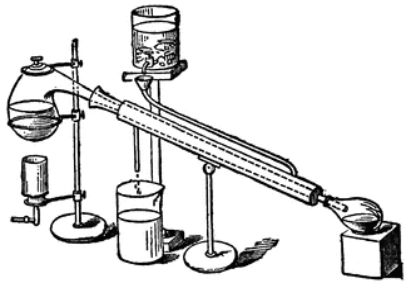
SOUTHWEST RETORT



SEVENTY-FIRST YEAR **MAY 2019**

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and Chemistry in this area

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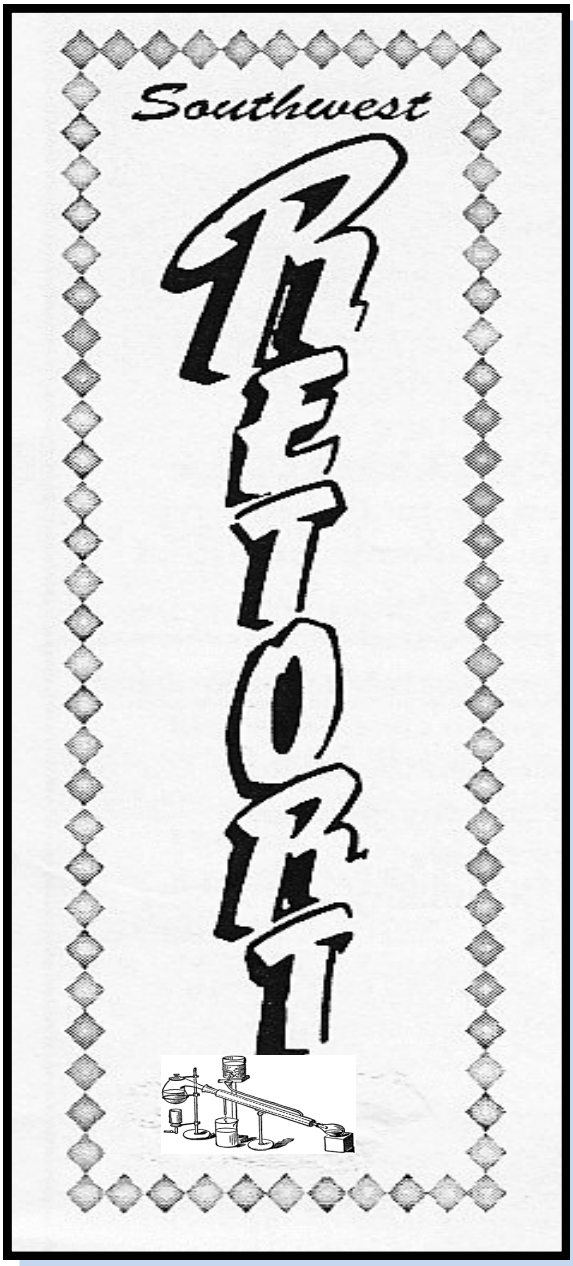

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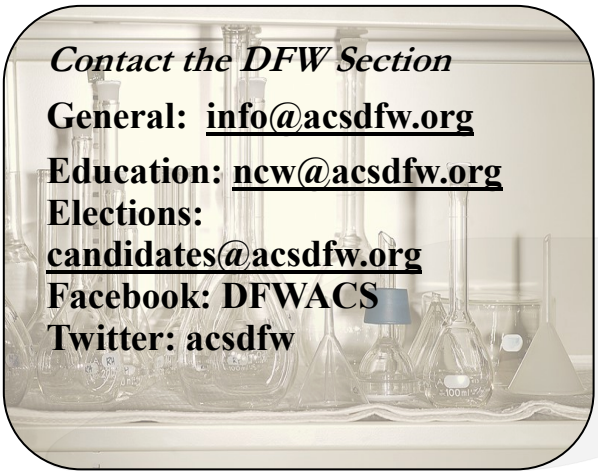

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FIFTY YEARS AGO IN THE SOUTHWEST RETORT

The ACS tour speaker for May is **Dr. Philip W. West** of Louisiana State University. Dr. West received his BS and MS degrees from the University of North Dakota and his Ph.D. from the University of Iowa. He joined the LSU faculty in 1940. In 1953 he was awarded the rank of Boyd Professor. In 1954 he received the ACS Southwest Regional Award, and he was a recipient of the Charles E. Coates Memorial Award in 1967. His research interests are in the areas of microchemical and trace analysis. He is the author of three textbooks and 140 research papers. His presentations will either be on "Trace Analysis" or "Techniques for the Study of Air Polution."

The Texas A&M chemistry department is the recipient of a $560,000 NSF Development Grant. The three year development plan involves improvement of both the undergraduate and graduate academic programs. New research centers are being developed in the fields of Polymer Chemistry, Nuclear Chemistry, Catalysis, and Solid State Chemistry in addition to the existing Thermodynamics Research Center.

In the Dallas-Ft. Worth ACS Section, at Texas Woman's University, **Dr. William Mecay** was selected as a Fellow of the American Institute of Chemists. Other TWU faculty who are AIC Fellows are **Drs. Helen Ludeman, Dr. Lyman Caswell, Dr. Everitt C. Hurdis, Dr. Murray G. Sturrock**, and **Dr. Norman Foster.** At the Mobil Field Research Laboratory, **Dr. Arthur C. Hall** gave a seminar to the Department of Petroleum Engineering at Stanford University. At North Texas State University **Drs. L. J. Theriot, S. J. Norton,** and **R. M. Hurd** gave seminars at other area universities. Austin College hosted the fourth annual meeting of the Great Plains Association of Chemistry Teachers in Liberal Arts Colleges on Mar. 28 and 29.

In the Heart o' Texas ACS Section, the speaker for the April meeting was **Dr. Edward M. Eyring** of the University of Utah. At Baylor University **Welch Professor Malcolm Dole** was the dinner speaker at the invitation banquet of the honorary physics fraternity Sigma Pi Sigma. His topic was "Famous Physicists I have Known." Formal dedication ceremonies for the beautiful North Waco campus of McLennan Community College took place on May 3.

The Central Texas ACS Section featured **Dr. W. C. Frenelius**, Associate Director of Research at Koppers Co. in Pittsburgh at a recent meeting. He discussed the need for re-establishing mutual understanding between academia and industry. At UT-Austin **Dr. A. H. Cowley** was awarded an NSF grant for "Studies in Phosphorus Chemistry."

compiled by
E. Thomas Strom

From the ACS Press Room

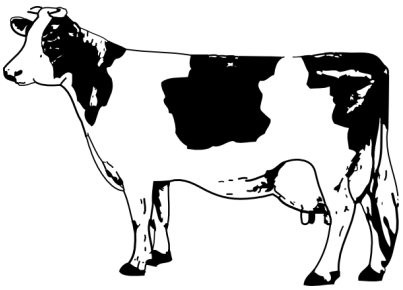
A Comprehensive Look at Cow's Milk

"Chemical Composition of Commercial Cow's Milk"

Journal of Agriculture and Food Chemistry

Milk is a staple of the human diet, full of key nutrients such as protein, carbohydrates, fats, and vitamins. Cow's milk in particular is one of the most-used dairy products globally, with over 800 million tons produced annually according to the United Nations Food and Agriculture Organization. Today, scientists report in ACS' Journal of Agricultural and Food Chemistry a comprehensive, centralized database of all known bovine milk compounds.

Human milk consumption has played a key role in global economic and agricultural developments for over 10,000 years. Given its popularity, cow's milk has been the subject of numerous scientific studies in recent history. There are thousands of known components in the liquid, but the data are scattered throughout the literature. And analyzing milk can be a complex undertaking, as the beverage can vary in amount of and identities of its constituent compounds, depending on the breed of cow, type of feed and other factors. Using targeted chemical analyses has provided a large amount of data on specific compounds, but none have been able to both fully identify and quantify the makeup of bovine milk. That's why David Wishart and colleagues at the University of Alberta set out to perform a multi-tiered analysis that provides the most complete picture to date.



To build a database of bovine milk components, the researchers applied a combination of experimental technologies and literature text-mining. For their experimental work, they assessed commercially purchased skim, 1 percent, 2 percent and whole milk with four different spectrometric technologies. They identified and measured various substances in milk, including metal ions, vitamins, organic acids and amino acids. For the computer analysis part of the study, the researchers used a series of digital text-mining tools to find published chemical information on dairy compounds. The data from the project are freely available at the Milk Composition Database. More than 2,300 metabolite entries are in the database, and over 160 of these substances were reported on for the first time in cow's milk.

The authors acknowledge funding from the Canadian Institutes of Health Research, Alberta Innovates–Bio Solutions, Alberta Livestock and Meat Agency, Genome Alberta and Genome Canada.

Dallas-Fort Worth Section Student Awardees

University/Community College & Department	Student Nominee Name
Abilene Christian University - Chemistry and Biochemistry Department	Diego Zometa Paniagua
The University of Texas at Arlington/Chemistry and Biochemistry	Catherine Daniel
University of Dallas	Rebecca Mitton
Department of Chemistry, Texas A&M University-Commerce	Michael Pimentel-Galvan
University of Texas at Arlington	Melissa Orr
University of Texas at Dallas	Samantha Paynton
McMurry University	Ananda Lewis
Southern Methodist University	Mansoor Khan
North Lake College, Math and Science	Ann C Johnson
Texas Christian University	Nate Schmitt
University of Texas at Dallas	Anna Fiedler
Brookhaven College/ Chemistry	Amal Patel

Meeting in Miniature

Here's the list of winners, in 1st, 2nd, 3rd order:

CHEM 106

Ashley Weiland, UTD

Matthew Tiemann, UNT

Juan Vizuet, UTD

CHEM 109

George Rawling, UNT

Ilia Ponomarev, UTA

Dineli Ranathunga, UTD

CHEM 253

Snipta Mallick, UTD

Abigail Lewis, UTD

Zachary Chroust, UTD

CHEM 352

Yejide Oyewole, McMurry University

Ethan Payne, UTD

Shahrin Sharikha, UTD

ENV 110

Michael Luzuriaga, UTD

Marc Gallenito, UTD

Whitney Webre, UNT

ENV 130

Kapil Sayala, SMU

Udaya Dakarapu, UTA

Justin Miller, UTD

Meeting in Miniature

First there was pizza...

Then there was none.

Meeting in Miniature

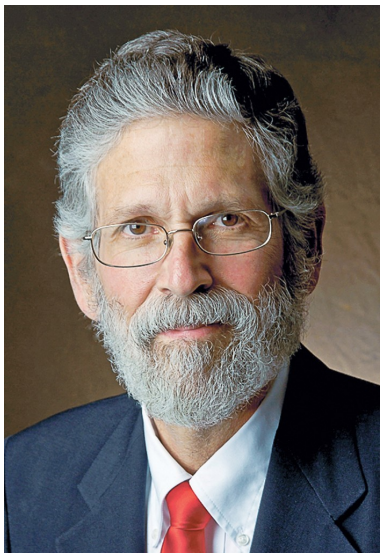
Many thanks to our hosts, the UNT Chemistry Department.

From the ACS Press Room

INTERVIEW WITH ACS PRESIDENT-ELECT LUIS ECHEGOYEN
Interviewer, E. Thomas Strom

They say that time passes quickly if you're having fun. I can testify that the older you get, the more quickly time seems to pass. It seems like 2005 was just yesterday, when I initiated this set of interviews with ACS Presidents-Elect beginning with Bill Carroll. I had known Bill a while and we lived in the same town, so why not interview him for *The Southwest Retort*? Bill's successor was Ann Nalley, whom I also knew, so why not interview her as well? Before I knew it, I had an interview series going. All but one of the interviews were at the President-Elect stage, when enthusiasm was high and reality had not yet set in. This Mar. 31 interview with ACS President-Elect Luis Echegoyen, Welch Professor at the University of Texas at El Paso, is my sixteenth in the series.

My goal in these interviews has been to give the President-Elect a forum in the Southwest to present what he/she hopes to accomplish in his/her three year sequence. I don't shy from asking hard questions, but there is always opportunity for these new leaders to promote their positive programs; and they do. These people are sharp and articulate, and I am always pleased that they represent ACS (and me) to the public at large. Leading the ACS is like steering a large ocean liner. You don't expect to make 180 degree turns or 90 degrees turns, or even 45 degree turns. The most you can expect to accomplish in your three years is to nudge the bow of the ship a very few degrees, hopefully in a positive direction. Our 2019 President-Elect Luis A. Echegoyen assumes this post with a varied background, with experience not only in academia but also in industry and government. After he received his Ph.D. from the University of Puerto Rico followed by a post-doc at Wisconsin, he worked two years for Union Carbide in New Jersey. His later career included faculty positions at the University of Puerto Rico, University of Miami, and Clemson University plus a four year term as Director of the Chemistry Division of NSF.



Echegoyen's statement last year to the ACS Council prior to his selection as a nominee focused on the following four areas: 1. **Promote Inter- and Multidisciplinary Education and Research; 2. Advocate Strongly for Increases in Research Funding; 3. Establish Closer Ties Between Industry and Academic Institutions; 4. Increase International Partnerships and Collaborations.**

I started out by asking Dr. Echegoyen what drew him to chemistry. He responded that his original focus was on science in general rather than chemistry, but he had thought that engineering was also a possibility. His first semester was actually in engineering, but after one semester he realized that it was science for him. His experience in freshman chemistry was what turned him to chemistry as a major. He did his BS degree in three years and went straight into the Ph.D. program, which he also did in three years. During those three years he was co-author of nine papers. Then came a one year post-doc with Steve Nelson at Wisconsin with five papers resulting. His work with Stevenson (Ph.D. mentor) and Nelson had focused on EPR. When he was hired by Union Carbide, he was put in charge of NMR. He campaigned successfully for Carbide to purchase a pulsed NMR, so that he could do carbon-13.

Our conversation then changed to the areas he intended to work on during his presidential sequence. Echegoyen enthusiastically moved to a topic to which he said his friend Nobel Laureate Fraser Stoddart had introduced him. The idea is to have a US-based conference similar to the Lindau conferences held yearly in Germany. The Lindau conferences involve 30-40 Nobel Laureates meeting with several hundred young scientists---undergraduates, graduates, and post-docs---all younger than age 35. Echegoyen is making a concept proposal to ACS that a similar conference focusing on chemistry be established on a trial basis. He is hoping that a pilot program could be approved for the time of the Fall, 2020 ACS meeting in San Francisco. He emphasized that nothing has been approved as yet. He envisions that the invitees be not just Nobel Laureates but also representatives from industry such as CEOs. Such a conference would give ACS high, positive visibility. To some degree this ties in with his third focus on establishing closer ties between industry and academic institutions.

Regarding the need of increased funds for research, Echegoyen reflected on his four years as Director of the Chemistry Division of NSF. During that time he was part of the executive branch of government, unable to lobby Congress about chemistry. That was a frustration for him. As of three years ago, at the behest of then ACS President Allison Campbell, ACS started a Congressional Chemistry Caucus. This is not a lobbying group, but it does give an opportunity for ACS to show Congress the importance of chemistry and chemical engineering. Echegoyen feels the US is lagging behind China and most of the rest of the world in our support of science and technology. Echegoyen would like to bring very high level people, Nobel Laureates, etc, before the Chemistry Caucus, who would have more impact than if Echegoyen himself appeared. Perhaps Fraser Stoddart would be one of these high level people. Echegoyen again highlighted what he has seen happen over the course of 25 years of visits to China. China has made amazing strides, and the US is in grave danger of falling behind. Echegoyen intends to push hard in this area.

I am grateful that our new President-Elect was able to give me 40 minutes of his valuable time to share the key points of his plans. We were able to touch on three of these four significant areas. I hope in the next three years to see how Dr. Luis Echegoyen helps ACS move forward on all of them.

From the ACS Press Room

Parboiling method reduces inorganic arsenic in rice

"Modifying the Parboiling of Rice to Remove Inorganic Arsenic, While Fortifying with Calcium"

Environmental Science & Technology

Contamination of rice with arsenic is a major problem in some regions of the world with high rice consumption. Now, researchers reporting in the ACS journal Environmental Science & Technology have found a way to reduce inorganic arsenic in rice by modifying processing methods at traditional, small-scale parboiling plants in Bangladesh. The new method has the added benefit of increasing the calcium content of rice, the researchers say.

People in Bangladesh eat about a pound of rice per person per day, according to statistics from the International Rice Research Institute. This consumption is among the highest in the world, placing Bangladeshis at risk for elevated exposure to inorganic arsenic, a toxic substance and carcinogen that can enter rice from the soil of flooded paddies. After harvest, most rice in the country is parboiled, a process that involves soaking the rough rice (with husk intact) in water and then boiling it, followed by other steps to produce polished white rice. Andrew Meharg from the Institute for Global Food Security, Queen's University Belfast, and colleagues wondered if parboiling wholegrain rice (with the husk removed) would reduce the levels of different forms of arsenic compared with parboiling rough rice. That's because the husk can have high levels of inorganic arsenic, and it could also act as a barrier, preventing arsenic species from leaving the rest of the grain during parboiling.

The researchers tested their new processing method in 13 traditional, small-scale parboiling plants throughout Bangladesh. The team used ion chromatography interfaced with inductively coupled plasma-mass spectrometry to analyze arsenic species in rice. They found that in untreated rough rice, inorganic arsenic is highly elevated in the bran compared with the husk. Parboiling wholegrain rice instead of parboiling rough rice reduced levels of inorganic arsenic by about 25 percent in the final polished grain, while increasing calcium by 213 percent. However, the new method reduced potassium by 40 percent. The researchers say that the potassium loss must be balanced with the advantages of reduced arsenic and increased calcium.

The authors acknowledge funding from the Nestlé Foundation.

Around the Area

Dallas-Fort Worth Section

U.S. National Chemistry Olympiad

The U.S. National Chemistry Olympiad Program is proud to announce the 20 finalists who will attend the Chemistry Olympiad Study Camp, June 2-13, 2019, at the University of Maryland at College Park, MD. The students will compete for a spot on the team representing the United States at the 51st International Chemistry Olympiad in Paris, France, July 21-30, 2019. Nicholas Tsao, St. Mark's School of Texas, TX, Dallas Fort Worth Local Section is one of the twenty finalists. He's also the only qualifier from Texas this year! His teacher at St. Mark's is Mr. Kenneth R. Owens.

University of Texas at Dallas

Assistant Professor Sheena D'Arcy has been invited to give a talk at the International Conference on Hydrogen Deuterium Exchange.

Associate Professor Ronald Smaldone received the UT Dallas Provost's Award for Faculty Excellence in Undergraduate Research Mentoring. Associate Professor John Sibert received the NS&M School's Teaching Award for tenured faculty and Dineli Ranathunga (Nielsen Group) received the NS&M School's Teaching Award for graduate students. Associate Professor Jeremiah Gassensmith was awarded a three-year research grant from the Robert A. Welch Foundation, and Professors Mihaela Stefan and Ken Balkus renewed their Welch Foundation Grants. Ashley Weiland (Chan Group) was one of 70 graduate students nation-wide to be selected for the U.S. Department of Energy's Office of Science Graduate Student Research Program. Virginia Blackwell (D'Arcy Group) placed third at the campus-wide Undergraduate Research Poster Contest, and Assistant Professor Sheena D'Arcy presented an invited talk at the International Conference on Hydrogen Deuterium Exchange. Welch Professor Ray Baughman and the Alan G. MacDiarmid NanoTech Institute contributed a presentation at "Science in the City", sponsored by the Dallas Morning news and UT Dallas.

Texas Woman's University

The Texas Woman's University Department of Chemistry and Biochemistry's student organization — KEM Club (Kappa Epsilon Mu) — received the Outstanding Award for student chapter, the highest award from the American Chemical Society Committee on Education, in recognition of the chapter's achievements and service to the university and community.

Dr. Richard D. Sheardy, Chair and Professor of Department of Chemistry and Biochemistry at Texas Woman's University, is the recipient of this year's prestigious Cornaro Award. This award recognizes an outstanding Texas Woman's

Around the Area

University faculty member for excellence in teaching, scholarship, and achievement.

University of Arkansas

On the Go

Joshua Sakon gave a talk, "Structure and Function of Bacterial Collagenase from H. histolytica." Vanderbilt Medical Center, Nashville, TN, March 18, 2019.

Foysal Khan gave an invited talk, "Optimizing Conducting Polymer Modified Electrodes and Miniaturizing Instrumentation to Enhance Microfluidics Pumped by Redox Magnetohydrodynamics (RMHD),"at Pittcom 2019, Philadelphia, PA. Other authors are David Parette and Ingrid Fritsch.

Mahsa Lotfi Marchoubeh gave an oral presentation in Neurochemistry Techniques to Study Neurotransmitters and Metabolites session, "Simultaneous and Differentiated Measurement of Catecholamines by Developing and Evaluating a Novel Neural Probe Suitable for In Vivo Studies," at Pittcon 2019, Philadelphia, PA. Other authors are Mengjia Hu, Richard N. Pellegrino, Miguel Abrego Tello, and Ingrid Fritsch.

David Paul and Paul Adams at tended the Emerging Researchers National Conference in STEM, Washing ton DC, February 2123, 2019. They received a $2050 travel grant from the Graduate School, from the Graduate Recruitment Assistance Fund. Pictured below is Dr. David Paul, judging a re searcher's poster.

Nan Zheng gave a talk, "Development of New Chemistries of Photogenerated Distonic Radical Cati ons: From Mechanistic Investigation to Synthetic Applications" March 5, 2019 for the Department of Chemistry and Biochemistry at the University of Tulsa.

Chynna Denham gave a talk, "Delineating the Structural Forces Responsible for the High Stability and Enhanced Activity of FGF1 Double Mutant, K126N/R136E." Arkansas State Capitol, Little Rock, AR, Feb. 20, 2019. Other authors are Shilpi Agrawal, T.K.S. Kumar.

The following students made presentations at the Biophysical Socie ty Annual Meeting in Baltimore, MD, March 26, 2019:

- Matthew Brownd, McKay, M. J., Greathouse, D. V., Andersen,
- O. S., and Koeppe, R. E. (2019) Novel F13,F15 Gramicidin Subu nits Predicted to Cross Bilayer Membranes and form Ion Chan nels. Biophysical Journal 116, 512a.
- Fahmida Afrose, Greathouse, D. V., and Koeppe, R. E. (2019) Position Dependent Orientation Difference of Transmembrane Peptides Flanked by Single or Mul tiple Histidine Residues. Biophysi cal Journal 116, 516a.
- M a t t h e w J . M c K a y , Greathouse, D. V., and Koeppe, R. E. (2019) Character ization of AlphaHelix Distortions at a Membrane Surface and a Par tial 3(10)Helix by SolidState NMR. Biophysical Journal 116, 517a.
- Brooke E. Nunn, McKay, M. J., Greathouse, D. V., and Koeppe, R. E. (2019) Influence of Charged Lipids on Glutamic Acid Containing Transmembrane Helices. Biophysical Journal 116, 516a.

Around the Area

Unversity of Texas at Arlington

A day and a half symposium entitled "Photocatalytic and Electrochemical Processes in Green Energy and Environmental Remediation: A Symposium in Honor of Professor Krishnan Rajeshwar" was held April 1 and 2 during the ACS National Meeting in Orlando, FL. This symposium was organized by the Division of Environmental Chemistry and featured many invited talks and contributed papers from scientists all across the globe. A plaque was also presented to Rajeshwar by the Chair of the ACS Environmental Chemistry Division to commemorate the occasion.

Dr. E. Thomas Strom co-organized, along with Dr. Vera Mainz of the University of Illinois, a symposium held April 2 at the ACS Orlando National Meeting. The symposium title was "Pioneers of Magnetic Resonance." Dr. Strom gave two presentations in the symposium: "A Bid for Immortality: A Thirty-Year Race and Rivalry between Paul Lauterbur and Raymond Damadian for the Invention of MRI" (co-presenter Dr. Morton Mason) and "Donald E. Woessner, Master of NMR Relaxation Effects."

Dr. Kayunta Johnson-Winters was the organizer of a day-long conference held at UTA on April 26. The conference theme was "Breaking Down Barriers in STEM by Being the Agents of Change." Dr Johnson-Winters was also recognized for a "Professor of the Year" award by the Arlington Sunrise Rotary Club.

A paper co-authored by Dr. Saiful Choudhury was cited as one of the 100 most accessed cell and molecular biology papers in 2018 by the journal *Scientific Reports*. Dr. Pernendu (Sandy) Dasgupta was invited as a speaker for the fourth annual UT-Dallas Chemistry Student Association's Distinguished Lecture Series. His April 12 talk was titled "From Perchlorate in Breast Milk to Perchlorate on Mars." Farooq Wahab was one of two winners of the Chinese American Chromatography 2019 Young Investigator Award. Wahab is a student of Welch Professor Daniel Armstrong.

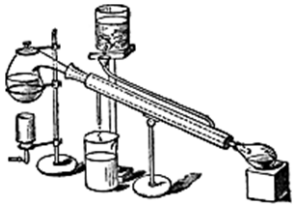
The DFW ACS Award for Outstanding Chemistry/Biochemistry Award was given to Catherine Daniel.

Awards for undergraduate research and undergraduate teaching were given, respectively, to Michelle Reyes and Melissa Orr.

Awards for outstanding freshman, sophomore, junior, and senior chemistry/biochemistry students were given, respectively, to Eric Cyganowski, Aladin Elkhalill, Payton Wasemiller, and Octavio Miranda.

The outstanding chemistry clinic tutor was Joshua Putman, and the chemistry/biochemistry society outstanding member award went to Kendall Hendrix.

Scholarships were given to Ebony Jones, Nguyen Nguyen, Kendall Hendrix, Ruby Hong Ngoc Le, Hope Johnson, Adjo Kadjo, David Smith, Saiyara Baset, and Archit Jaiswal. Graduate student awards were given to Monika Patterson, Mohammad Kabir Hossain, Tharun Teja Ponduru, Garrett Hellinghausen, Daipayan Roy, Rai Singh, and Jamie York.



From the ACS Press Room

How severe drought influences ozone pollution

"Observing Severe Drought Influences on Ozone Air Pollution in California"

Environmental Science & Technology

From 2011 to 2015, California experienced its worst drought on record, with a parching combination of high temperatures and low precipitation. Drought conditions can have complicated effects on ozone air quality, so to better understand the process, researchers have analyzed data from two ozone-polluted cities before, during and after the California drought. They report their results in ACS' journal Environmental Science & Technology.

Although ozone in the stratosphere protects the earth from ultraviolet radiation, at ground level the molecule is a harmful air pollutant to humans, animals and plants. Ground-level ozone forms when nitrogen oxide compounds, primarily from motor vehicle emissions, react with volatile organic compounds (VOCs) from natural and anthropomorphic sources. Isoprene, a VOC emitted by plants, is a significant contributor to ozone production during summer months in many locations

around the world. However, plants also decrease air ozone levels by taking the gas up through pores in their leaves. Because drought conditions affect both of these plant-related processes, Angelique Demetillo, Sally Pusede and colleagues wanted to examine air concentrations of isoprene and ozone — as well as leaf area index, nitrogen dioxide and meteorology — before, during and after the California drought.

For their study, the researchers analyzed publicly available data collected from the ground and satellites in Fresno, an ozone-polluted city close to an oak savanna, and Bakersfield, California. They found that

isoprene concentrations did not change significantly during the early drought, but they dropped by more than 50 percent during the most severe drought conditions. The effects of drought on isoprene were also dependent on atmospheric temperature. The researchers found that drought altered ozone production such that the process became chemically more sensitive to the decrease in isoprene and other drought-affected VOCs. These factors led to an estimated overall decrease in ozone production of approximately 20 percent during the severe drought. However, this decrease was offset by a comparable reduction in ozone uptake by plants, leading to only a 6 percent reduction in ozone levels overall during the severe drought period. These results suggest that drought influences on ozone pollution are complex and depend on drought severity and duration, the researchers say.

The authors acknowledge funding from NASA, the NASA Student Airborne Research Program, the National Suborbital Research Center and the NASA Airborne Science Program.

From the editor

In the Dallas-Fort Worth Section, May is the month for congratulations. Check these out:

> Winners at the Meeting-in-Miniature, hosted by the University of North Texas Chemistry Department (page 8),
>
> Student Awardees from the Dallas-Fort Worth Section schools (page 7),
>
> And to Nicholas Tsao (page 14).. Nicholas, a student at St. Mark's School of Texas, one of the twenty finalists in the US National Chemistry Olympiad Program and will attend the Chemistry Olympiad Study Camp in June. He's also the only qualifier from Texas this year. His teacher at St. Mark's is Mr. Kenneth R. Owens.

As you all probably know, the Southwest Retort is published on a nine month schedule, so we will return with the September issue. Have a good summer, everyone.