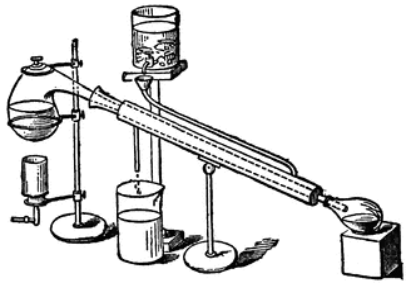
SOUTHWEST RETORT



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and Chemistry in this area

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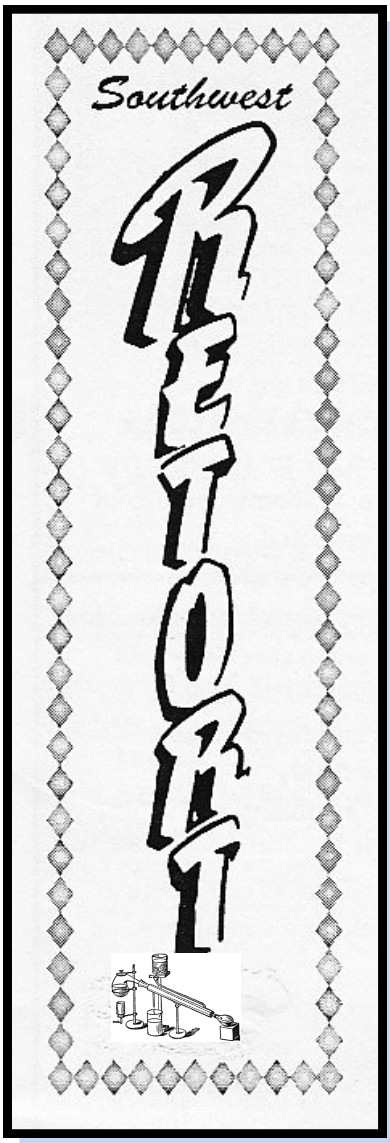

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EMPLOYMENT CLEARING HOUSE

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.

JENKEM TECHNOLOGY

The PEG and PEGylation Technology People

Job Title: Sales/Marketing Assistant

Name of Company: JenKem Technology USA Inc.

Nature of Business: Polyethylene Glycol (PEG) Polymers for Pharmaceutical and Biotech Applications

Job ID: JKUSA-20150501

Job Type: Full-time

Salary Range: Base salary $25,000.00 to $35,000.00; plus Sales Commission

Location: United States - Texas – Plano

Additional notes: Must be legally authorized to work in the United States. Local candidates preferred, no relocation benefits are provided for the position.

Job Functions: Sales and marketing for PEGylation products and services: provides quotations and information on product availability, and provides answers to technical questions to customers, by phone or email; processes orders, shipping, and payments; develops and maintains customer relationships; identifies and develops new customers and new markets for PEGylation products and services; and performs other tasks as assigned by the manager.

Job Requirements: Bachelor's degree or higher (Chemistry/Biology/Biochemistry or similar background REQUIRED); Excellent interpersonal and communication skills; Excellent reading, speaking, and writing skills in business English; Good arithmetic skills and attention to details required; Proficiency in the use of Microsoft Word, Excel, PowerPoint, and Outlook required; English/Chinese bilingual preferred; Ability to work independently required.

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Interested candidates should submit a cover letter including salary expectations, and an updated resume at email: hr@jenkemusa.com. Please do not call, we will contact only select candidates.

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Fort Worth

Analyzes chemical, biological or microbiological products, raw materials, in-process materials, or stability samples in support of the company's quality program. BS in Chemistry preferred, 0-5 years of combined experience within the Pharmaceutical, Medical Device, and/or FDA/GMP regulated industries. Hands-on understanding and experience with HPLC and GC and wet chemistry instrumentation skills.

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FIFTY YEARS AGO IN THE SOUTHWEST RETORT

The ACS tour speaker for January is **Dr. M. L. Salutsky** of W. R. Grace and Co. His topic is "By-Products from the Sea."

This issue contained the abstract of **Dr. Sean P. McGlynn's** ACS Southwestern Regional Award talk on "The Nature of Excimers," given last December in Little Rock.

At Texas Woman's University Chair **Dr. Robert W. Higgins** has stepped down from this position to focus more on research and teaching. Dr. Higgins, a World War II veteran, joined the TWU faculty as Chair in 1952. Under his leadership the department improved its master's program and instituted a Ph.D. program. Dr. Higgins was major professor to 19 master's students and two Ph.D. students. The Acting Chair will be Associate Professor **Lyman Caswell**.
Dr. Caswell joined the TWU faculty in 1961 as Assistant Professor and was promoted to Associate Professor in 1964. He carries out research on novel heterocyclic nitrogen compounds. Attending the Welch Conference in Houston from TWU were **Murray Sturrock, Lyman Caswell, Lewis Sams, Robert Davidow,** and **William Mecay**. **Dr. Norman Foster** gave a talk in December to the Dallas Society of Analytical Chemists.

At the Mobil Dallas Field Research Laboratory **Dr. Walter Munk** of the University of California at La Jolla gave a series of colloquium lectures on physical oceanography. **Dr. James C. Melrose** gave seminars at Lehigh University and at the University of Illinois. He also presented a series of five lectures at Stanford on "The Thermodynamics of Surfaces." **Dr. E. Thomas Strom** represented **President Robert Parks** of Iowa State University at the inauguration of **Dr. Charles Pitts** as President of Dallas Baptist College.

At North Texas State University (now UNT) **Drs. W. T. Brady** and **L. J. Theriot** attended the Southwest Regional Meeting in Little Rock. **Dr. William H. Glaze** attended an international symposium on organometallic compounds in Dayton, OH and gave a seminar at the University of Cincinnati. Attending the Welch Conference in Houston were Brady, Theriot, and **Drs. R. M. Hurd** and **S. J. Norton**.

At UT-Arlington those attending the Welch Conference were **Dean Peter Girardot, Dr. G. L. Johnson**, and **Dr. Tom Cogdell**. **Ms. Lynn Hardin** and **Dr. Robert Francis** attended the American Council of College Chemistry held at Texas A&M University.

The Central Texas ACS Section celebrated its 50th anniversary at the Driskill Hotel in Austin on Dec. 13. At UT-Austin Welch Professor **Michael J. S. Dewar** welcomed new post-docs **Dr. Erwin Haselbach** and **Dr. Muthanna Shanshal. Dr. Alan H. Cowley** recently gave a lecture at the University of Florida.

Compiled by E. Thomas Strom

An Interview with ACS President Peter K. Dorhout

Interviewer E. Thomas Strom

Peter K. Dorhout

This is the 14th year that I have carried out an interview for *The Southwest Retort* with an ACS President. On all but one occasion the interview was during that individual's year as President-Elect. I have always felt that the Dallas-Fort Worth area is of enough importance and size that these Presidents-Elect would welcome the chance to promote their ideas and goals to the *Retort* readers, and so far these presidents seem to agree.

Peter Dorhout's chemical training is centered in the Midwest. He received his BS degree in 1985 from Illinois, and during his undergraduate training he co-oped with DuPont Central Research. He received his Ph.D. in inorganic chemistry from Wisconsin in 1989, and then he did a two year post-doc with John Corbett at Iowa State. He joined the faculty of Colorado State in 1991. He became full professor in 2002, after which he took several positions in university administration there. In 2011 he was acting provost at Colorado State, Pueblo. In 2012 he went to Kansas State as Dean of Arts and Sciences, and he currently is Vice President for Research there. During these years he also served on a number of important ACS committees. He has also been an ACS councilor and a past chair of the ACS Division of Inorganic Chemistry.

My interview with President Peter K. Dorhout was Sunday, Aug. 20, at the ACS meeting in Washington, D.C. I was really primed for our meeting, because just four days earlier I had received a copy from the ACS task force on "The Present Employment Status of Chemical Professionals in the United States and Actions Needed for its Improvement." This task force had been set up by ACS President Donna Nelson, and Donna and Attila Pavlath were co-chairs of the task force. Dorhout was a member of that task force. This final report had been sent to all the comment on p. 47 of the Dec. 11/18, 2017 issue of *Chemical and Engineering News*. If you *Retort* readers have not yet read this comment, I urge you to do so. One of the more unpleasant facts covered in this report was that over the past 50 years the number of newly-graduated chemists has steadily increased, while traditional chemistry jobs have decreased due to industry consolidation, mergers, outsourcings, and other corporate actions. Consequently, there is no shortage of traditional chemists. We read all the time of the need for more students in the STEM professions:

An Interview *continued 1*

Science, Technology, Engineering, and Mathematics. In so far as chemistry contributes to the Science part of STEM, no increase there is needed, so I wonder if this push for more STEM students is really justified.

The Nelson/Pavlath report discussed the "onshoring of foreign scientists," and this certainly happens in graduate schools, where often the number of foreign-born students is greater than those from the US. This occasioned an early question in which I wondered whether he thought there should be limits in the numbers of international graduate students. He said that he was not one who advocated shutting the gates and not letting these students in. Chemistry is a global enterprise, and students worldwide will seek the best education possible for themselves. Students will try to find the situation best for them, and we should not shut the door.

Among the proposals in the Nelson/Pavlath report are the revamping of the ACS certified degree and the development of an analogous accreditation program for graduate school. Dorhout noted that we should focus on the critical skills necessary in the curriculum and emphasize adding value to both the undergraduate and graduate experience. This involves intelligent speculation as to the needs of the chemical professional over the next 20 years. He pointed out that safety is a critical skill that should not be overlooked. It's an important part of our foundation just like organic and physical chemistry. He believes that safety should be infused in the philosophy of everything we do.

I raised the point that older chemists like myself joined the ACS, because it was just something you do if you are a chemist. Younger chemists do not necessarily have that loyalty to the organization. The number of freshly minted chemists without a job recently was 16% (Dorhout interjected at that point that the number had dropped to 9%). The way to the hearts of younger chemists is probably best found through jobs. What can ACS do in this regard?

Dorhout noted that the current overall unemployment rate for chemists is 3%, well under the national unemployment rate, so chemistry is still not a bad career option. Yet the unemployment rate for new graduates is 9%. There has always been a gap, but there has been a change in the gap since the early 2000s. The gap has widened. This speaks to the importance of the newly formed Congressional Chemistry Caucus that President Allison Campbell and the ACS Office of Government Affairs has worked on. We have had congressional leaders step up in this regard from both houses of Congress and from both parties. This will help the Congress understand the value of chemistry and the chemical enterprise. This will insure that we have a voice!

Among Dorhout's goals were promoting industrial job growth, enhancing education, and improving the domestic employment situation. I asked if he priori-

An Interview continued 2

tized among them. He responded that he thought they dovetailed together. Enhancing education has spillover into promoting industrial job growth, which improves the employment situation. Several arms of ACS are working diligently in these areas.
Dorhout returned to the issue of enhanced safety training, which cuts across all the areas above. He noted that he volunteered at the Boy Scout Jamboree this summer, and that as a part of the merit badge for chemistry the scouts had to use the MSDS sheets on various chemicals. It enables them to understand that there are chemicals in everything. All of our students need to understand this, not just the scouts.

Dorhout went on to say that the ACS Scholars program was a passion of his. This goes along with his belief that we need a strong, diverse pipeline of students coming into chemistry. Somewhere in the three years he will be in the presidential succession the 300th Ph.D. of the program will be awarded to an ACS Scholar. Twenty-two years---300 Ph.Ds; that's an outstanding record. The other thing that is outstanding is that, of the 3000 students that have been in the program, better than 90% graduate with a degree. For the average group of students, the graduation rate is 70%. For traditionally unrepresented minority students, the graduation rate is below 50%. This testifies to the value of the ACS Scholars program. This is something to really celebrate.

As I usually do in these presidential interviews, I asked Dorhout what brought him into chemistry. He cited the Boy Scouts, although he admits to never having a chemistry merit badge. However, scouting gave him an appreciation for nature and the out of doors. His father was a big influence on his love for the Boy Scouts. Like Dorhout himself, his father had been an eagle scout. Although a music teacher during the school year, his father spent the summer at camps. Dorhout came to think that everyone spent their summers in a tent. Scouting made him curious, which manifested itself in a number of ways. Chemistry came early, but he never really thought about it as a career option until he entered college. However, there was a specific chemistry connection with the Boy Scouts. As a kid, Dorhout delivered papers, earning his own money to send himself to Boy Scout camps. The magazine of the Boy Scouts is *Boys' Life*. He saw in that magazine an ad for a Gilbert chemistry set, so he ordered it with his own money. The chemistry set was another way of exploring the world. While chemistry did come early, he never really thought about it as a career option until entering college. He also loved physics, having won a number of physics science fair awards. He started college in biophysics and gradually drifted into chemistry. Much of what he has done in chemistry is interdisciplinary, working with physicists and material scientists. Dorhout finished our interview by discussing how useful interactions with chemistry alumni could be to chemistry departments in improving the job readiness of

An Interview continued 3

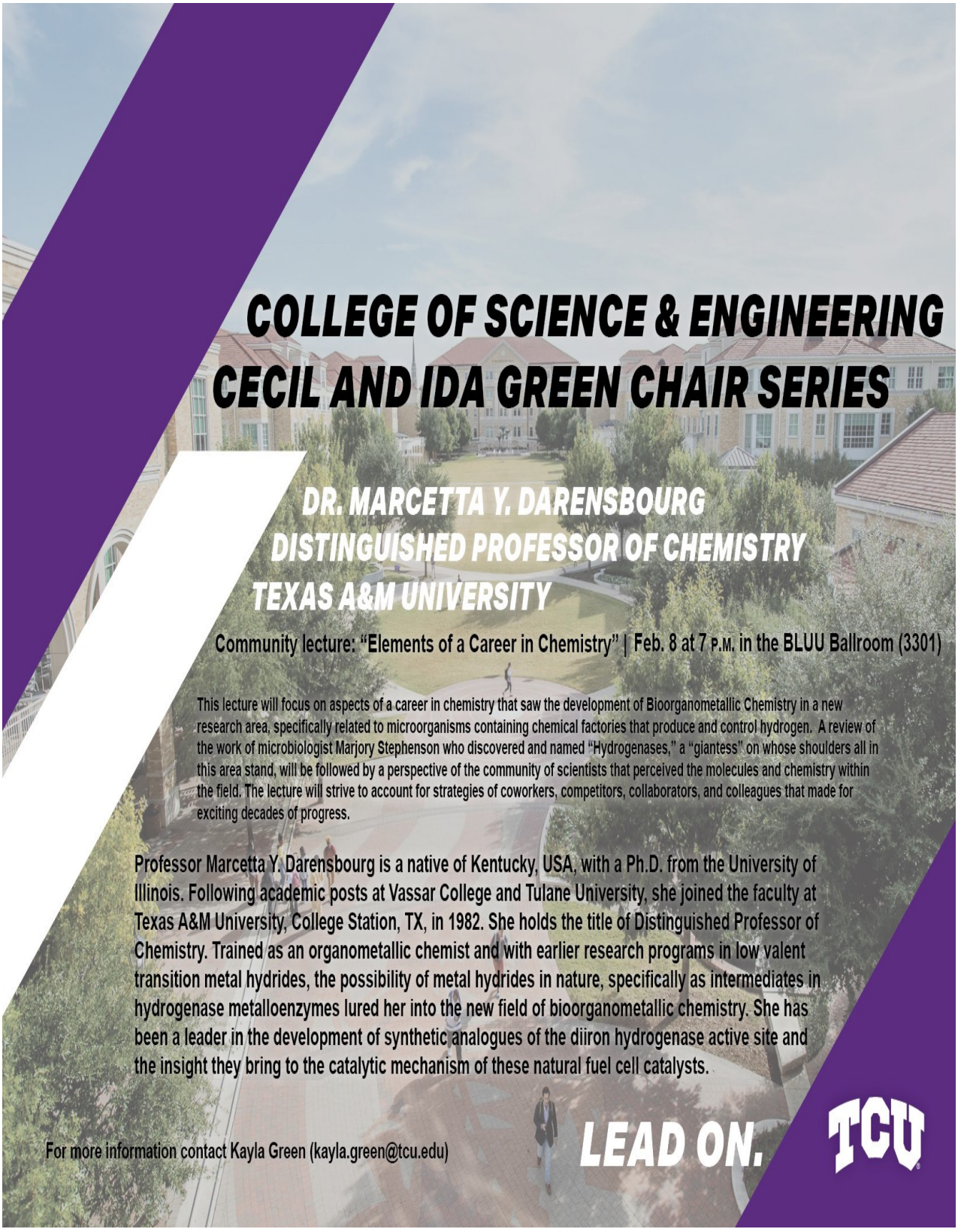
their graduates.

Peter Dorhout is another in the string of bright, articulate ACS Presidents. I am very proud to have him representing the American Chemical Society to the public at large. The progress made in accomplishing his stated goals will certainly advance the chemical enterprise, perhaps only gradually, but a series of gradual improvements can result in great things.

2018 DFW Chemistry Ambassador of the Year Award Call for Nominations

The Dallas-Fort Worth Section of the American Chemical Society would like to recognize an outstanding Section member who has made a significant impact via promoting chemistry to the community. The 2018 Chemistry Ambassador of the Year award is based on peer or self-nominations to the selection committee. Submissions should be one page in length and address the community outreach activities either through teaching, service, or working with legislators to affect public policy. Submissions will be evaluated on the impact made, which may include but not limited to how many people were reached, impact on individual people in the community, and exemplary commitment to the promotion of chemistry in the community.

To be eligible for this award, the person must be a section member in good standing and a member of the Chemistry Ambassadors program by the time the award is given. Submissions, as well as any questions, should be sent to the awards chair, Stephen Starnes (Stephen.Starnes@tamuc.edu) by May 15.


COLLEGE OF SCIENCE & ENGINEERING
CECIL AND IDA GREEN CHAIR SERIES
DR. MARCETTA Y. DARENSBOURG
DISTINGUISHED PROFESSOR OF CHEMISTRY
TEXAS A&M UNIVERSITY
Community lecture: "Elements of a Career in Chemistry" | Feb. 8 at 7 P.M. in the BLUU Ballroom (3301)
This lecture will focus on aspects of a career in chemistry that saw the development of Bioorganometallic Chemistry in a new research area, specifically related to microorganisms containing chemical factories that produce and control hydrogen. A review of the work of microbiologist Marjory Stephenson who discovered and named "Hydrogenases," a "giantess" on whose shoulders all in this area stand, will be followed by a perspective of the community of scientists that perceived the molecules and chemistry within the field. The lecture will strive to account for strategies of coworkers, competitors, collaborators, and colleagues that made for exciting decades of progress.
Professor Marcetta Y. Darensbourg is a native of Kentucky, USA, with a Ph.D. from the University of Illinois. Following academic posts at Vassar College and Tulane University, she joined the faculty at Texas A&M University, College Station, TX, in 1982. She holds the title of Distinguished Professor of Chemistry. Trained as an organometallic chemist and with earlier research programs in low valent transition metal hydrides, the possibility of metal hydrides in nature, specifically as intermediates in hydrogenase metalloenzymes lured her into the new field of bioorganometallic chemistry. She has been a leader in the development of synthetic analogues of the diiron hydrogenase active site and the insight they bring to the catalytic mechanism of these natural fuel cell catalysts.
For more information contact Kayla Green (kayla.green@tcu.edu)
LEAD ON.
TCU

Nominations are invited for 2018 Wilfred T. Doherty and Werner Schulz awards

Nomination forms and additional information are available online at http://dfw.sites.acs.org/localsectionawards.htm. Nominations are due by May 15, 2018. Each nomination should contain completed nomination form, cover letter highlighting the nominee's accomplishments, and a copy of the CV. One seconding letter may accompany nominations. The nomination package should be sent by email as a single pdf file to Stephen Starnes (Stephen.Starnes@tamuc.edu). Nominations remain active for five years but should be updated annually.

The Doherty Award is given for excellence in chemical research or chemistry teaching, meritorious service to ACS, establishment of a new chemical industry, solution of pollution problems, and advances in curative or preventive chemotherapy. Nominees may come from industry, academia, government, or small business. The nominee should be a resident member in the area served by the DFW Section, and the work should have been done here. The award is $1500 and an engraved plaque. A photo of the Doherty Award winner will be displayed permanently in the Gallery of Doherty Award winners, Berkner Hall, UT-Dallas.

The Schulz Award is given to high school chemistry teachers, who, like the late Dr. Werner Schulz, bring that something extra to the teaching of chemistry. The nominee and/or nominator need not be ACS members. Nominees should show 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. A photo of the Schulz Award winner will be displayed for one year at the Perot Museum of Nature and Science in Dallas, and then displayed permanently in the Gallery of Schulz Award winners, Science Bldg., Tarleton State University. A traveling plaque stays at the winner's high school for the year of the award. Winners will normally receive their awards and give their lectures at a fall meeting of the section.

Remember, a continuous flow of nominations is needed to maintain the quality of awards.

From the ACS Press Room

'Sniffing' out counterfeit liquors

A Hand-Held Optoelectronic Nose for the Identification of Liquors
ACS Sensors

Watered-down or fake liquors can reap financial rewards for nefarious individuals, but the adulteration of liquor cheats consumers and can even lead to health hazards from added contaminants. Scientists now report in ACS *Sensors* a portable device with an advanced sensor array that can identify liquors and determine if they'd been altered, offering a strategy for liquor quality assurance.

A portable device with an advanced sensor can "sniff" out counterfeit liquors.

Credit: Kenneth S. Suslick, Ph.D.

In the past few years, deaths from contaminated alcohol have been reported in Indonesia, Mexico, China, Poland and Russia, among other places. Unscrupulous individuals hoping to make a profit may homebrew liquor and bottle it in official-looking packaging or dilute liquor with anything from water to antifreeze. Kenneth S. Suslick and Zheng Li from the University of Illinois at Urbana-Champaign wanted to address this growing health concern by engineering a device that can easily identify tainted products.

The researchers developed a disposable sensor with 36 dyes that change color upon exposure to particular components in liquor. Partial oxidation of the liquor vapors improved the sensor's response. Using a handheld image analyzer to detect these color changes, the scientists correctly identified the alcoholic content and brand of 14 different liquors, including various scotch whiskies, bourbon, rye, brandy and vodka with greater than 99 percent accuracy. In a proof-of-concept experiment to demonstrate a real-world application, the researchers also sniffed out booze that had been watered down, even by as little as 1 percent.

The authors acknowledge postdoctoral funding from the Procter and Gamble-Foundation.

...And Another Thing…

by Denise L. Merkle, PhD

As has happened twice in recent months, the articles I had in mind just wouldn't write themselves. Usually everything arranges itself in my head and when the typing (keyboarding, for you computer gurus) starts, the document appears. Not so 2017 and 2018. Words barricaded themselves in my brain and would not be persuaded to leave. The insoluble reagents of composition glommed onto the thought processes with teeny tiny dissociation constants. No reaction -or paragraphs- for me. What kind of experiment does one plan to identify the causes of writer's block? How does one even hypothesize the cause? Hmm.

Could the issue be DAKAR[1]? The rally is certainly exciting, and the early stages in Peru yielded a lot of surprises. What exact topic should dominate an article about DAKAR? Preparation? Fitness? Technological advantages? Grit - literal and figurative? Malle Moto - if you want grit, that class has it. So, maybe DAKAR is the culprit - but it's really inspiring. Could something so inspiring be bad for creativity? I think not.

Are Fear and the Unknown the culprits? Fear and the Unknown are certainly known to spur people to great bursts of strength and accomplishment. Since these outcomes are guaranteed -even documented- to be unrelated to yours truly, Fear and the Unknown may very well be trapping sentences in my head. But everyone (or possibly anyone who has any grasp of reality) is experiencing an undercurrent of Fear and the Unknown. Maybe they're just the new baseline and not the trap for sentences?

Work? Could work count as an impediment to writing? How does one test *this*? Quit? Not an option. And I love science. Science doesn't always love me, but it would not block my brain.

Other stuff must be the reason. That pesky other stuff that isn't even part of the experiment. Ack! The attic is infested with roof rats! Ack! Maybe, it's the Acks that are actually activation energy for the writing process. Maybe it's time to add some heat and overcome the Acks.

You know the only cure for Acks? No? Volunteering in the American Chemical Society is the only cure for Acks. Don't think so? Set up an Experiment to investigate: "Does Volunteering prevent Acks?" Local section officers can help with Materials and Methods. I'd offer to help write up the grant, but I'm busy overcoming Acks.

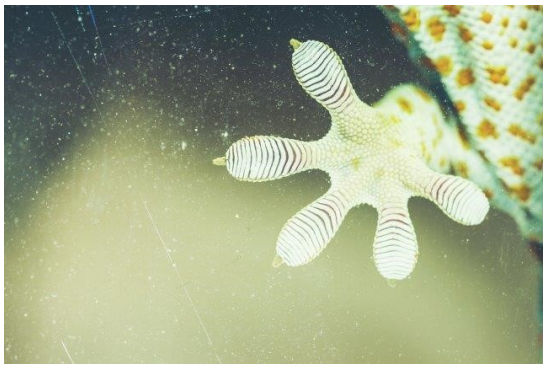
Wishing everyone a 2018 filled with interesting Results - and lots of Science!

[1]https://www.dakar.com/en/

From the ACS Press Room

Scaling to new heights with gecko-inspired adhesive

Gecko-Inspired Dry Adhesive Based on Micro-Nanoscale Hierarchical Arrays for Application in Climbing Devices
ACS Applied Materials & Interfaces



Some animals, such as geckos, can easily climb up walls and across ceilings. But currently, no material exists that allows everyday people to scale walls or transverse ceilings as effortlessly. Now, scientists report in *ACS Applied Materials and Interfaces* a dry adhesive that could someday make it easier to defy gravity.

Geckos can scale walls because of their unique toe pads that help them quickly attach and detach from surfaces. Interestingly, gecko toe pads are covered with bristle-like layers of a stiff material called keratin. The bristle-like structure of the keratin in a toe pad helps it to stick — each pad is covered with microscopic pillars, which then branch out at the tips into even smaller structures. Scientists have manufactured dry adhesives with similar properties, but they haven't been as sticky as gecko toes. And some methods involve the use of layers, but the first layer is usually damaged as successive ones are applied. Other methods are not easily scaled up. Hemant Kumar Raut, Hong Yee Low and colleagues wanted create a dry adhesive that was ultra-sticky but also simple to fabricate in large batches.

The researchers made a dry adhesive with stiff polycarbonate using a nanoimprinting technique to build web-like layers. This method is cost-effective, easy to perform and is scalable. To prevent damage to the first layer, the team used a sacrificial layer, which was dissolved away after the second layer was applied. In repetitive attachment and detachment tests, only a 20 percent decline in stickiness occurred after 50 cycles. This level of adhesion lasted for up to 200 cycles. The researchers say that their film's adhesion was comparable to that of a gecko. The team also placed the adhesive film on the feet of a miniature robot, which moved with ease up a 30-degree incline.

The authors acknowledge funding from the Temasek Laboratories at Singapore University of Technology and Design and SUTD-MIT International Design Centre.

Around the Area

UTD

Dr. Monica Jung de Andrade, a research scientist in the Alan G. MacDiarmid NanoTech Institute, received the Materials Research Society's Woody White Service Award, which honors outstanding individuals who have embodied MRS's mission, vision and values for an egalitarian interdisciplinary community advancing materials science and technology to improve the quality of life.

University of Arkansas

On the Go

Matt McIntosh gave a talk entitled "Radical Chemistry of the Breslow Intermediate" at the Midwest Regional ACS Meeting in Lawrence, KS, on October 20, 2017.

Chengunag Fan presented "Biochemical Characterization of Lysine Acetylation of Tyrosyl-tRNA Synthetase in Escherichia coli" at the 11th IUBMB Focused Meeting on Aminoacyl- tRNA Synthetases in Clearwater, FL, on October 30, 2017.

Publications

Lutishoor Salisbury, Anuradha Rai Chowdhury & Jeremy J. Smith. 2017. Faculty Publications from a Research University: The Scholarly Impact of Open Access versus Non-Open Access. Science & Technology Libraries, Vol. 36(2), p187-199, https://doi.org/10.1080/0194262X.2016.1273815

Lutishoor Salisbury, Abayomi Omotola Omolewu & Jeremy Joseph Smith. 2017. Identifying "Free" Full-Text Resources in Agriculture, Food and Life Sciences: A Research Study. Journal of Agricultural & Food Information, Vol. 18(2), p136- 144. https://doi.org/10.1080/10496505.2017.1300537

Qinglei Gan and Chenguang Fan. Increasing the fidelity of non-canonical amino acid incorporation in cell-free protein synthesis. Biochim. Biophys. Acta. 2017; 1861(11 Pt B):3047-3052.

Sumana Venkat, Caroline Gregory, Qinglei Gan, and Chenguang Fan. Biochemical Characterization of Lysine Acetylation of Tyrosyl-tRNA Synthetase in Escherichia coli. ChemBioChem. 2017; 18(19):1928-1934.

Sumana Venkat, Dharma The- ja Nannapaneni, Caroline Gregory, Quinglei Gan, Matt McIntosh, and Chenguang Fan. Genetically Encoding Thioacetyl-lysine as a Nondeacetylatable Analog of Lysine Acetylation in Escherichia coli. FEBS Open Bio. 2017; 7(11):1805-1814.

David Bryson, Chenguang Fan, Li

Around the Area

-Tao Guo, Corwin Miller, Dieter Söll, and David Liu. Continuous directed evolution of aminoacyl-tRNA synthetases to alter amino acid specificity and enhance activity. Nat. Chem. Biol. 2017; DOI: 10.1038/nchembio.2474.

Sumana Venkat, Caroline Gregory, Kexin Meng, Qinglei Gan, and Chenguang Fan. A facile protocol to generate site-specifically acetylated proteins in Escherichia coli. J. Vis. Exp. 2017; DOI: 10.3791/57061.

Honors and Awards

Feng Wang is the co-PI on a new Provost's Grant entitled "Innovative high-throughput computing for predictive modeling in biological and material sciences." The award funds the collaboration between Dr. Huang's group in high-performance scalable computing and Dr. Wang's group in high-accuracy predictive modeling to solve new problems in materials sciences and biophysics. Leveraging the computa- tional power of the state-of-the-art GPUs, the aim of the collaborative research is to speed up predictive modeling in physical chemistry by 100 fold.

Mahsa Lotfi Marchoubeh won the analytical division and departmental 3-minute thesis competition. She also won the ECS (Electrochemical Society) chapter at the U of A 3-minute thesis competition. She will compete in the college's three minute thesis competition January 22-26. The top finisher from each college will advance to a university-wide final on February 2.

The competition celebrates discoveries made by graduate students and encourages them to communicate the significance of their research to the broader community in language that is understood by the general public. The competition is sponsored by the Graduate School and International Education and was founded by the University of Queensland in 2008. The event will serve as the capstone to Graduate Education Week.

UT-Arlington

In December Shimadzu Distinguished Professor **Kevin Schug** gave an invited lecture on the use of gas chromatography-vacuum ultraviolet spectroscopy at the 2nd annual PEFTEC conference in Antwerp, Belgium. Also in December a next generation vacuum ultraviolet detector, VGA-101 from VUV Analytics, was installed in the Schug laboratory. This will enable GC -VUV-MS analysis of complex mixtures such as textile dyes. Renewed support was also received in the form of a research gift from Apache Corp. to continue environmental monitoring in West Texas as well as laboratory studies associated with enhanced oil recovery and hydraulic fracturing additive behavior.

From the ACS Press Room

Bridging tumor moats with potent drug delivery particles

Multifunctional Protocells for Enhanced Penetration in 3D Extracellular Tumoral Matrices
Chemistry of Materials

Despite herculean efforts, cancer remains a formidable disease, with each malignant subtype responding differently to therapeutics. One hurdle specific to treating solid tumors is a protective layer called an extracellular matrix that can prevent chemotherapeutic agents from penetrating the tumor's core. Scientists now report results in ACS' *Chemistry of Materials* showing that, by cloaking anti-cancer drugs in a specially designed particle, they could target and destroy tumor cells deep inside a malignant mass in vitro.

For tumors that can't be extracted with surgery, radiation and chemotherapy are the treatments of choice, but both can involve serious side effects due to a lack of specificity: They'll kill healthy cells along with malignant ones. Researchers have long known that, thanks to the unique blood vessel architecture surrounding tumors, nanoparticles can easily pass into the cancer zone, offering a potential route for the specific delivery of chemotherapies to cancer cells. However, efforts to exploit this phenomenon have fallen short, with experimental drug-loaded particles failing because they can't get through the dense extracellular matrix or they lose the therapeutic payload en route to the tumor's interior. Alejandro Baeza, C. Jeffrey Brinker, Maria Vallet-Regi and colleagues addressed this shortcoming by developing a brand-new type of particle.

The researchers created a "protocell," a nanoparticle that can carve through the extracellular matrix, delivering cell-killing doses of drug to the deepest tumor regions. To develop the protocell, the team started with a mesoporous silica skeleton with a high internal surface area that can contain a large amount of drug. They surrounded this skeleton with a lipid bilayer outfitted with an array of tools to help the protocell deliver its drug arsenal to the desired locale, including enzymes that cleave collagen, a major component of the tumor's extracellular matrix. The protocell also features pH-sensitive ligands that trigger the release of the drug upon entry into the relatively acidic interior of a cell, ensuring the medication is only delivered where needed. The researchers tested the protocells in a 3-D cell culture model of a solid tumor, showing that the protocell penetrates and destroys malignant cells better than drug-loaded protocells without the enhanced toolkit.
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From the ACS Press Room

Blueberry vinegar improves memory in mice with amnesia

Cognitive Improving Effects by Highbush Blueberry (*Vaccinium crymbosum* L.) Vinegar on Scopolamine-Induced Amnesia Mice Model
Journal of Agricultural and Food Chemistry

Dementia affects millions of people worldwide, robbing them of their ability to think, remember and live as they once did. In the search for new ways to fight cognitive decline, scientists report in ACS' *Journal of Agricultural and Food Chemistry* that blueberry vinegar might offer some help. They found that the fermented product could restore cognitive function in mice.

Recent studies have shown that the brains of people with Alzheimer's disease, the most common form of dementia, have lower levels of the signaling compound acetylcholine and its receptors. Research has also demonstrated that blocking acetylcholine receptors disrupts learning and memory. Drugs to stop the breakdown of acetylcholine have been developed to fight dementia, but they often don't last long in the body and can be toxic to the liver. Natural extracts could be a safer treatment option, and some animal studies suggest that these extracts can improve cognition. Additionally, fermentation can boost the bioactivity of some natural products. So Beong-Ou Lim and colleagues wanted to test whether vinegar made from blueberries, which are packed with a wide range of active compounds, might help prevent cognitive decline.

To carry out their experiment, the researchers administered blueberry vinegar to mice with induced amnesia. Measurements of molecules in their brains showed that the vinegar reduced the breakdown of acetylcholine and boosted levels of brain-derived neurotrophic factor, a protein associated with maintaining and creating healthy neurons. To test how the treatment affected cognition, the researchers analyzed the animals' performance in mazes and an avoidance test, in which the mice would receive a low-intensity shock in one of two chambers. The treated rodents showed improved performance in both of these tests, suggesting that the fermented product improved short-term memory. Thus, although further testing is needed, the researchers say that blueberry vinegar could potentially be a promising food to help treat amnesia and cognitive decline related to aging.

The authors acknowledge funding from Konkuk University.

From the editor

I always try to decide which is my favorite news short of the month, but this time it's a tie among gecko toes, liquor sniffers, and blueberry vinegar. After a re-read, I am still torn between geckos and liquor sniffers; both have direct impact on my professional work. The wall-walking talents of geckos beautifully illustrates the principle of surface studies: increase in the area of surface-to-surface contact results in better adhesion. For the liquor sniffer, this would solve a problem with detection of both watered-down and counterfeit spirits, and prove extremely valuable in detection of hazardous adulterants.

This January issue of the Southwest Retort is running later than usual due to the holidays (always a slowdown), but will be back on schedule next month.

Get those awards nominations in!