

# THE VORTEX

AMERICAN CHEMICAL SOCIETY  
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## TABLE OF CONTENTS

SEPTEMBER MEETING REPORT (G.SEQUIN)	PAGE 2
CHAIR'S MESSAGE	PAGE 3
SF NATIONAL ACS MEETING REPORT (M. FRISHBERG)	PAGE 4
DIGITAL DENTISTRY REVISITED (B. MOTZER)	PAGE 6
BOOK REVIEW (L.WRAXALL)	PAGE 9
OCTOBER 19 ON-LINE PRESENTATION (A. TAYLOR)	PAGE 9
OCTOBER 21 ON-LINE PRESENTATION (A.TAHERI)	PAGE 10

## *A 48-year PhD Pathway: Secrets to Success in Attaining One's Goals*

The Women Chemists' Committee (WCC) held a successful first ZOOM meeting on Sept. 12, 2020. The program started with informal chatting in various breakout rooms, with attending guests greeting old colleagues and meeting new ones. This was followed by a captivating talk by Dr. Cheryl Dembe.

Dr. Dembe described her education and the challenges during her career, including historical influences, along her 48-year pathway to obtain her PhD. Her career pathway began with a strong early math and science education in grade school. After obtaining her B.S. in physical chemistry at the University of Michigan Dr. Dembe performed ground-breaking research work focusing on Helium-3 and Helium-4 cooled to temperatures approaching absolute zero at the University of Chicago. Close to completion of her PhD in 1971 Dembe's research adviser, Prof. Lothar Meyer, died unexpectedly. Subsequently the only option she was given was to start her doctoral research all over again, on a different project with a different advisor, but those close to her research area refused a woman in their group. Without obtaining directions on how to proceed by the University of Chicago she left the university with a master's degree. Shortly afterwards Dembe was sexually assaulted in her off-campus apartment.

After teaching assignments at various different colleges she taught chemistry at Diablo Valley College (DVC) in Pleasant Hill, California, for 34 years and became the first woman Chemistry Department

Chair as well as Division Chair of Physical Science and Engineering at DVC. She also authored the ancillary materials for the TV series "The World of Chemistry".

In 2000, Dr. Dembe discovered that two years after she would have published her Ph.D. thesis work, very similar parallel research was published that was awarded the Nobel Prize. After contacting Douglas Osheeroff, the Nobel laureate, she was encouraged by him to request that The University of Chicago award her the degree. After that first letter went unanswered the #MeToo movement inspired her to write again in 2018, this time with a successful outcome. Forty-eight years after leaving the University of Chicago, Cheryl Dembe earned her doctorate in Chemistry.

At the conclusion of her talk Dr. Dembe presented her four steps to encourage a correction when unjustly treated: 1. include the importance of dropping anger, 2. view the person or institution before you as the solution not the problem, 3. believe that they have the integrity to want to right an error, and 4. offer multiple paths that could be satisfactory resolutions. This leads to successful results for everyone involved. Dembe encourages people not to give up in their own paths and journeys in life—and stresses the importance of respectful persevering.

Dr. Dembe who enjoys singing opera concluded her lively talk with her "Solubility Song for writing net ionic equations in chemical equations", to the tune of Puff, the Magic Dragon.

Greti Sequin



### *CALLING ALL READERS*

Read a book lately? Share why you liked it with a brief review for *The Vortex*.

# THE VORTEX

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## Chair's Message

Jim Postma

There are a lot of things that the American Chemical Society does well. If you took a survey (something the ACS does often, if not well) I'm sure that the publications and SciFinder would be the top result. Because most of us don't think about finding a new job too often, the ACS's career services might not one of the leading items, but if you have ever needed them, I'm sure that you were impressed with how many resources are available and the quality of those offerings.

I've only looked for a chemistry job once, and 40 years ago that mostly consisted of perusing the ads at the end of the Chemical and Engineering News. Not many of us has all that much experience at successful job searches but this is where the power of the ACS network can really shine; and it does.

If you peruse the ACS website ([www.acs.org](http://www.acs.org)) you will find resources for resume preparation, searching, interviewing, and negotiating. There is advice for traditional academic, industrial, and governmental positions as well as less conventional career tracks, such as sales, marketing, and law. You can find advice for small business employment (or startups) and for large organizations. And then there are

all the wide-ranging fields of chemistry: pharmaceuticals, energy, polymers, paints and coatings, agricultural, and more along with the wide range of fields of chemistry: analytical, synthesis, production, design, quality control, and environmental.

To me, one of the big losses in losing the in-person ACS national meetings is the loss of the display, especially to students, of the broad range of chemistry, including its global nature. The other loss is the in-person career resources that the ACS provided. Several of our members: Mark Frishberg, Lee Latimer, Marinda Wu, and others have contributed to the ACS career services.

Fortunately, you can still find the wide array of these services online. Check out "Careers" at the ACS website and you can see for yourself. If you are in need of a job, wish to transition, or have a friend or colleague who is in this situation, you'll find a rich set of resources. If you watch our Section calendar at [www.calacs.org](http://www.calacs.org) you will see multiple events that can aid in the search.

One of the most used databases is the collection of chemists' salary data. If you need to make a case for a higher salary with your boss or if you are considering a career change, I'm sure you will find value in this resource.

Jim [jpostma@csuchico.edu](mailto:jpostma@csuchico.edu)

## *2020 Highlights from the “Virtual” San Francisco Meeting, August 17-20*

The COVID-19 pandemic has been destructive to just about every area of life in the US, and ACS National Meetings were no exception in 2020. With the epidemic starting so close to the Spring National Meeting in Philadelphia, the ACS had no choice but to cancel that meeting. Given more time and the developing scenario that the pandemic would not let up over the summer, the ACS made the historic decision to try to hold a “virtual” meeting and searched high and low for a way to present papers, posters, and the interactive Council meeting in a “virtual” format. Multiple solutions were adapted, registration information went out, papers, posters, networking sessions, the Council meeting, and a virtual Expo were all accommodated, and then everyone sat back and held their breath— and from your author’s experience, it worked – not perfectly, but it worked!

Unfortunately, there were several exciting features of ACS Fall National meetings that did not match up well with the virtual format and had to be cancelled – the most significant being the ACS Fellows Induction Ceremony, the ChemLuminaries, the ACS Career Fair, and the evening in-person poster sessions. Sci-mix ran on the afternoon of Tuesday, Aug. 18, but was not the same without the crowds – and the popcorn. And, of course, there were all of the opportunities missed to meet old friends and make new ones – and to sample some of San Francisco’s fine restaurants and city sights.

Even with the regular member registration fee cut in half to \$250, registration suffered, with announced attendance at 6477. This is significantly less than would have attended at a higher fee had the meeting been held under normal conditions in San Francisco, traditionally the meeting site with the largest attendance. The last ACS National Meeting held in San Francisco was in April 2017, with spectacular weather and record setting attendance of over 18,800. With Philadelphia and San Francisco being two of ACS’ four rotating major meeting sites, 2020 was a terrible year to not have in-person meetings. Considering the continuing threat of the coronavirus and the failed efforts for containment, it is hard to bet against needing this virtual technology again in 2021 when the National meetings are set for San Antonio in the Spring and Atlanta in the Fall, in two of the currently hardest hit States.

Prior to the start of the ACS meeting, a Public Outreach event was held virtually as the “ACS Kids Zone.” Since hand’s-on experiments were not feasible, students, parents, and teachers who “Vimeood-in” were shown demos and given instructions for four chemistry experiments that can be easily performed safely at home, presented by teachers and one by the reigning Miss America 2020, who was the first contestant ever to use a chemistry demonstration in her talent competition. It was reported that around 400 families and 1000 viewers attended either the one-hour program in English or the presentations in Spanish that followed.

The overall theme of the San Francisco meeting was “Moving Chemistry from Bench to Market.” Instead of the usual Presidential sessions on Sunday afternoon, there was a kick-off live session on Monday morning entitled “We are all Heroes in Moving Chemistry from Bench to Market,” with four lead-off talks by Richard Mackman, Gilead Sciences, Malika Jeffries-El, Boston University, David Heldebrant, Pacific Northwest National Labs, and Melissa Moore, Moderna Therapeutics.

The popular Kavli Foundation Lecture series continued, this time split between Tuesday and Wednesday morning instead of its normal Monday afternoon slot, with the Emerging Leader Lecture given by Dr. Bryan Barton, DuPont entitled, “Innovator’s Guide to Industrial Impact,” and the main Innovations in Chemistry lecture given by Nobel Laureate, Dr. Ben Feringa, University of Groningen, entitled “The Art of Building

Small.” The ACS also picked up on one of CALACS’ recent speakers and highlighted Dr. Leland Jourdan, Chevron’s Chief Diversity Officer and “The Case for Diversity, Inclusion, and Respect” on Thursday morning. Other symposia took the opportunity to shift their schedules, several carrying over into the week of August 24<sup>th</sup>. The C&EN sponsored “Talented 12” program, introduced by Dr. Stuart Schrieber of Harvard, was presented on Tuesday, August 25th, with their new “Future of Science” program presented on the 26th.

#### Report from the Virtual Council Meeting and other Society governance activities

CalACS was represented at Council by our full contingent of eight Councilors or Alternate Councilors, our two Past ACS Presidents and current two Directors-At-Large to the ACS Board. Information on some of the activities of the committees to which they are affiliated can be found below. The Virtual San Francisco Council meeting was a fairly quiet and efficient one – primarily since everyone calling in was muted.

In actions of note, a new International Chapter was approved in Israel, and the Committee on Chemical Abstracts Service was disbanded. The latter issue generated significant discussion from both sides – and gave Councilors a good test of the Lumi-Zoom system for raising one’s hand to join the speaking cue and then get unmuted in order to talk. The gist of the CAS situation boiled down to the reality of the formation of the CAS Governing Board in 1993 that essentially transferred all of the CAS committee’s oversight responsibilities and authority to the Governing Board, which includes seven ACS members. The CAS committee has been struggling with how to be relevant in their remaining duties ever since and probably should have been disbanded years ago, as it had to be a frustrating challenge for its members to try to identify areas where they could still have some positive input.

#### Affiliations/comments from our Councilors, Past ACS Presidents, and current Directors-At-Large

Bryan Balazs – ACS Board of Directors, Elected 2020 Vice Chair, Budget and Finance Committee (B&F), Chair, Board of Trustees – ACS Member Insurance Program Undergraduate Program Advisory Board (UPAB), ACS Career Consultant (not meeting) B&F reviewed the financial performance of the ACS for the first half of the year (through June 30, 2020), noting that both revenues and expenses were trending in positive directions relative to the planned budget, despite the pandemic. The Society’s 2020 financial performance through July 31st yielded a Net from Operations of \$55.7 million, or \$25 million greater than the same period in 2019. Total revenues are \$354 million, 5% ahead of last year, and total expenses are \$298 million, or 3 percent below last year. Unrestricted Net Assets increased to \$466 million. B&F received an update on efforts to restructure membership categories in light of recent trends in membership, and how this would interface with such issues as local section and division allotments. The Board of Directors, in contrast to in-person interactions at the national meetings, met virtually both before and after the Fall 2020 national meeting, thus allowing a preview of what would be happening at the meeting as well as a “debrief” afterwards. All agreed that this “before and after” approach was useful. The Board heard an extensive briefing by CEO Tom Connelly on recent efforts within the ACS in the areas of Diversity, Inclusion and Respect (DI&R), adjusting to a “new normal” for business operations under the pandemic, planned resumption of onsite work at ACS Washington HQ (and for CAS in Ohio), and general financial and membership trends. Reports were provided to the Board from the three members of the Presidential Succession (Charpentier, Echegoyen, Cheng), noting that much of President Louis Echegoyen’s planned activities for 2020 have had to

*continued on Page 7*



## Digital Dentistry: Revisited (Part 2)

Bill Motzer

"The nitrogen in our DNA, the calcium in our teeth, the iron in our blood, the carbon in our apple pies were made in the interiors of collapsing stars. We are made of star stuff." Carl Sagan, in *Cosmos* (1980 and 2013 reprint), Ballantine Books

In Part 1 (September 2020 *Vortex*), I discussed new research on the chemical and physical characteristics of tooth enamel, which is largely composed of hydroxyapatite or  $\text{Ca}_5(\text{PO}_4)_3(\text{OH})$  with magnesium-rich rods or cores. How did it come about that elements such as calcium (Ca;  $Z=20$ ), phosphorus (P;  $Z=15$ ), and magnesium ( $Z=12$ ), form our endo-skeletal structure, including our teeth? Was it luck or chance or, as some scientists say, just serendipity? To answer these questions, we need to go back to the "beginning" (well not quite all the way back). Cosmologists (astronomers and physicists) theorize that just shortly after the Big Bang Expansion (BBE), about 13.8 billion years ago, stable isotopes of hydrogen-1 (1H) and deuterium (2H or D), helium-3 (3He), helium-4 (4He), with perhaps traces of lithium-7 (7Li) were formed in a process known as the Big Bang Nucleosynthesis (BBN). Additionally, two unstable or radioactive isotopes were also produced:

tritium (3H or T); and beryllium-7 (7Be); these however, soon decayed back to 3He and 7Li.

According to theory and recent research involving modeling, BBN occurred from perhaps 10 seconds to 20 minutes into the BBE, when the Universe's temperature was about one billion kelvin. At this temperature, neutrons combined with protons forming the Universe's D and He nuclei. However, protons remained uncombined as H nuclei. Continued cooling resulted in matter's density becoming gravitationally dominant over photon radiation. Therefore, after ~379,000 years, electrons and nuclei combined forming atoms of mostly hydrogen, which then emitted radiation, the relic of which is now detected as the cosmic microwave background.

All elements heavier than Li were created much later, by stellar nucleosynthesis (SN), in evolving and exploding stars or supernova. Recent SN research now includes: (1) exploding massive stars, (2) exploding white dwarfs, (3) merging neutron stars, and (4) dying low mass stars. These are described in an excellent and very readable paper by Jennifer A. Johnson: "Populating the Periodic Table: Nucleosynthesis of the Elements" in the February 1, 2019 issue of *Science Magazine* (v. 263, issue 6426, pp. 474-478). You can freely access and download this paper at: <https://science.sciencemag.org/content/363/6426/474>

Her periodic table is shown in Figure 1. Note that calcium is created from exploding massive stars and exploding white

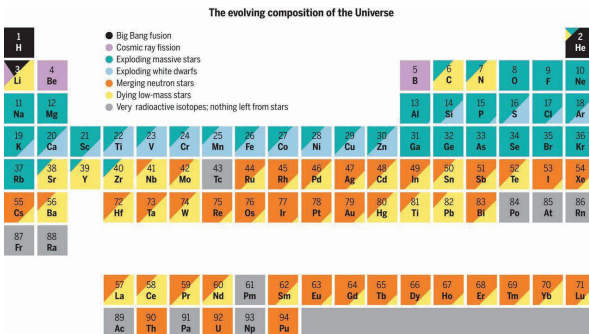


Figure 1: Periodic Table of evolving elements from the BBN to dying low-mass star nucleosynthesis. Only naturally-occurring elements found in the solar system are shown. From J. Johnson (2019) open access paper.

(continued on page 10)



be restructured due to the pandemic and its effect on travel.

Jenelle Ball – new Councilor in 2020 awaiting committee assignment

Michael Cheng – Project SEED ran a virtual program in 2020 for 300 students. All were equipped with network connection equipment. Each student was paid a \$1000 stipend. The students were grouped into cabins, and each cabin had a cabin leader. The 62 cabin leaders were paid a \$1500 stipend. Several cabin leaders worked with a campsite manager. After the four-week program, an “un-conference” was held with many authoritative and informative speakers on the topic of epistemology, college admission, college financial aid, and diversity. In addition to the “normal” executive meeting, an open meeting was held to discuss and present scenarios for the 2021 program; one is all virtual like 2020; and other is an in-person and virtual hybrid.

Mark Frishberg

Council Policy Committee (CPC) and its Long Range Planning and Constitution, By-Laws, and Petitions Sub-committees, and, ACS Career Consultant (not meeting) CPC met at its normal time on Tuesday, with subcommittees earlier. The Long Range Planning subcommittee, did not meet as it was decided earlier not to try to hold another Strategy Café at this meeting in a virtual format. The Constitution, By-laws, and petitions subcommittee, met and discussed the items that were to come up for a vote at the Council meeting.

Sheila Kanodia – Committee on Ethics (ETHX)

The Committee on Ethics met virtually through ZOOM platform on Sat. Aug. 15 and had a productive meeting. ETHX has a new website: [acsethics.org](http://acsethics.org). Members are invited to visit the website which has lots of useful information and resources listed both ACS and non-ACS. The Committee on Ethics’ ChemLuminary Award recognizes outstanding programming by a local section related to the promotion of ethics in chemistry. The first awardee in 2019 was the Silicon Valley Section.

Lee Latimer – ACS Board of Directors, Western Region Board

Patrick Lee – new Councilor in 2020 awaiting committee assignment

Alex Madonik – Committee on Community Affairs (CCA); currently serving on the CCA theme teams, including Chemists Celebrate Earth Week 2021, whose theme is “Reducing our Footprint with Chemistry.” Contributed an article and activity about thermal insulation, as well as a “Words to Know” list with definitions aimed at a fifth grade audience. The NCW 2022 theme team is brainstorming potential themes.

The Program Development and Promotion (PDP) subcommittee reviewed the progress of the various theme teams. NCW 2020 has launched online with the theme, “Sticking with Chemistry.” Contributed an introductory article, “What Kind of Glue” was incorporated into the center spread of Celebrating Chemistry. The theme for NCW 2021 will be, “Fast or Slow . . . Chemistry Makes It Go” with a focus on reaction rates, catalysis, etc. PDP also discussed the potential rebranding of National Chemistry Week to better include the activities of our International Chapters. CCA is seeking closer links with other committees; the Committee on Ethics is writing an article for the CCEW 2021 issue of Celebrating Chemistry on the responsibility of chemists vis-à-vis Sustainability.

Eileen Nottoli – Local Section Activities Committee (LSAC) Attended the virtual meetings of the LSAC Subcommittee on Grants to evaluate IPGs and MEET grants.

Attila Pavlath – ACS Past President, International Activities Committee (IAC)

Was actively involved in developing a full day virtual symposium for the Senior Chemists Committee (SCC). The 10 speakers covered the ways for retired chemists to remain active and how to utilize their experience collected during the many years of their work. The SCC will try to make the actual lectures available in hard copies. His talk was entitled “Your experience is too important, it should not be wasted.”

James Postma – Committee on Constitution and By-Laws (C&B)

C&B work consisted of clarification and cleanup of Society and Section guiding Documents. In particular, we clarified the Guidelines for Preparing Petitions to Amend the Standing Rules, made a series of touch-ups to the Model Bylaws for ACS Sections, and accepted the interpretation that the reference to “mail” in ACS guiding documents includes email, except where explicit reference is made to “postage” or other terms exclusively associated with traditional mail.

Marinda Wu – ACS Past President, Committee on Budget and Finance (B&F), ACS Career Consultant (not meeting), Board Chair for Chinese American Chemical Society (CACS)

At the virtual B&F meeting, a status report was presented on a new subcommittee on which Marinda is a member, called PEVOP (portfolio evaluation and optimization). A new process that is more streamlined, collaborative, and based on the ACS strategic goals has been developed for piloting next year. The CACS 8/19/20 first virtual program with 146 registered was a great success. See [www.cacs.hq.org](http://www.cacs.hq.org) for link to Youtube video of Dr. H. N. Cheng, 2020 ACS President-elect speaking on “The Future Pursuit of Chemistry.”

Looking ahead to San Antonio, March, 21-25, 2021. The overall meeting theme will be “Macromolecular Chemistry the Second Century.”

#### NEWS YOU MIGHT USE

The theme of National Chemistry Week in October - is “Sticking with Chemistry,” the chemistry of glues and adhesives.

Ballots for the upcoming ACS election will go out on September 28, with the close of the election on October 23<sup>rd</sup>. There will be a virtual Town Hall for Directors-at-Large candidates on September 21st and a “Meet and Greet” event is planned with the candidates for ACS President-Elect for some time in September.

Do not forget that ACS offers dues waivers upon request for any unemployed or laid-off members.

Abstracts of the papers and posters presented at the meeting are archived at [www.acs.org](http://www.acs.org), and those plenary and symposium presentations that were recorded, with sequenced slides, can be found at [www.acs.org/meetingcontent](http://www.acs.org/meetingcontent).

Any members interested in the latest ACS financial performance can look at [www.acs.org](http://www.acs.org), click on the “About ACS” tab and then “ACS Financial Information.”

Information regarding grants offered by all ACS committees can be found at [www.acs.org/getinvolved](http://www.acs.org/getinvolved).



### Interesting Statistics

While the ACS Career Fair was not held virtually, there have been over 900 career consulting interactions through the ACS Career Office and the ACS Career Consultants since March.

ACS membership is at 158,766, including International members. The Membership Affairs Committee (MAC) has been experimenting with several discount dues categories in order to try to improve member retention, but it was not mentioned which, if any, has led to the membership growth. While there continues to be significant turnover year to year, the current membership number represents a rebound from a low of 150,562 in 2017, but not yet back to 161,840 in 2013.

The number of Local Sections and Divisions who have not updated their by-laws for over 20 years are 42.

Of the 26 ACS National Awards, five have never gone to a woman.

From Mark Frishberg, CalACS Councilor, with input from our others

### *Book Review--The Library Book by Susan Orlean*

This is the fascinating story of the disastrous fire at the Los Angeles Public Library in 1986. Burning for more than 7 hours and reaching 2000 degrees, it consumed and damaged over one million books. More than just books went up in smoke – patent collections, music scores, magazines, microfilm archives. Susan Orlean delves into the history of this building and its librarians and the evolution of libraries across the country and around the world. She studies arson and re-examines the case of Harry Peak, the blond-haired actor long suspected of setting the fire.

The Central Library building opened in 1926 but there have been libraries in LA since 1844 and, in 1873, an official building opened in LA. Membership was \$5 per year which meant that only affluent people could join and no women were allowed to. Along the way, Susan introduces us to an unforgettable cast of characters from libraries past and present, from Mary Foy, who at age 18 in 1880 was named the head of LAPL at a time when men dominated the role of

librarian, to the present day. It is a thrilling journey through the stacks that reveals how more than just books are provided and how libraries have remained an essential part of our lives today, perhaps especially in this digital era.

She even investigates how the water damaged books, which had been kept frozen for two years, were reconstituted with the aid of ARCO, which had a building across the road, and McDonnell Douglas with their space simulation chambers. Using wild swings in both temperature and pressure, the water was either squeezed out or sublimated. The first small batch of books run through these processes let out 600 gallons water! Both systems took a week to dry out a single book and then they had to be assessed as to whether they could be ever put back on the shelves. The author's research was thorough and her writing is delightful. Read it and enjoy!

Linda Wraxall

### *"Healthy Workplaces" Presentation Oct.19, 5:00 - 6:30 pm*

Stressed with Covid-19 and work life balance? Join our presentation by Dr. Cristina Banks, Director of the Interdisciplinary Center for Healthy Workplaces,UCB, an expert on healthy workplaces. The presentation will discuss what has worked and what has not in the work-from-home environment. Professor Banks will also examine family complications with working from home, theories of human nature and motivation, and how we can be more effective. The presentation will be followed by a Q&A.For more information email: [aliciaataylor@gmail.com](mailto:aliciaataylor@gmail.com) or [calacs.org](http://calacs.org) The email Zoom link will be shared with attendees on the day of the event.

continued from page 6)

dwarfs, magnesium solely from exploding massive stars, and phosphorus from exploding massive stars with minor amounts from exploding white dwarfs. These elements are then dispersed throughout galaxies as supernova remnants (SNR) and we can now determine the compositions of such SNR by X-ray spectra (see Figure 2).

Many large galaxies, such as Andromeda and our own Milky Way, began forming shortly after the BBE and were fully formed by one billion years after the BBE. For example, our own Milky Way, a spiral galaxy, has a central halo containing some of its oldest stars; and we can actually "date" these stars, some having estimated ages of ~13 billion years. These estimates were made using the UV-Visual Echelle Spectrograph from the Very Large Telescope in Chile's Atacama Desert, where spectral line strength indicated the presence of thorium and other heavy element isotopes created by the rapid neutron-capture process (R-Process), the nuclear reactions responsible for creation of about half the atomic nuclei heavier than iron. This can be contrasted with the slow/secondary or s-process that primarily occurs within

ordinary stars.

As galaxies and their star populations began evolving, some stars began exploding, creating elements above hydrogen, particularly the calcium, phosphorus, and magnesium in our bones and teeth. SNR dispersed these elements as gas and dust that could, under subsequent gravitational attraction, form future metal-rich stars and planets. And I will explore this in my next article.

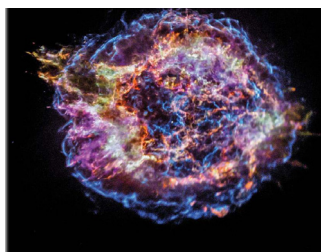


Figure 2: X-ray spectral image transposed to visual light of the Cassiopeia A collapse-core supernova remnant (SNR): silica (Si) shown in red, sulfur (S) in yellow, calcium (Ca) in green, iron (Fe) in purple, and the blast-boundary in blue. From J. Johnson (2019) open access paper.



*A co-sponsored online event between ACS California Section and AWIS East Bay Wednesday October 21st, 5:00 – 6:00 PM (PDT)*

The event will include a presentation by Dr. Candice Bridge followed by a Q&A session.

Zoom link to be shared with attendees the day of the event. The event is FREE and open to all. More information at: [calacs.org](http://calacs.org) or email [taheri@ucdavis.edu](mailto:taheri@ucdavis.edu) or [ebawis.help@gmail.com](mailto:ebawis.help@gmail.com)

Lubricants and Glitter:

Revolutionizing Sexual Assault Investigation

While DNA is the go-to forensic evidence in sexual assault cases, the reality is that the use of condoms in sexual assault is increasing in an effort to minimize the type of DNA left at the crime scene, specifically sperm/semen. Therefore, in the absence of DNA, it is necessary to identify other types of forensic evidence (such as lubricants and cosmetic residues) that could be used in these types of cases to link the three points in the criminal triangle, e.g. victim, suspect and crime scene. This talk will discuss current efforts that we are conducting to understand the evidentiary value of lubricant and cosmetic evidence and appropriate analytical methods to analyze and characterize unknown samples collected in a sexual assault or physical assault cases.

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