears to listen to whatever input you may have. I wish you all a great start to 2021, and I hope to meet you in person soon!

## SVACS Book Club

By Greg Braggin and Natalie McClure



The Silicon Valley ACS Book Club will meet on Zoom in January to discuss *The Immortal Life of Henrietta Lacks* by Rebecca Skloot. All are welcome to join the SVACS Book Club! Use our [Doodle Poll](#) to indicate your preference for the meeting date and time. To join this discussion group, sign up for email alerts at [svacs-book-club@googlegroups.com](mailto:svacs-book-club@googlegroups.com). If you have any questions, contact Greg Braggin ([gregbraggin@yahoo.com](mailto:gregbraggin@yahoo.com)) or Natalie McClure ([nmclure@drugregulatoryaffairs.com](mailto:nmclure@drugregulatoryaffairs.com)).

**About *The Immortal Life of Henrietta Lacks*:** "Her name was Henrietta Lacks, but

scientists know her as HeLa. She was a poor black tobacco farmer whose cells—taken without her knowledge in 1951—became one of the most important tools in medicine, vital for developing the polio vaccine, cloning, gene mapping, in vitro fertilization, and more. Henrietta's cells have been bought and sold by the billions, yet she remains virtually unknown, and her family can't afford health insurance.

Made into an HBO movie by Oprah Winfrey and Alan Ball, this New

York Times bestseller takes readers on an extraordinary journey, from the "colored" ward of Johns Hopkins Hospital in the 1950s to stark white laboratories with freezers filled with HeLa cells, from Henrietta's small, dying hometown of Clover, Virginia, to East Baltimore today, where her children and grandchildren live and struggle with the legacy of her cells. *The Immortal Life of Henrietta Lacks* tells a riveting story of the collision between ethics, race, and medicine; of scientific discovery and faith healing; and of a daughter consumed with questions about the mother she never knew. It's a story inextricably connected to the dark history of experimentation on African Americans, the birth of bioethics, and the legal battles over whether we control the stuff we're made of."



[Watch the book trailer](#)



# ChemLuminary Awards

By Natalie McClure

*The Silicon Valley Local Section won two ChemLuminary Awards in 2020: Outstanding Local Section Career Program and Outstanding Local Section Industry Event.*

**ChemLuminary Awards** are given to ACS Local Sections and Technical Divisions for their most innovative and successful programming. Sections self-nominate for the awards. Finalists are selected by the ACS National committees that sponsor the awards, and then a winner is identified from the finalists. There are over twenty different categories offered by various ACS National committees including the “top” award of best Local Section which is divided into 5 sections based on section size. In past years, the ChemLuminary Award consisted of a sculpture, as shown below. In 2020, the award consisted of a \$500 cash prize which will enable future programs.



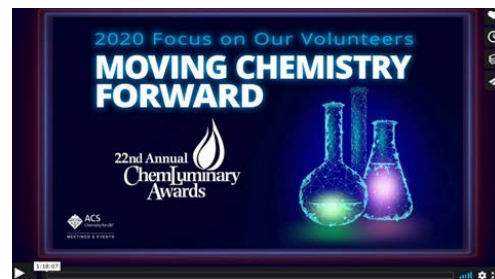
In a typical year, the ChemLuminaries are celebrated in an evening-long program at the Fall ACS National Meeting. The program starts with poster displays of the nominated events, is followed by an award assembly when the winners are announced, and is capped off with a festive party and dancing. Below is a picture from last year's ceremony held at the San Diego meeting when our section won two ChemLuminaries for the NoBelles program: Best New Public Relations Program of a Local Section and Outstanding Local Section Programming Related to the Promotion of Ethics in Chemistry). At the 2018 ChemLuminary Awards, our Section's Younger Chemist Committee's Beer Brewing Contest won the ChemLuminary Award for Outstanding or Creative

Local Section Younger Chemists Committee Event.

In 2020, the Fall meeting was scheduled to occur in San Francisco and our Section was looking forward to an awards ceremony which could be attended by many sections members since it was going to be a local event. We had nominated ourselves for 12 awards and were selected as finalists for 7 including the best Local Section (Large size). The projects that received finalist status were the Bay Area Chemistry Symposium which was a finalist for Outstanding Local Section Career Program, Outstanding Local Section Industry Event, Industry Engagement and Outreach, and Best activity Highlighting ACS Change Drivers. Our Chemistry Escape Room event was also a finalist in the Best New Senior Chemist Activity; our beer brewing, trivia night and career speed networking events were finalists for activity in the Outstanding New Local Section Younger Chemists Committee category.

On December 9, 2020, we won these 2020 ChemLuminary awards:

- **Outstanding Local Section Career Program** (Sponsored by the ACS Committee on Economic and Professional Affairs). *This award recognizes Local Section Career programs that have contributed significantly to ACS Members' career management and development. Winner: Silicon Valley Local Section.* Held at Merck Research Labs in South San Francisco, and attended by over 200, the Bay Area Chemistry Symposium was the Silicon Valley Local Section's most successful event in 2019 by virtue of the number of attendees,



2020: Award ceremony

[Watch 2020 ChemLuminary Awards video](#)  
[View List of 2020 ChemLuminary Award Winners](#)

engagement with the community, and positive feedback.

- **Outstanding Local section Industry Event** (appropriately shared with the CAL local section) (Sponsored by the ACS Committee on Corporation Associates). *This award recognizes a local section for outstanding efforts in producing an event that benefits industry members or students seeking a career in industry. Winners: California and Silicon Valley Local Sections.* California and Silicon Valley Local Sections are both recognized for their joint effort on the Bay Area Chemistry Symposium which brought together academic and industrial chemists to discuss various themes.

Because it was 2020, the award ceremony was changed to a virtual event, including virtual posters instead of the usual party. It was still a very nice recognition of all our outreach efforts.



2019: Award ceremony

# Local Science Fairs 2021 - Judges Needed

by Susan Oldham-Fritts

Haven't decided on a New Year's resolution yet? 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 with all of the following fairs being virtual due to the pandemic, it's now easy. All of these science fairs need category awards judges, especially in the areas of botany, biology, chemistry, microbiology, and behavioral science. Other than Sciencepalooza!, all serve as qualifiers for the International Science and Engineering Fair, ISEF.

Please contact me at [svsefmgr@gmail.com](mailto:svsefmgr@gmail.com) to join our SVACS special chemistry award team of dedicated chemists at the Synopsys Championship on March 11. To judge other fairs, click through the links below to science fair websites where you'll find contact information. No matter which fair(s) you choose, please volunteer now!

- **Sciencepalooza!\***: February 6
- **Future City Competition, Northern California Regional Competition**, February 20-27
- **Synopsys Science & Technology Championship**: March 11
- **Golden Gate STEM Fair**: March 8-11
- **Santa Cruz County Science and Engineering Fair**: March 1-13
- **San Mateo County STEM Fair**: March 15
- **Monterey County Science & Engineering Fair**: March 8-20

\*Many students at this competition are first time science fair participants



## 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 a number of 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 October. Plan to be at our annual beer & wine tasting and awards picnic each July on the Stanford campus. The local section is a volunteer organization. Attend an event, volunteer to help, and get to know your local fellow chemists. Welcome!

Please note: in-person events have been suspended during the pandemic but we are meeting virtually. The offer for a free dinner meeting stands for new members once we start getting together in person again.

### NEW ACS MEMBERS

Larosina Benadam  
Mar Bet  
Dr. Dariush Davalian  
Rubin Diaz  
Nonso Elleleh  
Stormy D. Falcone  
Jessica Frick

Dr. Tez Guney  
Sara Rois Kelly  
Charlotta Lebedenko  
Ying Liu  
Sandhya V. Mandlekar  
Dr. Meagan Stumpe Mauter

Victor Raabe-Pavlov  
Jennifer Staub  
Anasuzy Vazquez  
An Tam Vu  
Zaikuan Yu  
Yitao Zhang

## Paul Jagodzinski to serve as chair of American Chemical Society's board of directors

“WASHINGTON, Dec. 17, 2020 — Paul Jagodzinski, Ph.D., was elected chair of the board of directors of the American Chemical Society (ACS), a scientific membership organization with more than 152,000 members. Jagodzinski will begin this term on Jan. 1, 2021.

As chair of the Society's 16-member chief governing body, Jagodzinski will preside over board and executive committee meetings, appoint chairs and members of board committees and task forces, oversee the performance of the chief executive officer, and support strategic planning and evaluation of progress toward those goals, among other duties.”

[Read full press release](#)



Paul Jagodzinski, Ph.D.  
Photo credit: D.S. Photo (Daniel Stanley)



# Worth Knowing About Open-Source Electronic Lab Notebooks (ELN)

By Stephen Boyer Ph.D.

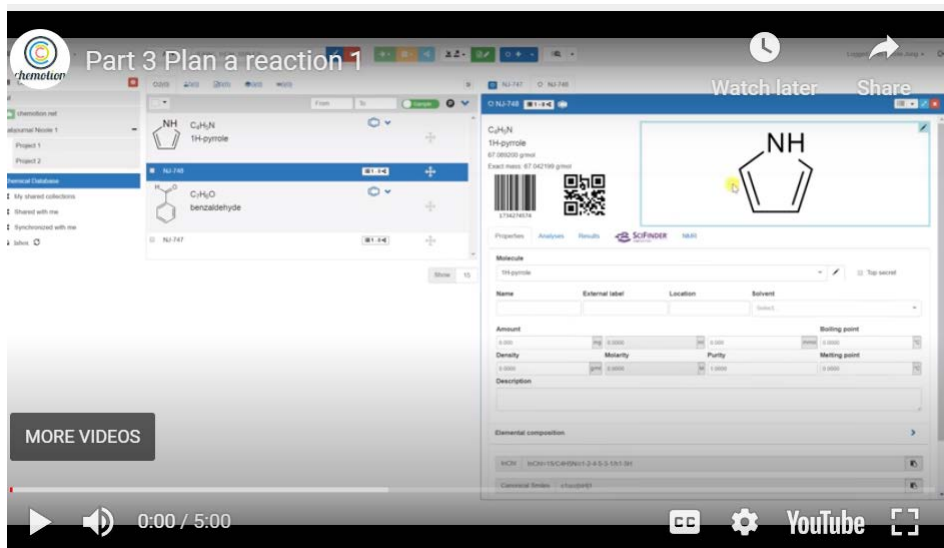
Historically, scientific progress has been recorded in notebooks. More recently, efforts have been directed toward making the all-important “notebook” digital, embellishing with attributes such as spellchecking, information-sharing, encryption, and legal signatures. Chemistry requires the additional functionalities of drawing molecular structures and reactions, as well as aggregating laboratory data in multiple formats such as spectra and graphs. Other desirable features include structure-search and integration with other scientific resources such as external databases, laboratory information managements systems (LIMS), and day-to-day experimental reporting and recording tools.

Today there are over 30 ELNs supporting an abundance of chemistry-rich functions. A

recent (December 2020) and fairly exhaustive *comparative analysis of ELNs* is posted on a Harvard University website. The University of Cambridge has also compiled a *useful list of factors* to consider when adopting an ELN.

To illustrate the functionality of electronic lab notebooks, this column will focus on one, *Chemotion*, that was developed by Professor Stefan Braese and students at Karlsruhe Institute of Technology (KIT). This ELN is freely available and provides an exceptional resource for chemistry data management. This website also includes the *Chemotion Repository for Molecules, Reactions and Research Data*.

Users are guided by *YouTube tutorials* (some set to classical music!), an example of which is shown in the figure.



The screenshot shows the Chemotion ELN interface. The main window is titled "Part 3 Plan a reaction 1". It features a search bar, a list of chemical structures, and a detailed view of a molecule (1H-pyridine). The detailed view includes a chemical structure, a QR code, and a table of properties such as Name, External label, Location, Solvent, Amount, Density, Purity, Boiling point, and Melting point. The interface is clean and professional, with a blue and white color scheme.

Among the features offered in Chemotion are

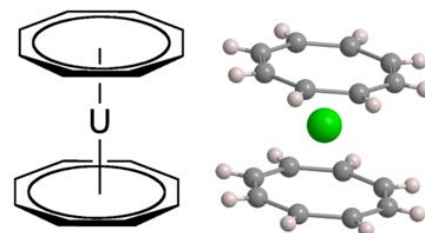
- molecular editing
- data import and export, e.g., SMILES from Excel
- text and chemical search
- links to open-data repositories like *PubChem*, *NMRshiftDB*, and its own *Chemotion repository*
- networking and registration of results with multiple scientific data systems
- long-term archive
- public posting of users' reactions, structures, and characterization data, citable via DOI
- support for QR-code and barcode for flexible labeling and identification

Ultimately, each lab must evaluate the suitability of an ELN for their particular lab situation on the basis of a wide range of capabilities. Chemotion is a good place to start on the pathway of checking out ELN solutions.

CHEMISTRY

## Quiz

I'm a green chemical, but not in the environmental sense.



What molecule am I?

Answer

## Call for Authors: New Dynamic ACS In Focus Series

By Carly Ziegler

“*ACS In Focus* is seeking an author or author team to write on a broad range of emerging topics for a new series of brief e-books.

The purpose of these e-books is to get new graduate students up to speed on topics they might not have learned as an undergrad but need

in their graduate research. *ACS In Focus* e-books are also designed to introduce new topics to scientists interested in bringing additional and often multidisciplinary perspectives into their lab. With this work, you have the opportunity to reach a wide audience of young minds and prepare

them for a successful research experience.

This is your chance to be part of an amazing new e-book series! In 2020, ACS In Focus will publish 10 titles as part of the Inaugural Collection; in 2021 we will begin a regular schedule of publishing twenty titles per year. ACS in Focus Editors are seeking authors for a broad range of topics, including drug development, solar energy conversion, neurochemistry, biology for chemists, and more. As these works are intended to be read in four-to-six hours and offer the fundamentals of a topic, the length of your work should be approximately 35,000 words.

If you are interested in participating in this series, please email: [infocus@acs.org](mailto:infocus@acs.org).”

Source: *ACS Axial*, December 11, 2020



## Announcing ACS Au A Suite of Global Open Access Journals

By Jesse Stanchak

“ACS Publications will launch a suite of nine global open access journals in 2021, collectively known as ACS Au, led by Professor Shelley D. Minteer of the University of Utah. All nine journals will be compliant with the most stringent open access requirements, including those listed under ‘Plan S’ and those of funders requiring publication in a fully open access journal, just like JACS Au,

which was launched earlier this year.” [Learn more about these titles and sign up for news.](#) Source: ACS Axial, posted December 7, 2020. Read the [press release](#) posted on December 7, 2020, from ACS Publications to learn more about Shelley D. Minteer. View [ACS Open Science](#) to learn more about ACS Publications Open Access program.

## Royal Society of Chemistry Publishes First Analysis of Diversity



The Royal Society of Chemistry (RSC) is one of the first publishers to gather and report diversity data across the organization, launching its first [biennial diversity report](#) on 16 December. These new figures for 2020 reveal the representation of women, racial or ethnic minorities, and sexual minorities among its leadership, prize and grant winners, and publishing pipeline.

In a press release, Dr. Helen Pain, Acting CEO for RSC Publishing, noted “Collecting data in a transparent and fair manner is challenging. Today we also announce that we have updated our journal submission and peer review system to enable diversity data collection relating to gender. This data will be self-reported and authors, reviewers and editors do not have to provide this

information if they do not wish to.”

“We are also currently working with 31 other publishers (number correct at the time of writing) internationally toward making collective improvements to data collection – this was central to the [Joint agreement to inclusion and diversity in publishing](#) we spearheaded this year to reduce bias in scholarly publishing.” [ACS Publications is part of this joint agreement.]

Learn more by reading these two news articles:

- Trager, Rebecca. [Royal Society of Chemistry publishes first analysis of diversity.](#) Chemistry World, December 22, 2020.
- [Improving diversity with data: dual announcement](#) (Press Release, December 12, 2020)

## View Slides from Talks Presented at the NIH Virtual Workshop on Ultra-Large Chemistry Databases

Dec 1-3, 2020



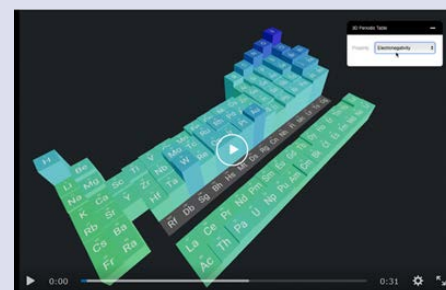
With the explosion of chemistry data resources capable of housing information on a billion or more molecules each, we are presented with tantalizing new opportunities and challenges for integrating and mining information across multiple ultra-large databases spanning widely divergent sets of properties.

This virtual workshop organized by the National Institutes of Health focused on defining the major challenges and promising new approaches for creating, curating, integrating, and querying across ultra-large chemistry databases.

[View the Slides](#)

## Web 3D Interactive Visualization of Periodic Table of Elements

Ean Warren came across this [website](#) which depicts the characteristics of the elements of the periodic table in 3D. Select the characteristic in the dropdown menu on the upper right. You can move the table around with your cursor. If you click on the element, more information comes up. Pretty cool site and very helpful for students.



[View video demonstrating features](#)



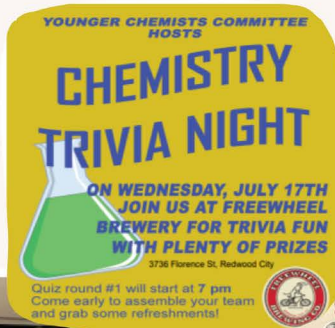
**CELEBRATING A YEAR 2019  
IN THE SILICON VALLEY SECTION**



**ACS** Local Section  
Silicon Valley



**Radding Award**



**Picnic**



**Bay Area Chemistry Symposium**



**Escape Room**

**National Chemistry Week**



**Escape Room**



**Speed Networking**

**4**

*New Programs Introduced*  
**Bay Area Chemistry Symposium**  
**YCC Trivia Night**  
**Chemistry Escape Room**  
**High School Mentoring Program**

*YCC Events*

**35**

*Overall Events*

*Dinner Meetings & Outreach Events*

**8**



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**Radding Award -**  
**Teacher Scholar Award - Kathleen Armstrong**  
**Salute to Excellence - Elizabeth Migicovsky**

**Salute to Excellence**



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# WHAT ARE RNA VACCINES AND HOW DO THEY WORK?

### WHAT ARE RNA VACCINES?

**SARS-CoV-2**

**Viral RNA**  
The virus's genetic material. Contains instructions for making proteins.

**Spike protein**  
Protein which helps the virus penetrate cells and initiates an infection.

The genetic code of the SARS-CoV-2 virus is made up of RNA. Scientists isolated the part of this genetic code that contains the instructions for making the virus's spike protein.

**RNA INSTRUCTIONS** → **LIPID NANOPARTICLES** → **VACCINE SHOT**

Synthetic RNA which codes for the virus spike protein is packed in lipid nanoparticles (very small fat droplets). This stops our bodies' enzymes breaking it down and helps our cells take it in.

**Human cell** → **Synthetic RNA** → **Viral proteins** → **Immune response**

Once the synthetic RNA is inside one of our cells, the cell follows the RNA instructions to produce the virus spike protein. Its production then triggers an immune response in our bodies.

### RNA VACCINES FOR COVID-19

Several proposed vaccines for COVID-19 are RNA vaccines. They can be based on two different types of RNA.

mRNA vaccines	saRNA vaccine
Moderna Pfizer & BioNTech CureVac	Imperial College Aucturus

### mRNA AND saRNA: WHAT'S THE DIFFERENCE?

The structures of mRNA and saRNA are similar but have a key difference, as the diagrams below show.

#### mRNA

mRNA stands for messenger ribonucleic acid

**RNA cap**  
Stops RNA breaking down; helps start protein synthesis in human cells.

**SPIKE PROTEIN CODING REGION**

**Untranslated regions**  
Regions which don't contain code for proteins.

**Poly-A tail**  
Long chain of adenine (A) bases which help stabilise the RNA.

#### saRNA

saRNA stands for self-amplifying ribonucleic acid

**RNA cap**  
Stops RNA breaking down; helps start protein synthesis in human cells.

**SPIKE PROTEIN CODING REGION**

**Code for viral replicase enzyme**  
Once in human cells, the construction of the viral replicase enzyme helps make multiple copies of the viral RNA.

As saRNA produces more copies of itself once it's in a cell, it can be given in smaller doses than mRNA vaccines. This makes the cost per dose lower and means higher numbers of doses can be produced from the same volume of vaccine.

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