

THE VORTEX

AMERICAN CHEMICAL SOCIETY
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CALIFORNIA SECTION
November 2020



University of California, Berkeley, biochemist Jennifer Doudna, Speaker at the CalACS Meeting November 2017, and along with colleague Emmanuelle Charpentier are the 2020 recipients of The Nobel Prize in Chemistry, for the co-development of CRISPR-Cas9, a genome editing breakthrough that has revolutionized biomedicine.

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*WCC November Meeting
California Section American Chemical Society
All Are Welcome*

Title: My Journey in Life and Chemistry
Time: 10:30 – 11:00 a.m.
Chatting: 11:30 a.m.
Talk and Discussion: 11:00 a.m.
Reservation RSVP by November 5th 2020.
For more information visit our website at www.calacs.org or email office@calacs.org.
Cost: Free

Abstract:

Nancy will talk about her journey from her childhood in a rural Washington state community through her education and her technical career in the cleaning products industry, touching on some relevant technologies used in the industry. She will also reflect on work-life balance, technical society roles, outreach, and mentoring.

About the Speaker:

Nancy Falk is a Research Fellow in Cleaning R&D at the Clorox Company, based in Pleasanton, where she develops and leads



strategic technology platforms. Previously, she worked in Laundry R&D at Unilever in Edgewater, NJ, where she developed a number of laundry products. Nancy is an inventor on 17 granted US

patents. She recently authored a chapter on “Chlorine and Chlorine Compounds” in the just-released 6th edition of “Block’s Disinfection, Sterilization, and Disinfection.” Last year, she presented and published a short review on surfactants as antimicrobials for the Surfactants in Solution Conference. She’s also Senior Associate Editor for the Journal of Surfactants and Detergents, and served a term as Member At Large for the Colloid and Surface Science Division at ACS.

CALLING ALL READERS

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

Lou Rigali, Editor

THE VORTEX

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Chair's Message

My Experience with the ACS and Its Lessons – Pieces of an Autobiography

I thought I would use this month's Chair Report to describe my history with the ACS and the doubled lessons that are embedded in those experiences.

I joined the SAACS Chemistry Club at my college, Chico State. Lessons: a) Student clubs at universities, colleges, and high schools are essential to students and b) the ACS also needs them to maintain its energy and creativity.

I joined the ACS as an undergraduate (junior year) because my professors encouraged it and presented it as the “normal” thing to do. Lessons: a) Encourage young people in your sphere to join the ACS. b) If you are a young chemist, join the ACS early; it is the “cheapest” time to join and the benefits are huge for pre- and early-career chemists.

Attila Pavlath came to CSU Chico when I was still a student to give a seminar and to tout the value of the ACS. Lessons: a) Attend a local event when you can and, (b) if you are inclined, give a chemist's presentation to some appropriate group while still a student,

I attended an ACS national meeting in San Francisco. Lessons: a) Meeting attendance can really open your eyes to the global scope of chemistry and the ACS. b)

Encourage a student or colleague in your sphere to attend a national or regional meeting, help them figure out a way to pay for it and attend with them if you can.

Attila Pavlath came to Chico after I had joined the faculty of CSUC to give a seminar and, as he always does, tout the value of the ACS. Lessons: a) If you have found your niche in the ACS, continue to stay involved for a (long) lifetime. b) Attend a local event when you can; it is a great time to learn and to network.

I worked with colleagues at CSUC and at Butte College to form the Northern California Subsection and then organized events that brought in chemists as well as dentists, pharmacists, MDs, geologists, educators, and others. Lessons: a) A little effort on your part with a few colleagues can create immense value for yourself, your company, and/or for the ACS. b) One of Attila's mantras: Chemistry is so all-pervasive that it is of interest and benefit to everyone.

As an outgrowth of the Subsection, I became involved with the CalACS executive committee. Lessons: a) Chemists, while very goal/task oriented by nature make good, stimulating friends; seek them out. This networking has many benefits, too many to list here. b) The Section offers an amazing array of opportunities to be involved and the rewards of involvement are numerous. I hope this is an inspiration.

Jim Postma jpostma@csuchico.edu

Join the California Section for the Virtual ChemLuminary Awards on December 9th! The California Section has been selected as a finalist for the following ChemLuminary Awards:

Outstanding Local Section Industry Event

- Outstanding Project SEED Program Award
- Best New Public Relations Program of a Local Section
- Local Section Partnership Award/Marinda Li Wu Award
- MAC Industry Engagement & Outreach
- Outstanding Engagement with K-8 Students

We received the following message from ACS President Luis Echegoyen:

Thank you all for your patience and understanding as we pivot to new ways of planning celebratory events for our ACS members during the COVID-19 pandemic! Safety is a core value of the American Chemical Society, and it permeates all our actions, activities and events. Therefore, the 22nd Annual ChemLuminary Awards ceremony will be held virtually on Wednesday, December 9, at 4:00 p.m. Eastern Time. The ceremony will include a keynote address by Janet L. Bryant, recipient of the Award for Volunteer Service to the American Chemical Society, and the presentations of awards given by 23 committees of the Society will follow.

Since the ChemLuminary Awards celebration could not take place at the National Meeting in San Francisco, this is our chance to participate in the annual recognition of ACS volunteers, not the least the many California Section members who organized



For UC Merced Professors Andy and Patricia LiWang, chemistry is a family affair.

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Improving stormwater and wastewater removal of contaminants using low-cost composites

Wednesday November 18, 2020 – 5:00 to 6:30 PM (Pacific)

Online Zoom Event

Professor Ray designs, characterizes and applies low-cost composite media (e.g., adsorbents, functionalized polymers and nanomaterials) to remove contaminants from waste streams such as wastewater and urban stormwater. Dr. Ray is also investigating development of novel materials to selectively remove and recover contaminants in water. The presentation will be followed by a Q&A.

Zoom link to be shared with attendees the day of the event.

Our Distinguished Panelist:



Jessica Ray, PhD
Assistant Professor
Civil & Environmental Engineering
University of Washington

The event is free and open to the Community, for
information: aliciaataylor@gmail.com



Comment on "Prelude to a tentative idea"

Bill Motzer

I've been catching up with my monthly Vortex readings. On page 10 of the September 2020 Vortex I noted Peter Olds article concerning the Chicxulub crater just off Mexico's Yucatán Peninsula, caused by an impact of a 10 to 11 km diameter asteroid with an estimated mass of 1.0×10^{15} kg. It's theorized to have caused the extinction of the dinosaurs ~66 million years ago (Ma), thereby ending the Cretaceous (K) Period and auguring in the Paleocene (Pg) Epoch. In his article, Peter cited his 2019 paper: "Hypervelocity Impacts and Exposed Lithospheric Mantle: A Way to recognize Large Terrestrial Impact Basins?" *Journal of Earth Science*, v. 30, pp. 451-459. <https://doi.org/10.1007/s12583-019-1225-x>. I located and read his paper and became even more intrigued, because I wrote several Vortex articles on this topic: "The Impacts of Impacts: Aspects of Ecological Changes by Asteroid Impacts," (Parts 1-3, March, April, and May 2010) and "The Impacts of Impacts (Revisited)," (April 2013). Much of what I wrote remains relevant and more recent research has shown that the tsunamis created by the K-Pg asteroid impact reached as far north as North Dakota, along a Cretaceous inland seaway, with sediment and fossil debris deposited in what is now the Hell Creek Formation (see D. Preston: <http://www.newyorker.com/magazine/2019/04/08/the-day-the-dinosaurs-died>). Additionally, the effect of the vaporized molten rock resulted in a world-wide firestorm producing clouds of dust, sulfate-rich aerosols (e.g., for aerosol chemistry see May 2014 Vortex: "Volcanic Violence"), and carbon soot contributed to a global "nuclear" winter (e.g., see Lyons, et al., 2020, "Organic Matter from the Chicxulub Crater Exacerbated the K-Pg Impact Winter:" *PNAS*, v. 117, n. 41, pp. 25327-25334. <https://doi.org/10.1073/pnas.2004596117>).

However, I've often wondered if the impact that created the 100 km diameter

Chicxulub crater was large enough to produce the tsunamis and world-wide fires that caused extinction of about 75% of plant and animal species, including all of the terrestrial and oceanic non-avian dinosaurs. Were there additional impacts and if so where are they? Recent computer modeling suggests that the K-Pg asteroid may have been much larger, perhaps up to 80 km in diameter (4.6 x 10¹⁸ kg), impacting at a velocity of 20 km/s, and an inclined degree angle of ranging from 45 to 60. Other researchers have suggested that the asteroid broke into several parts before impacting and therefore have searched, and continue to search, for additional K-Pg impact craters in oceanic basins (e.g., in the Indian Ocean off of western Australia). But onshore evidence for such an impact has not been found.

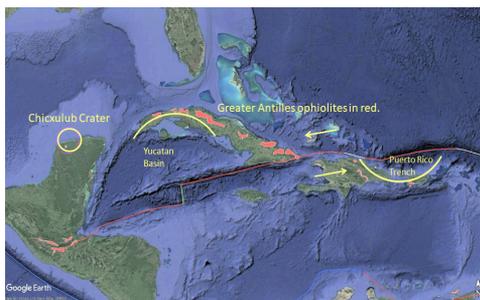
Peter presents a rather interesting and unique answer to these questions. His figure 4 (see below) shows another possible impact – a 700 to 800 km diameter crater east of Chicxulub (outlined by the yellow arcs), which is offset by a later left lateral transform fault that is the boundary between the North American and Caribbean plates. This transform began opening about 50 Ma, thereby bisecting this large impact crater.

Also shown are red areas (ovals) representing known or mapped Greater Antilles ophiolites in Cuba. These are important because ophiolites are rock sequences originating from the mantle, below the crust and therefore are segments or portions of oceanic plate that have been thrust (obducted) onto the edge of continental plates. They form stratified igneous rock complexes composed of an upper basalt member, a middle gabbro member (dense, greenish intrusive rock with abundant pyroxene, plagioclase, and minor amounts of amphibole and olivine), and a lower peridotite (olivine and pyroxene-rich ultramafic rock) member. Thus, the outline of a larger impact crater and the ring of ophiolite sequences suggests that the impact was large enough to have penetrated to the mantle, because oceanic crust is thinner (5 to 10 km) than continental crust (30 to 50 km).

(continued on page 7)

Science works best when multiple lines of evidence are found. For the K-Pg event this includes the original iridium anomaly in the K-Pg boundary layer, to the discovery and drilling of the Chicxulub crater, to shocked quartz (indicating impact pressures greater than 2.0 GPa), to tektites (fused glass spherules formed from rapidly

cooled melted rock), to geochemistry (e.g., Os and Cr isotope ratios that characterize differences of the crust/mantle from meteorites); and now we have Peter's elegant tectonic and geologic evidence indicating that there may indeed be a larger impact structure. Thanks Peter!



Peter Olds Figure 4 showing a possible impact structure adjacent to the Yucatan Basin and Puerto Rico Trench.

Year End Giving in Support of Stem Education

If you are considering giving year end charitable donations, please consider the following:

(1) Our local section Project Seed. The Project Seed program gives high school students, recommended by their chemistry teacher, a paid summer job in a lab. Due to the current COVID-19 situation, last summer's program was a successful, national 4 week ZOOM summer camp. It is amazing how much participating students grow over the summer. To make a donation, please send a check made out to California Section with Project Seed donation on the memo line. Send check to California Section c/o Julie Mason, 2950 Merced Street, San Leandro, CA 94577.

"Lend a Hand to Education", a project that gives mini grants (upto \$250.00) for supplies to K-12 teachers in the Petaluma (Sonoma County) area that teaches Science. This year there are 10 grant requests. This project is a joint venture of the Petaluma Sunrise & Petaluma Valley Rotary Clubs. It was started and run by retired chemist and ACS member Libby Harvey FitzGerald. For further information please contact Libby Harvey FitzGerald, libfitz@sbcglobal.net, cell 707-480-4584.

Enjoy the Holidays!!
Sandi Tillin

continued from page 4)

our 2019 programs. In addition to our outstanding Project SEED summer internship program, the California Section held the first Bay Area Chemistry Conference, an innovative collaboration with multiple corporate partners, and hosted “MANYA – The Living History of Marie Curie”, two memorable presentations by Susan Marie Frontczak.

Every student at Korematsu Middle School in El Cerrito had the chance to learn about Marie Curie’s career and the discovery of radium; two days later, we kicked off NCW 2019 with her performance at Laney College on October 19th, 2019.

The Korematsu Middle School partnership started with a Family Science Night and Science Fair on February 25th, 2019, when Cal ACS volunteers presented a chemistry show and a half-dozen hands-on chemistry activities for students and their families, including several activities from the NISEnet “Let’s Do Chemistry” kit.

Finally, 2019 was the International Year of the Periodic Table, and the California Section wove this theme into numerous events that constitute an innovative Public Relations Program. Former ACS President

Attila Pavlath brought together a team of chemists to create a series of 32 posters illustrating the history and significance of the elements in our everyday lives. The posters approach the diverse elements not only by the traditional chemical groups (alkali and alkali earth metals, halogens, noble gases), but also through familiar materials (micronutrients, alloys, semiconductors, precious metals, radioactive elements) and by applications (fireworks). These colorful, informative posters are available online in well over a dozen languages, including English, Chinese, and Arabic.

Elaine Yamaguchi worked with our colleagues at UC Merced to introduce the posters at a campus celebration on April 12th attended by well over one hundred faculty and students, including a dozen representatives from our Student Affiliate at CSU Stanislaus.

Back in the SF Bay area, we exhibited the Element posters for a large audience at the Lawrence Hall of Science in Berkeley on August 11th, while rededicating the 2000 National Historic Chemical Landmark for the Discovery of New [transuranium] Elements at LBNL.



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Book Review--"Agewise" by Lou Rigali

Following the lead of Jim Postma and Linda Wraxall, here is another book review hoping that it will be a regular feature in the Vortex. The book, "Agewise, Fighting the New Ageism in America." is written by Margaret Morgenroth Gullett and published by University Press, Chicago (2011). The writer has published previous books, including *Aged by Culture*, a best book of the year by The Christian Science Monitor, *Declining to Decline*, which won the Emily Toth award for best feminist book on American popular culture. She also writes for The New York Times Magazine and The Boston Globe among others, and is a resident scholar in the Women's Studies Research Center at Brandeis University.

As I was looking for the various categories of stereotyping that exist in our culture, this book like many others selected me rather than the other way around. Most of us use stereotyping constructs. This book provides a brief discussion on how stereotypes on aging affect all of us, regardless of our age. The beginning and shorter section of the book is about ageism but if that is not your thing, skip to the later section where the author describes not only her relationship with her mother and the mother's illness, an interesting form of Alzheimer's but also how she and others navigated this section of their lives as a positive experiences of caring. Surprisingly, the book branches out and provides a wide viewing lens on age that can be of interest to anyone from pre-teens, to octogenarians and older because it impacts all of us, our children, parents and spouses. While many fear getting older, those who are older and, who have both physical and cognitive challenges, have left those fears behind and are enjoying their life.
Lou Rigali

Editor's Comment

Some space was saved for an anticipated letter to the editor, it never arrived.

Happy Thanksgiving.



New test claims to detect gene-edited crops

8 September 2020 Today's release of an open source test for detecting the first "gene edited" crop is a game changer. It refutes claims by GMO developers suggesting that new GM foods are "indistinguishable" from similar non-GM crops, and so cannot be regulated.

Published today in the scientific journal *Foods*, the test has been delivered by an international consortium of leading non-GM food certifiers, NGOs, and a European supermarket chain, coordinated by the Sustainability Council.

The new genetic modification techniques known as gene editing are promoted as something different, but they are still GM and the test shows that the first gene edited crop in the field will not fly under the radar. This test identifies a gene-edited rapeseed made by US company Cibus and has been independently verified as meeting European regulatory criteria for such testing. It can identify the smallest genetic change and is able to readily distinguish the Cibus product from similar non-GM varieties.

The ability to develop a precise detection test starting from just a bag of seed sends a very clear message: detection of gene edited GMOs is well within reach. The method announced today provides a basis for developing detection methods for all gene-edited crops. Successful development of the test is a commercial game changer as well as a technological breakthrough. Farmers and food companies will now need to make commercial decisions on the assumption that gene edited crops will be detected and visible to consumers. The test also has implications for GMO developers as proposals for making new gene edited varieties will need to disclose this development to potential funders.

Market sensitivity to GMOs is clearly demonstrated by the rapidly rising volumes of food products being certified as Non-GM. In North America, US\$26 billion in products are certified by the Non-GMO Project, while the German Retailer Association for Non-GM food products certified 9 billion euros of products last year. Both have said they will require the new test to be used for product certification.

For leading New Zealand exporters selling to markets that reject GMOs, and those companies going the extra mile to gain "non-GM" certification, the test is a valuable tool. Fonterra, Zespri and Atkins Ranch are among those that have certified products as Non-GM.

It also demonstrates the strategic value to New Zealand Inc of having gene editing regulated under the country's GMO law. This ensures gene edited crops can only be grown if approved following a public process and can be shown to deliver a net benefit for New Zealand.

New Zealand has always been a standards-taker when it comes to GM foods and for more than two decades, consumers around the world have strongly resisted GMOs in their food. The standards set by high-value markets, and by the regulators in those countries, are what New Zealand exporters ultimately seek alignment with. There are just two gene edited crops in production at present – the Cibus rapeseed and a soybean by Calyxt. The Cibus rapeseed is being grown on a modest scale in North America, and the Calyxt product so far just in the US. For further background, including statements from other project consortium members, go to www.detect-gmo.org.

Reprinted from the GMWatch website

Lou Rigali



BUSINESS DIRECTORY

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