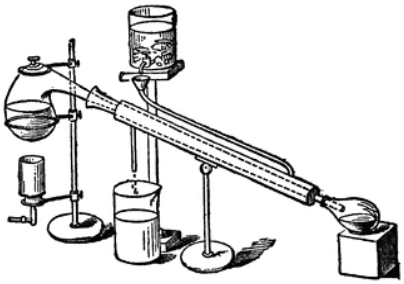
SOUTHWEST RETORT



SEVENTY-SECOND YEAR **September 2019**

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and Chemistry in this area

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FIFTY YEARS AGO IN THE SOUTHWEST RETORT

Compiled by E. Thomas Strom

The Southwest Retort is now beginning its 22nd year of publication. We now represent 16 sections of the ACS in the Southwest covering an area of 550,000 square miles. Our subscribers total some 4800 chemists and chemical engineers.

Dr. Thomas Aczel, J. Q. Foster, and **J. H. Karchmer** of Esso Research and Engineering Co. in Baytown, TX, have been named recipients of the Bituminous Coal Research, Inc. Award for the best paper pertaining to coal at the ACS Division of Coal Chemistry papers at the Minneapolis ACS National Meeting.

A course on "Interpretation of Infrared Spectra" will be sponsored by the Dallas-Ft. Worth ACS Section and taught by **Norman B. Colthup** Nov. 1-2 at the University of Texas at Arlington. In other news from the Dallas-Ft. Worth ACS Section, the newest faculty member at the University of North Texas is **Dr. G. R. Dobson**. Dr. Dobson has previously had faculty positions at the University of Georgia and the University of South Dakota. He joins NTSU as Associate Professor. **Dr. William H. Glaze** attended the Fourth International Symposium on Organometallic Chemistry held in Bristol, England, July 27-Aug. 1. He also presented a seminar at the University of Salford. His travel expenses were covered by an NSF grant. He also has received a two year NSF grant to study "Organometallic Photochemistry." At the recent ACS Meeting-in-Miniature held at UT-Arlington, five North Texas students were honored. **Robert Roe, Jr., D. D. Justice,** and **J. C. Terry** won, respectively, 1st, 2nd, and 3rd place honors in the graduate division. **R. C. Rains** and **J. P. Brooks** placed 1st and 3rd, respectively, in the undergraduate division.

Dr. Donald R. Martin has been named Professor of Chemistry and Chair of the UT-Arlington Department of Chemistry. He comes from Harshaw Chemical Co. in Cleveland where he was Vice President for Research and Development. He recently received a two year Air Force grant to study "Stable Aqueous Solutions of Gold." **Dr. Hugh D. McAfee** was recently promoted to Professor, while **Dr. Robert F. Francis** was promoted to Associate Professor

Recently joining the chemistry department of Texas Christian University were **Dr. William Koehler** and **Dr. Dale Huckaby**. **Dr. Francis S. Johnson** has been appointed Acting President of the University of Texas at Dallas.

From the ACS Press Room

Microfluidic Devices Made of Wood

"Wood Microfluidics"

Analytical Chemistry

To analyze tiny amounts of liquids, scientists often use devices called microfluidic chips, which are small pieces of plastic that are etched or molded with miniscule channels. Although these single-use chips are small, their widespread use in labs, hospitals and point-of-care situations adds up to a lot of plastic pollution. Therefore, researchers reporting in ACS' journal *Analytical Chemistry* have developed versatile microfluidic chips made of a renewable, biodegradable and inexpensive resource — wood.

Microfluidic chips are useful for analyzing small samples, like a single drop of blood, at low cost because only miniscule amounts of expensive reagents are needed. When a fluid flows through the microchannels, it is mixed with certain substances and then analyzed, for example, for the presence of microbes or disease-related proteins. Recently, scientists have tried making microfluidic chips from inexpensive, environmentally friendly resources such as cloth or paper, but these devices are typically limited to relatively simple applications. Govind Rao and colleagues wanted to make a microfluidic device out of low-cost wood that could be used for a variety of purposes.

To make their device, the researchers used a laser printer to engrave tiny channels into birch plywood chips. Then, to prevent liquids from seeping into the porous wood, they coated the channels with a thin layer of Teflon™. When they introduced blue and red food dyes to the tips of Y- and T-shaped patterns of channels, the liquids mixed as efficiently in the wood chips as in conventional plastic devices. The researchers also used the wood chips, in conjunction with a fluorescence technique, to measure the amounts of two proteins and live bacteria, all of which were similar to the amounts determined by a plastic chip. The wood devices were 10–100 times less expensive than comparable plastic ones and more environmentally friendly. Now, the researchers are working on finding a renewable replacement, such as beeswax or natural oils, for the Teflon™ coating.

Credit: Adapted from Analytical Chemistry

2019 DOI:10.1021/acs.analchem.9b01232

The authors acknowledge funding from the Defense Advanced Research Projects Agency (DARPA) and the UMBC Technology Catalyst FundWood microfluidic devices could analyze small amounts of liquids in a more environmentally friendly way.

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Many Congratulations to ACSDFW Award Recipients 2019

Remember to Register and Attend the events Recognizing the Awardees' respective Innovations in ChemEd, Contributions to Chemistry, and effectiveness in Sharing Chemistry with the World

Werner Schulz Award for Excellence in High School Chemistry Teaching
Neil Milburn, MA
AP Chemistry Teacher
National Academies Honorary Board of Educators
LASER, & Key Club Club Sponsor
Plano West Senior High

Wilfred T. Doherty Award for Contributions to Chemistry
Julia Chan
Professor of Chemistry
Department of Chemistry and Biochemistry
University of Texas at Dallas

Chemistry Ambassador Award for Promotion of Science
Robert G. Landolt, Ph.D.
Professor, emeritus
Texas Wesleyan University

Many thanks to the Awards Committee of the ACSDFW Local Section (2019 Chair: Sean O'Brien, PhD of TI) for the selection of such worthy Recipients. Nominate deserving chemists and chemistry teachers for The Schulz, Doherty and Ambassador Awards. Online nomination info available on acsdfw.org.

From the ACS Press Room

Fungal Compound Deodorizes Skunk Smell

"An Electrophilic Natural Product Provides a Safe and Robust Odor Neutralization Approach to Counteract Malodorous Organosulfur Metabolites Encountered in Skunk Spray"

Journal of Natural Products

Being sprayed by a skunk is no fun for people or their pets, and the strong, stinky secretions can serve as a nasty reminder of the wildlife encounter for days or weeks. Available "de-skunking" formulas often either don't work well or can irritate the skin and eyes. Now, researchers reporting in ACS' *Journal of Natural Products* have identified a compound from fungi that safely and effectively neutralizes skunk spray odor.

When skunks feel threatened, they spray fluids from their anal glands that contain several nasty-smelling organosulfur compounds. The human nose can detect extremely low concentrations of these substances, making it difficult to completely rid clothing, hair, fur or skin of the stink. Various home and commercial remedies claim to neutralize skunk odor, but they often don't work well or contain skin and eye irritants. Robert Cichewicz and colleagues wondered if a natural product they had previously identified from fungi, called pericosine A, could react with and neutralize odoriferous compounds in skunk spray.

To find out, the researchers mixed pericosine A with different organosulfur compounds from skunk spray and analyzed the products of the reactions. They discovered that the fungal compound reacted with two types of organosulfur compounds — thiols and thioesters — and converted them to stable, odorless products. Then, the team very slightly altered the structure of pericosine A and adjusted other ingredients in the reaction to produce a formula that would be safer and more effective for skin application than the original compound. Finally, the researchers used in vitro eye and skin tests to determine that the fungal compound was non-irritating.

Researchers have identified a fungal compound that can deodorize skunk smell.

Credit: Layne VR/Shutterstock.com

The authors acknowledge funding from the University of Oklahoma.

Video Link::

https://www.acs.org/content/acs/en/pressroom/reactions/videos/2019/how-to-get-rid-of-skunk-smell.html

Please read this important message from ACSDFW Secretary, Mandy Dark, MS

Thinking of Getting more involved with our local ACS Section? We Need YOU! We Invite you to run for office!

ACSDFW – Local Section Elections

Volunteers are elected to govern the DFW Local Section and interact with ACS National. Section officers join the Executive Committee (aka EC or ExCom) for the length of their terms. The DFW local section cannot carry out its mission of promoting chemistry and chemical professionals without the help of as many ACS members as possible. Serving the local section as an officer - or even as a candidate - is a great way to contribute to the community. A description of the duties of each of the open offices is available at the local section website: https://acsdfw.org/officer-duties/

The new terms begin on January 1, 2020.

- Chair: chair 2020; past chair 2021
- Chair-elect; 3 year term; chair-elect 2020; chair 2021; past chair 2022
- Secretary; 2 year term; 2020-2021
- Councilor; 3 year term; 2020-2022
- Alternate Councilor; 3 year term; 2020-2022

To run for office please submit a 1/3 page biography, single space typed, to the Secretary of the DFW Section, Amanda Dark at amanda.m.dark@gmail.com as soon as

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Join ACSDFW on 9/25/19 to Honor Neil Milburn, MA Recipient of the 2019 Werner Schulz Award

On Tues 9/25, Join ACSDFW @ Plano West Senior High School (PWSH) to honor Neil Milburn, MA

2019 Recipient of the Werner Schulz Award for Excellence in High School Chemistry Teaching

The Werner Schulz Award for Excellence in High School Chemistry Teaching is presented Annually to the Chemistry Educator who embodies Chemistry as a Central Science while inspiring students to pursue further education and careers in Chemistry and the Sciences.

Register Now: https://www.eventbrite.com/e/2019-werner-schulz-award-dinner-honoring-neil-milburn-tickets-71542919799?aff=ebdssbdestsearch

6p - Social Hour w/ Appetizers, iced tea and lemonade

7p - Delicious BBQ Buffet Dinner* by Royal Catering

8p - Presentation of the Schulz Award and Talk by the Honoree

Title: "I Think He's Flipped!"How "Flipping the Classroom" enables differentiation so that all students can reach their maximum potential. The traditional classroom approach with the "sage on the stage" delivering lectures leads to some students getting left behind and yet others bored and unchallenged. Flipping so that the lectures are received outside of the classroom frees up class time such that multiple differentiated activities can be undertaken concurrently.

Neil Milburn, holds an MA in Teaching Science and is on the National Academies Honorary Board of Educators. He teaches AP Chemistry and is LASER, Key Club and Rocketry Club Sponsor.

Registration Deadline: September 18, 2019

*Beef & chicken, let us know if you have dietary re-

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From the ACS Press Room

Sunscreens Release Metals and Nutrients into Seawater

"Sunscreens as a New Source of Metals and Nutrients to Coastal Waters"

Environmental Science and Technology

Beachgoers are becoming increasingly aware of the potentially harmful effects UV filters from sunscreens can have on coral and other marine organisms when the protective lotions wash off their bodies into the ocean. Now, researchers have studied how sunscreens release different compounds — trace metals and inorganic nutrients — into Mediterranean seawater, with unknown effects on marine ecology. They report their results in ACS' journal *Environmental Science & Technology.*

Millions of people are hitting the beach slathered in sunscreen this summer. Some might choose "coral-safe" sunscreens that lack oxybenzone and octinoxate, the two substances most widely linked to coral reef damage. However, scientists don't yet know what effects other trace compounds in sunscreens might have on marine ecosystems. As a first step, researcher Araceli Rodríguez-Romero and colleagues wanted to determine how quickly sunscreen releases trace metals and nutrients into seawater, and how sunscreen from beachgoers' bodies could impact the overall levels of the compounds in coastal waters.

The researchers added a commercial, titanium-dioxide-containing sunscreen to samples of Mediterranean seawater and observed how droplets of the lotions released various metals and nutrients into the water. Some compounds entered the seawater more quickly after UV treatment, which simulated sun exposure. Aluminum, silica and phosphorous had the highest release rates under both light and dark conditions. The team used these data to develop a model that predicts the release of compounds from sunscreen under different conditions.

Then, they used the model to estimate that, on a typical summer day at the beach, beachgoers could increase the concentration of aluminum in coastal waters by 4% and of titanium by almost 20%. More research is needed to determine how these metals and nutrients, which are normally present at very low amounts in seawater, could be affecting marine ecosystems, the researchers say.

The authors acknowledge funding from the University of Cantabria and the Juan de la Cierva Formación.

From the ACS Press Room

Designing a Better Low-fat Potato Chip

"Enabling the Rational Design of Low-Fat Snack Foods: Insights from In Vitro Oral Processing"

Journal of Agricultural and Food Chemistry

Munching on low-fat potato chips might reduce the guilt compared with full-fat versions, but many people don't find the texture as appealing. Now, researchers have developed a technique to analyze potato chips' physical characteristics from simulated first bite to swallow, which they say could be used to help formulate a tastier low-fat snack. They report their results in the *Journal of Agricultural and Food Chemistry.*

Cutting fat in potato chips usually involves reducing the vegetable oil content. However, the oil helps give the product its characteristic crunch, taste and mouthfeel. When food scientists formulate a new low-fat chip, they often rely on trained sensory panelists to tell them how well the new snack simulates the full-fat version. This process can be expensive, time-consuming and often subjective, since perceptions can vary based on factors like a person's saliva flow rate and composition. While at PepsiCo, Stefan Baier — now at Motif Ingredients — and Jason Stokes' team at the University of Queensland wanted to develop a more objective method to analyze the physical characteristics of a potato chip at four stages of simulated eating: the first bite, when the chip is taken from the package and broken by the teeth; comminution, when the chip particles are broken down further and wet by saliva; bolus formation, when the small, softened particles begin to clump as enzymes in saliva digest the starches; and swallow, when the clumped mass moves to the rear of the mouth and is finally swallowed.

To develop their method, called in vitro oral processing, the researchers used different instruments to measure the physical characteristics of chips with various oil contents at each of the four stages. For example, for the "first bite" stage, they conducted mechanical testing to measure the force required to break the chips, and for bolus formation, they measured the hydration rate of particles in buffer as the fragments became a soft solid. The researchers used the results to design a lower-fat chip coated in a thin layer of seasoning oil, which contained a small amount of a food emulsifier. The seasoning oil made the low-fat chip more closely resemble the greasiness of a full-fat one in tests with sensory panelists, but it only added 0.5% more oil to the product. Food scientists could use the new technique to link physical measurements with sensory perceptions, the researchers say.

The authors acknowledge funding from PepsiCo., Inc. and the Australian Research Council Linkage Program.

TUESDAY, OCTOBER 22 - SATURDAY, OCTOBER 26

Did you know that 76% of periodic table elements are metals? Conduct interesting investigations and fascinating experiments with these glistening and gleaming elements during Chemistry Connections 2019. Museum staff, American Chemical Society Student Groups from area universities and high school students will lead engaging hands-on explorations with these marvelous metals along with classic chemistry experiments.

CHEMISTRY CONNECTIONS HOURS

OCTOBER 22-25
10:00 AM-2:00 PM

OCTOBER 26
10:00 AM-4:00 PM

School Field Trips
All Chemistry Connections experiences are included with exhibit admission and are designed for 2nd grade and above. School groups of 15 or more can book field trips in advance by calling 817-255-9440 or visiting www.fwmuseum.org/about-us/school-field-trips/

HOMESCHOOL AFTERNOON
(2ND GRADE AND ABOVE)
Special extended Chemistry Connections hours for homeschool educators and children will be offered on Thursday, October 24 from 1:30 - 4:00 PM. Explore the fascinating properties of metals, try out classic chemistry experiments and learn from area high school and university students.

FWMUSEUM.ORG/EXHIBIT/CHEMISTRY-CONNECTIONS/

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SCIENCE AND HISTORY

Chemistry Connections is sponsored locally by Alcon FOUNDATION

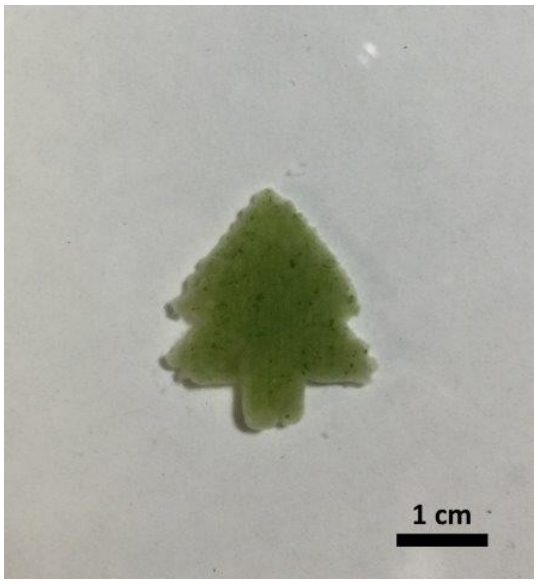
From the ACS Press Room

A Silky Home for Air and Water Purifying Microalgae

"3D Printing of Functional Microalgal Silk Structures for Environmental Applications"

ACS Biomaterials Science & Engineering

Microalgae are tiny but important organisms, producing oxygen for us to breathe. But scientists have also used the microscopic, aquatic creatures to make biofuels, food and pharmaceuticals, as well as to capture carbon dioxide from power plants and turn it into oxygen. Now, with the help of silkworm cocoons, researchers reporting in ACS Biomaterials Science & Engineering have made an artificial home to support microalgae growth and photosynthesis for environmental applications.



A 3D-printed silk hydrogel "tree" hosts oxygen-producing microalgae (green).

Credit: Adapted from ACS Biomaterials & Engineering 2019, DOI: 10.1021/acsbiomaterials.9b00554

Someday, microalgae might be used for purposes ranging from wastewater cleanup to the purification of indoor air. But first, scientists need a way to keep microalgae in the proper place to do their jobs, without floating away or contaminating natural water systems. Researchers have developed various materials to immobilize the microorganisms, but they have limitations, such as possibly being toxic, or not being strong or stable enough. David Kaplan and colleagues had previously developed a silk hydrogel that could support mammalian cell growth, and they wondered if it would also work for microalgae.

To find out, the researchers diced up silkworm cocoons, dissolved the fiber and combined it with a thickening agent to produce a 3D-printable ink. Then, they added microalgae. The team 3D-printed the microalgae-containing ink into various shapes, such as a tree, in a container of seawater. The water contained a small amount of hydrogen peroxide, which solidified the ink into a gel. The silk structures supported microalgae growth for at least 4 weeks and photosynthesis for more than 90 days. The results suggest that the system could be suitable for environmental applications, such as indoor air improvements and carbon dioxide reduction, the researchers say.

The authors acknowledge funding from the National Institutes of Health.

Around the Area

University of Texas at Arlington

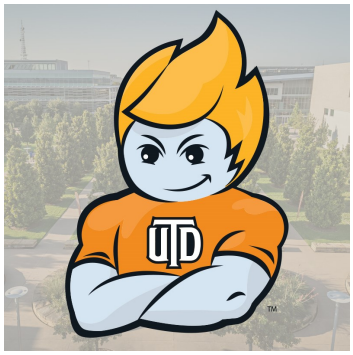
Biochemist **Dr. Subhra Mandal** has been promoted from Associate Professor to Professor.

Dr. Krishnan Rajeshwar has received the Electrochemical Society's (ECS) Electrodeposition Research Award. Raj was also honored with a special symposium at the ECS meeting held in May 26-30 in Dallas. A special focus issue of the *Journal of the Electrochemical Society was distributed at the same meeting.*

Dr. Robin Macaluso has received a UT-Arlington interdisciplinary grant to study "New Bulk and Thin Film Phosphor Materials to Meet Challenges in Solid State Lighting. A Collaborative Chemical and Engineering Approach." Her collaborator is **Prof. Weidong Zhou** from the Electrical Engineering Department.

Graduate student **Melissa Orr** has received a Grant in Aid of Research Award from Sigma Xi. She is studying rare earth oxysulfides for their unique magnetic, luminescent, and photocatalytic properties. Her mentor is Dr. Robin Macaluso.

A number of chemistry department faculty have been honored by the UT-Arlington administration for their excellence in teaching, research, mentoring, and service. Those so honored were Drs. **Daniel Armstrong, Frank Foss, Robin Macaluso, Subhra Mandal,** and **Alex Bugarin.**



University of Texas at Dallas

The chemistry department welcomes **Dr. Vladimir Gevorgyan** (Robert A. Welch Distinguished Chair) and **Dr. Eric Welin** (Assistant Professor) to the faculty.

Dr. Amandeep Sra was selected as a 2019 Reagents' Outstanding Teaching Award recipient.

Dr. Sheena D'Arcy won a Maximizing Investigators' Research Award for Early Stage Investigators from the NIH.

Dr. Jeremiah Gassensmith was awarded tenure and promoted to Associate Professor.

Michael Luzuriaga (Gassensmith Lab) was awarded the David Daniel Thesis Award, and **Bujie Du** (Zheng Lab) was awarded the inaugural IKA Graduate Research Leadership Fellowship Award.

ACS Local Section
Dallas-Fort Worth

Mark Your Calendars!

Tuesday November 5, 2019 6p - 9p

Wilfred T. Doherty Award Dinner

Honoring 2019 Recipient

Professor Julia Chan

Department of Chemistry & Biochemistry

The University of Texas at Dallas

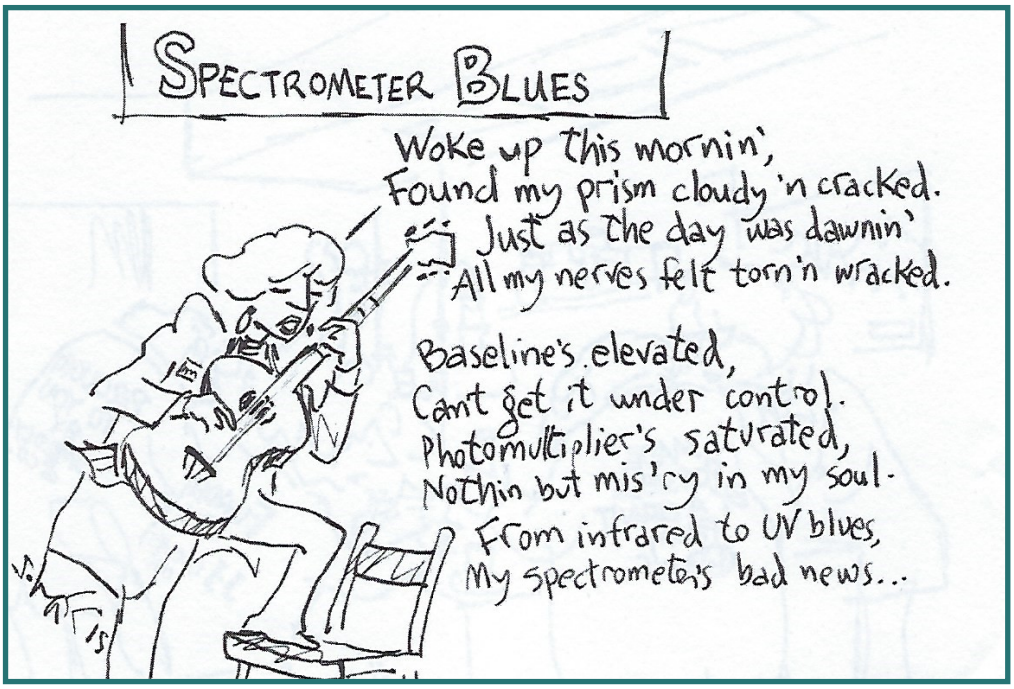
The event will be held in the McDermott Suite at UTD

and will feature Dr Chan's Award Talk:

"Adventures in the Discovery and Crystal Growth of Quantum Materials"

as well as Presentation of the 2017, 2018, and 2019 Doherty portraits to the UTD Doherty Gallery

Eventbrite Registration will be available as soon as details are finalized.



Copyright credit:ScienceCartoonsPlus.com

Ed. Note:

This brings back dreadful memories of the time I talked my major professor into buying new salt plates for the IR...and then I sneezed on them….

Tuesday, October 22, 2019 at 6:45pm ET

Join thousands of students and early career chemists from around the world for this FREE, one-night only event during National Chemistry Week. Discover how chemists are developing new technologies using metals at the intersection of organic and inorganic chemistry. From innovations in medical imaging and theranostics to fundamental changes to the way we create everyday necessities like clothing, food, and energy, these scientists will demonstrate how we can harness the power of our "marvelous metals."

ACS-affiliated groups: Register and confirm your shipping address by October 4th, 2019 (Sept. 27th for US Territories and International groups) to receive your physical box.

What to Expect from Your Event

- A live interactive video broadcast featuring presentations and Q&A with experts in organometallic chemistry
- Professor Vy Maria Dong will discuss the importance of organic chemistry processes to the industries that power modern society and how she is using metals to create improved reagents, catalysts, and strategies for a more sustainable and greener future
- Professor Thomas J. Meade will define molecular imaging, what it can currently do in

the clinic, and how his "bioactivated" or "conditionally activated" probes could revolutionize how we diagnose and even treat patients during the diagnostic phase

- Be the first to answer "Marvelous Metal Trivia" on Twitter with #ACSPIB and get a shout out live on-air!
- Meet thousands of fellow students and professionals around the world on Facebook, Twitter, and Instagram by posting with the event hashtag #ACSPIB
- Unpack raffle prizes, handouts, and other ACS resources to share with your members*
- Take your event further with the ACSPIB "Expansion Pack," including guides for optional hands-on activities, ice breakers, experiments, and discussion questions
- This event is aimed at college-level chemistry students and early career chemists, but it may be suitable for some high school groups and other communities.

  Email multimedia@acs.org with questions about program content.

*Final Box and Presentation Content Subject to Change.

What is ACS Program-in-a-Box?

ACS Program-in-a-Box is the easiest event you'll ever host because "it's all in the box." With very little effort (acquire the space and gather the crowd), you can host an energetic science event that engages chemistry students and early career chemists.

Physical boxes are an exclusive benefit for active ACS-affiliated groups. This includes, but is not limited to, groups hosted by ACS Local Sections, ACS Technical Divisions, ACS Student Chapters, and ACS members. ACS International Chemical Sciences Chapters and ACS International Student Chapters are also now eligible! If you have any questions about the status of your ACS group and your eligibility to receive a physical box, contact the ACS PIB team at multimedia@acs.org.

Not affiliated with ACS? That's okay! We want all chemists to join the party and connect with each other. We'll send you a "digital box" to download handouts included in the physical box for you to print and share with your attendees. We can also help you use ACS Program-in-a-Box™ to start your Student Chapter, or get your Local Section or Student Chapter back into an active status, so next time you'll see an ACS Program-in-a-Box™ on your doorstep!

ACS Program-in-a-Box™ does not endorse any products or services. The views expressed in this presentation are those of the presenters and do not necessarily reflect the views or policies of the American Chemical Society.

Meet the Experts

Thomas J. Meade
Professor of Chemistry
Northwestern University

Vy M. Dong
Full Professor of Natural Sciences
University of California, Irvine

From the editor

Congratulations to our award winners Neil Milburn, Julia Chan, and Bob Landolt for the Schultz, Doherty, and Chemistry Ambassador awards, respectively.

National Chemistry Week is fast approaching, and will be celebrated by Chemistry Connections at the FW Museum of Science and History.

As you know, I always like to comment on the press releases. I cannot decide on my favorite this month; I am torn between potato chips and skunks. Potato chips, as we all know, are nature's most nearly perfect food (phooey on the milk and bananas!). Here's hoping the research group at PepsiCo can successfully come up with a low-fat chip with great texture.

And run for Section office! Do it now!

Best regards,
Connie