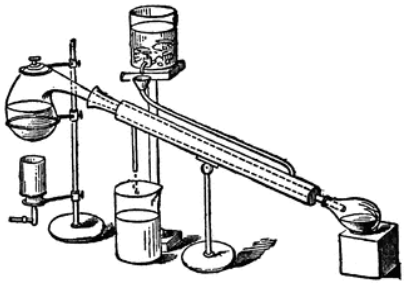
# SOUTHWEST RETORT



**SIXTY-NINTH YEAR** **OCTOBER 2016**

***Published for the advancement of***
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***and Chemistry in this area***

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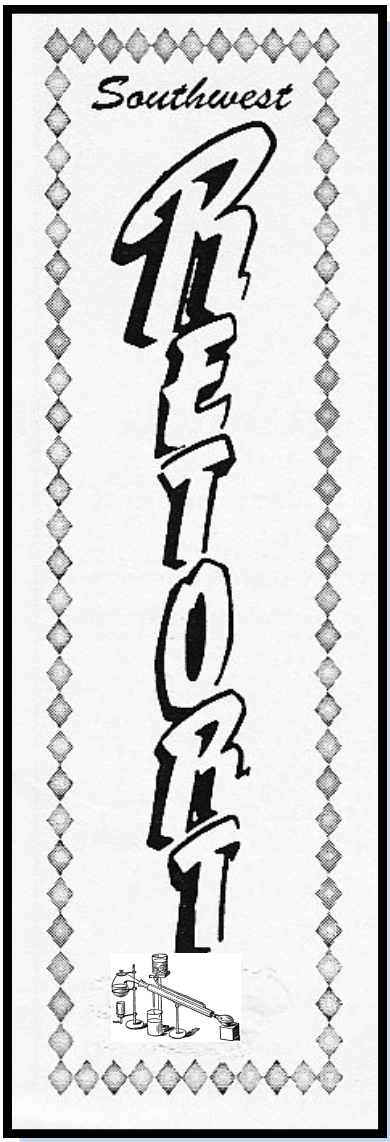


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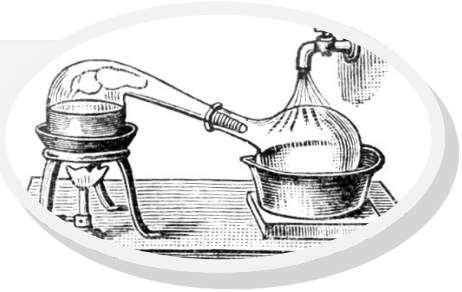

# EMPLOYMENT CLEARING HOUSE

**Job applicants should send name, email, and phone, along with type of position and geographical area desired; employers may contact job applicants directly. If you have an opening, send your listing, including contact info for your company, to retort@acsdfw.org. Deadlines are the 7th of each month.**

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**Computer and software skills** including MS Office Suite programs, Internet, email systems required.
**Proven multi-tasking skills** able to handle multiple projects simultaneously within a GMP environment; ability to motivate teams, work within aggressive timelines collaboratively with cross-functional departments
**Demonstrated ability** to work as a strong contributor in a team environment on complex projects.
**Required skills** include strong communication, leadership, decision-making, organizational and analytical skills. A candidate must be able to maintain customer focus, handle difficult discussions, build consensus, work independently and prioritize multiple tasks and adjust quickly, as needed. The ideal candidate must be willing to pursue tasks that may be required for projects but are not clearly defined within this job description.
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**The Department of Chemistry and Biochemistry**

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**Application review will begin immediately and continue until the position is filled. The anticipated start date is January 2, 2017.**

**UT Arlington is an Affirmative Action/Equal Opportunity Employer. Women, minorities, veterans, and individuals with disabilities are encouraged to apply. The use of tobacco products is prohibited on UT Arlington properties. A criminal background check will be conducted on finalists.**

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# *FIFTY YEARS AGO IN THE SOUTHWEST RETORT*

Here is up-to-date information on the ACS Southwest Regional Meeting to be held Nov. 30 to Dec. 2 in Albuquerque, NM, and hosted by the Central New Mexico ACS Section. There will be a program of 218 papers. Special symposia have been organized on the topics of "New Approaches in Teaching Undergraduate Chemistry," "High Temperature Chemistry," "Cryochemistry," "Physical Chemistry of Water Desalination," and "Complex Fluorides and Molten Salts." **Glenn T. Seaborg**, Chair of the AEC, will be the speaker at the banquet to be held on Thursday evening. A Friday plenary lecture will be given by **Dr. William R. Fisher**, psychiatrist at Albuquerque's Langner Clinic, on the topic "Some Reflections on the Creativity Process." There will also be a one-day ACS short course Oct. 29 on the topic "Modern Theory of Acids and Bases" given by **Dr. Ralph G. Pearson** of Northwestern University.

The October ACS tour speakers are **Dr. Edward A. Meyers** of Texas A&M University and **Dr. Paul K. Kuroda** of the University of Arkansas. Their topics are, respectively, "Crystal Structure of Certain Complex Compounds" and "Origin and Age of the Chemical Elements."

New faculty members at Sam Houston State University are as follows: **Maurice Dyke**, who is completing a Ph.D. at Rice in physical organic chemistry. He previously received B.S. and M.S. degrees from North Texas State University. **Dr. James E. Johnson**, who is an organic chemist specializing in heterocyclic chemistry. He received B.S. and M.S. degrees from the University of Minnesota and a Ph.D. from the University of Missouri. **Dr. Paul S. Poskozim**, who is an inorganic chemist with interests in Group IV A elements. He received his B.S. degree from Loyola University of Chicago and his Ph.D. from Northwestern.

In the ACS Panhandle Plains Section, **Mrs. Elaine Ledbetter** of Pampa High School was the winner of the James Bryant Conant Award for our district, which includes Texas, Iowa, Missouri, Kansas, Oklahoma, Arkansas, and Louisiana. She gave a talk at the local section meeting on "The New Look in High School Science."

**Professor Frederick Duke** of Purdue University was the speaker for the Oct. 10 meeting of the University of Arkansas ACS Section. His topic was "The Flavin Enzymes."

**Dr. Joseph A. Polack** has been appointed Director of the Esso Baton Rouge Research Laboratories. He replaces **Dr. L. E. Swabb**, who has been appointed Manager, New Areas Planning and Coordination, with Esso in Linden, NJ.

**Compiled by E. Thomas Strom**

# 2016 Schulz Award Winner

# Gale Hunt of Hebron High School

2016 Schulz Award winner
Mrs. Gale Hunt

On Tuesday, October 18, Mrs. Gale Hunt of Hebron High School in Carrollton (Lewisville ISD) was honored as the 2016 Schulz Award winner. The meeting was held at Saltgrass Steakhouse in Plano.

Gale Hunt has over 40 years of teaching experience, including 22 years in Texas. Currently, she teaches AP Chemistry at Hebron High School. Gale earned a BS with a double major in chemistry and zoology, and a MEd in supervision and curriculum. She worked in a genetics research laboratory and as a LSU lab instructor before transitioning to teaching science at the high school level. She is a leader in the ACT2 (Associated Chemistry Teachers of Texas), and a member of the National Science Teachers Association (NSTA), Science Teacher Association of Texas (STAT), ATPE, and AP College Board. Her honors include being the 2003 State of Texas Teacher Presidential Scholar of the Year, Irving ISD Apple Award for Outstanding Educator, and being a Panel Member of the Texas State Review Committee. In 2008 she was awarded a $10,000 teacher grant from Best Buy for her innovative instructional program.

At the ceremony Mrs. Gale Hunt gave a speech titled "My Journey on the Big School Bus."

According to the ACS website, the Schulz Award is given to high school chemistry teachers like Dr. Werner Schulz, who bring something extra to the teaching of chemistry. Nominees should exemplify excellence in chemistry teaching as demonstrated by testimonials from students and fellow teachers, results in student competitions, and diligence in updating and expanding scientific/teaching credentials. The honorarium for the Schulz Award is $1000. A large photo of the Schulz award winner will be displayed for one year at the Perot Museum of Nature and Science and then permanently displayed in the Gallery of Schulz Award Winners, Science Building, Tarleton State University in Stephenville. A traveling plaque also stays at the winner's high school for the year of the award.

## *From the ACS Press Room*

# Former pesticide ingredient found in dolphins, birds and fish

**Perfluoroalkylphosphinic acids in northern pike (Esox lucius), double-crested cormorants (Phalacrocorax auritus), and bottlenose dolphins (Tursiops truncatus) in relation to other perfluoroalkyl acids**

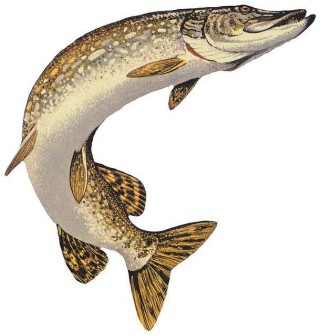
*Journal of the American Chemical Society*

A family of common industrial compounds called perfluoroalkyl substances, which are best known for making carpets stain resistant and cookware non-stick, has been under scrutiny for potentially causing health problems. Focusing on one of the family's subgroups, scientists report for the first time that some dolphins, fish and birds have perfluoroalkyl phosphinic acids (PFPIAs) in their blood. The work appears in the ACS journal *Environmental Science & Technology.*

Studies on PFPIAs have been limited, but some have detected the compounds in human blood samples. The substances also stick around in the environment for a long time, which makes them likely to be inhaled or ingested by people and animals. This particular subgroup of perfluoralkyl substances was once used in pesticides and continues to be used in other industrial applications such as carpet cleaning.

Bottlenose dolphins, cormorants and northern pike have been found to have low levels of a former pesticide ingredient in their blood.

Credit: Tory Kallman/Shutterstock.com



To find out more about PFPIAs, Amila O. De Silva and colleagues analyzed blood samples from northern pike near the Island of Montreal, cormorants from the Great Lakes and bottlenose dolphins from Sarasota Bay, Florida, and Charleston, South Carolina. Although the concentrations were low, the survey detected PFPIAs in 100 percent of the samples. The researchers say this ubiquity underscores the need for further studying the potential effects of these substances.

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The Innovation Studios will be filled with hands-on chemistry mysteries that we invite you to solve! Learn about the chemistry of forensic science and try out classic experiments that deepen your understanding of this fascinating field. Museum staff, American Chemical Society Student Groups from area universities and high school students will lead these engaging experiences.

**CHEMISTRY CONNECTIONS HOURS:**
**OCTOBER 15 | 10AM - 4PM**
**OCTOBER 18 - 21 | 10AM - 2PM**

## SCHOOL FIELD TRIPS

2ND GRADE AND ABOVE

School groups of 15 or more can book field trips in advance by calling 817-255-9440.

## HOMESCHOOL AFTERNOON

2ND GRADE AND ABOVE

Special extended hours for homeschool educators and children will be offered on Thursday, October 20 from 1:30-4:00 PM. Your students will solve chemistry mysteries, use amazing tools of science and learn from area high school and university students.

## SPECIAL EDUCATOR MORNING

October 15 | 10AM - 12PM

Educators, don't miss this fun opportunity to gather chemistry and matter ideas for your classroom! *Educators receive free Museum admission all year long (with proof of school affiliation).*

*Chemistry Connections is sponsored locally by* Alcon FOUNDATION

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*Volunteer support is provided by Texas Christian University, Southern Methodist University, Texas Wesleyan University, Texas Woman's University, University of Dallas, University of North Texas, University of North Texas-Health Science Center, University of Texas at Arlington, Eastfield College, Tarrant County College, Birdville High School, Fort Worth Country Day, Lamar High School, Southwest Christian School, Trinity Valley School, STEAM Middle School, Fort Worth Police Department.*

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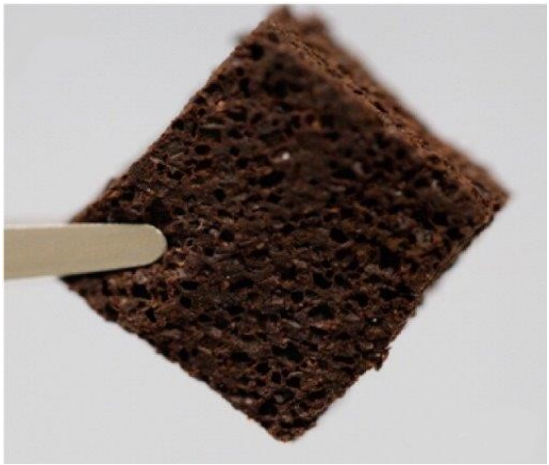
*From the ACS Press Room*

# Coffee-infused foam removes lead from contaminated water

**Spent Coffee Bioelastomeric Composite Foams for the Removal of $Pb^{2+}$ and $Hg^{2+}$ from Water**
*ACS Sustainable Chemistry & Engineering*

Coffee is one of the most popular drinks in the U.S., which makes for a perky population — but it also creates a lot of used grounds. Scientists now report in the journal *ACS Sustainable Chemistry & Engineering* an innovative way to reduce this waste and help address another environmental problem. They have incorporated spent coffee grounds in a foam filter that can remove harmful lead and mercury from water.



A foam filter made with used coffee grounds removes lead and mercury from contaminated water.

Credit: American Chemical Society

Restaurants, the beverage industry and people in their homes produce millions of tons of used coffee grounds every year worldwide, according to researcher Despina Fragouli. While much of the used grounds go to landfills, some of them are applied as fertilizer, used as a biodiesel source or mixed into animal feed. Scientists are also studying it as a possible material for water remediation. Experiments so far have shown that powder made from spent coffee grounds can rid water of heavy metal ions, which can cause health problems. But an additional step is needed to separate the powder from the purified water. Fragouli and colleagues wanted to simplify this process.

The researchers fixed spent coffee powder in a bioelastomeric foam, which acted as a filter. In still water, the foam removed up to 99 percent of lead and mercury ions from water over 30 hours. In a more practical test in which lead-contaminated water flowed through the foam, it scrubbed the water of up to 67 percent of the lead ions. Because the coffee is immobilized, it is easy to handle and discard after use without any additional steps, the researchers say.

# And Another Thing...

**By Denise Merkle, PhD**

September's topic was supposed to be Zika, but was scrapped in favor of an extension of summer. Now, it's autumn, with its lack of flip flops and lazier days, and October is a good month to discuss viruses, too. After all, Punkin' Chunkin' has already been addressed - and Zika is one wild piece of genetic material. As with almost any vector, some hosts never know they're harboring an extra snippet of RNA, and some hosts suffer extreme consequences. The devastation of the latter Zika infections is phenotypically obvious and catastrophic, especially for fetuses, and the potentiation of viral effects by pre- or co-infection with other similar viruses is an interesting microbiological phenomenon. Fascinating is not, however, the humane descriptor of the human cost of Zika infection. Hurricane Zika is a scientific puzzle - one that will be solved by those who are brave enough to shed their preconceived and possibly archaic notions of infectious diseases, and think outside the envelopes.

While I was listening to TWIV and writing up a pithy summary of Zika (in 500 words or less), a visit from Hurricane Matthew enlivened my musings. As infectious agents have the Centers for Disease Control,[3] Hurricanes have the National Hurricane Center.[4] NHC is a reference site bursting with information that can be used to abate and possibly avoid hurricane-wreaked damage, but which doesn't have any bearing on the Hurricane itself. There is no anti-Hurricane vaccine. There's not yet a Zika vaccine, either, at least according to the CDC.[5]

Definitions of Damage caused by Hurricane Winds are available on NHC, allowing those in the predicted path of the hurricane to adjust their fear levels. Shopping trips also scale with Category. A Category 1 yields slight nervousness and forays for bottled water, ice, candles, flashlights, canned fruit, and cocktail components. Category 5 generates distracted fretting and car trunks full of provisions, with the addition of tarps, generators, and a long list of hotels that will likely not lose electricity when the eye wall hits the coast (and don't forget the cocktail fixings).
What is the point of all this, you may ask? The point is viruses and hurricanes are naturally occurring phenomena that contribute to the survival of our species in ways we cannot comprehend. Especially in the aftermath of a Category 3 storm or a clinically significant infection, there's not a lot of time to acknowledge that we constantly coexist with forces beyond our control, or even beyond our abilities to re-

act. Which is why we have science. And scientists. Those who carefully plan experiments and test models, who don't discard possible explanations because they don't fit what is known; those who warn us not to contract Dengue before we're exposed to Zika, and that, in seven hours, the serene, sunny beach we're contemplating will be the Atlantic. Someone, please, hand me the bug spray - and a tarp.

Works Cited:


1) http://www.who.int/mediacentre/factsheets/zika/en/

2) http://www.microbe.tv/twiv/ (podcast #410, among others).

3) http://www.cdc.gov

4) http://www.nhc.noaa.gov/aboutsshws.php

5) https://www.cdc.gov/zika/prevention/index.html

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*From the ACS Press Room*

# Snake venom composition could be related to hormones and diet

**Dynamic Rearrangement in Snake Venom Gland Proteome: Insights into *Bothrops jararaca* Intraspecific Venom Variation**
*Journal of Proteome Research*

Many people are afraid of snakes, but scientists are now revealing insights about their venoms that could give even ophidiophobes an appreciation for the animals. One team has found that the proteins from the venom gland can vary depending on age and gender. These findings, reported in ACS' *Journal of Proteome Research*, suggest that hormonal and dietary influences are at play.

Venom differences within a snake species can depend on age and sex.

Credit: Agustin Esmoris/Shutterstock.com

Among the animals that can instill immediate fear in passers-by, snakes rank fairly high. They are stealthy and can strike quickly with precision. Many can inject victims with a nasty poison. Scientists have already found that venom composition varies between and within species. André Zelanis and colleagues wanted to conduct a precise protein profiling of the gland where the toxin is produced to find out more information about this variation.

The researchers analyzed venom from infant and adult snakes, both male and female, of the poisonous species *Bothrops jararaca*, a well-studied South American snake. Between the infants and adults, about 8 percent of the venom gland protein profiles differed. And the type of toxins expressed in the infants' glands were dominated by a different type than that dominating the adults' toxins, which could help the animals shift their diet from small reptiles and amphibians to mammals. The venom gland proteomes of males and females differed by almost 5 percent. The study's findings could indicate that hormones associated with either aging or gender play a role in what's in a snake's venom, the researchers say.

The authors acknowledge funding from the National Council for Scientific and Technological Development (Brazil), São Paulo Research Foundation and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior.

# Around the Area

## UTD

The Department of Chemistry and Biochemistry welcomes **Sheel Dodani** back home as an Assistant Professor. Dr. Dodani performed postdoctoral training in the lab of Frances Arnold at Cal Tech after earning her Ph.D. under Chris Chang at Cal Berkeley and her B.S. Chemistry degree from UT Dallas.

## UT-Arlington

**Dr. Jimmy R. Rogers**, Associate Professor of Practice, has written a textbook for General Chemistry I. This textbook is now being used in all of the first semester General Chemistry courses at UT-Arlington. Likewise, **Dr. Seiichiro Tanizaki**, Assistant Professor of Practice, wrote a textbook for use in General, Organic, and Biological Chemistry, a course taken by nursing and allied health students. Much of the motivation in writing these textbooks is to lower the cost for students. While most chemistry textbooks cost around $250 or more, these textbooks may be purchased at the UT-Arlington Bookstore for $25 or less.

## University of Arkansas

**Marlena Patrick**, **Zayne Derden**, and **David Paul**. In Situ Recalibration of Biofouled Polymer-Coated Ampero metric Oxygen Microelectrode Array. Poster presented by Marlena at the ACS meeting in Philadelphia, August 21, 2016.

**Feng Wang** gave an invited talk, "Post Hartree-Fock Free Energies through Adaptive Force Matching: Recent Progresses on Salt and $CO^2$," Manybody Interactions Workshop, Telluride, CO, July 12, 2016.

**O. Matsushita**, **R. Gensure**, **T. Ponnapakkam** and **J. Sakon**. Patent application, "Fusion proteins of collagen-binding domain and parathyroid hormone" EP 2,155,874 was granted and was validated in 13 countries in Europe on May 11, 2016.

**Hu, Z.-J.**, **Zong, G.-H.**, **Aljewari, H.**, **He, Q.-L.**, **Zhou, J.-H.**, **Du, Y.-C.**, **Shi, W.** "Exploring the mode of action of ipomoeassin natural glycoresins" International Carbohydrate Symposium, New Orleans, LA, US, July 17–21, 2016. **Zhiji-an Hu** received an honorable mention for this poster.

**Whisenhunt, L.**, **Zong, G.-H.**, **Aljewari, H.**, **Shi, W.** "Conformationally-controlled late-stage modification to facilitate SAR studies of ipomoeassin F" International Carbohydrate Symposium, New Orleans, LA, US, July 17–21, 2016.

**Publications**

**Mukherjee, R. P.**, **S. Jayanthi**, **T. K. S. Kumar**, and **B. Beitle** (2016) Production of an anti-Candida peptide via fed batch ion exchange chromatog-

raphy. Biotechnol. Progress, doi. 10.1002/btpr.2296.

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**Song, Jibin**, **Feng Wang**, **Xiangyu Yang, Bo Ning**, **Mary G. Harp**, **Stephen Culp**, **Song Hu**, **Peng Huang**, **Liming Nie**, **Jingyi Chen**, **Xiaoyuan Chen, J.** "Gold Nanoparticle Coated Carbon Nanotube Ring with Enhanced Raman Scattering and Photothermal Conversion Property for Theranostic Applications", *Am. Chem. Soc*., 138, 7055 (2016).

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**Fan, Chenguang**, **Kevan Ip**, **Dieter Söll**. Expanding the genetic code of Escherichia coli with phosphotyrosine. *FEBS Lett*. 2016 Sept.; 590(17):3040-3047.

**Henderson, R.**, **F. Gao**, **S. Jayanthi**, **A. Knight**, **P. Sharma**, **R. Goforth**, **C.D. Heyes**, **R. Henry**, and **T.K.S. Kumar** (2016) Domain Organization I the 54kDa subunit of the chloroplast signal recognition particle. *Biophysical Journal* 111 (6):1151-1162. This article has captured the Cover Art of the September 20 issue of the Journal.

**Mukherjee, R.P.**, **S. Jayanthi**, **T.K.S. Kumar**, and **B. Beitle** (2016) Production of an anti-Candida peptide via fed batch ion exchange chromatography. *Biotech-nol. Progress*, doi 10.1002/btpr.2296.

**Nguyen, Q.**, **N. Hettiarchchy**, **S. Rayaprolu**, **S. Jayanthi**, **T.K.S. Kumar**, **P. Chen** (2015) Physico-chemical properties and Angiotensin-I converting enzyme inhibitory activity of Protein hydrolysates from a non-genetically modified soy cultivar. *Journal of American Oil Chemist's Society,* 93, 595-606.

**Department of Chemistry and Biochemistry**
**Texas Woman's University**
**Seminar Schedule Fall 2016**

| | |
|---|---|
| Sept 16 | Dr. Keith Miller, University of Denver |
| Sept 30 | Dr. Jason Slinker, UTD |
| Oct 21 | Dr. John Beatty, Texas Woman's University |
| Oct 28 | Dr. Andrew Fischer, Abbott Laboratories |
| Nov 4 | Dr. Ronald J. Rahaim, Oklahoma State |
| Dec 2 | Dr. Enrique Dilone, Amicus Therapeutics |

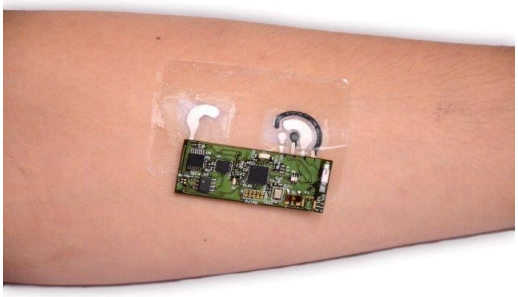
*From the ACS Press Room*

# Detecting blood alcohol content with an electronic skin patch

**Noninvasive Alcohol Monitoring Using a Wearable Tattoo-Based Iontophoretic-Biosensing System**
*ACS Sensors*

Overconsumption of alcohol can lead to errors in judgment, causing, for example, some people to get behind the wheel when they are impaired. To help imbibers easily and quickly know when they've had enough, scientists have developed a flexible, wearable patch that can detect a person's blood-alcohol level from his or her sweat. The monitor, reported in the journal *ACS Sensors*, works quickly and can send results wirelessly to a smartphone or other device.

In the U.S., one person dies every 53 minutes in an alcohol-related car accident, according to the Centers for Disease Control and Prevention. Currently, ignition interlock devices are being marketed as a way to prevent drunk drivers from starting a car engine. But these are based on breath analysis, which can be affected by a number of factors including humidity, temperature and whether someone has used mouthwash. Recent research has demonstrated that sweat can be a more reliable real-time indicator of blood alcohol content. At least two transdermal sensors have been developed to measure alcohol levels in sweat, but users have to wait up to 2 hours for results. Joseph Wang, Patrick Mercier and colleagues at the University of California, San Diego, set out to make a more practical version.



A skin patch that detects blood alcohol content could help drinkers know when they've had enough.

Credit: Wang lab

With temporary-tattoo paper, the researchers developed a patch that tests blood alcohol content non-invasively in three rapid steps. It induces sweat by delivering a small amount of the drug pilocarpine across the skin. An enzymatic reaction leads to the electrochemical detection of the alcohol content. And a flexible electronic circuit board transmits the data via a Bluetooth connection to a mobile device or laptop. The steps take less than 8 minutes from start to finish. In addition to connecting to vehicles' ignition interlock systems, the sensor could be a simple tool for bartenders, friends or law enforcement to use, the researchers say.

# *From the editor*

My favorite press room article this month is the use of coffee grounds to scrub heavy metals from wastewater. Not only do coffee grounds remove metal ions, the filters can be washed with dilute acid and reused. With the amount of coffee grounds produced in this country alone, this could be a big step in low cost water treatment. The use of agricultural wastes as filter material for waste water goes back into the 1980's. However, immobilizing of the grounds in a foam is a large step in the direction of ease of use. (Here are two good references: Coffee and tea as filter material; Exhausted coffee grounds.)

I am not sure that there is such a thing as an abnormal fear of snakes. It is a natural evolutionary reaction to these reptiles. If no snakes were poisonous or aggressive, would that phobia have developed for us? The official scientific name for snake phobia is ophidiophobia or ophiophobia, while herpetophobia is a fear of reptiles and/or amphibians. The word is derived from the Greek: ophis—snake and phobia—fear.

It is unfortunate that all snakes carry the stigma, when many snakes are harmless and interesting. Hognoses, common down in Bosque County, hiss like a steam kettle when disturbed; if that doesn't work, they roll over and play dead (really). Black racers climb cedar trees; I once startled one having a nap on a warm rock and it scooted right up the closest cedar.

Addendum: *From that font of all information, Wikipedia, we have this statement: Care must also be taken to differentiate people who do not like snakes or fear them for their venom or the inherent danger involved. An ophidiophobe would not only fear them when in live contact but also dreads to think about them or even see them on TV or in pictures. About a third of adult humans are ophidiophobic, making this the most common reported phobia.*

Best regards,
Connie