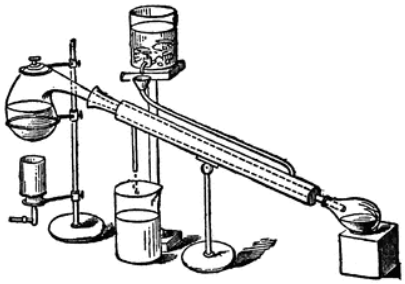
SOUTHWEST RETORT



SEVENTIETH YEAR **SEPTEMBER 2017**

Published for the advancement of
Chemists, Chemical Engineers
and Chemistry in this area

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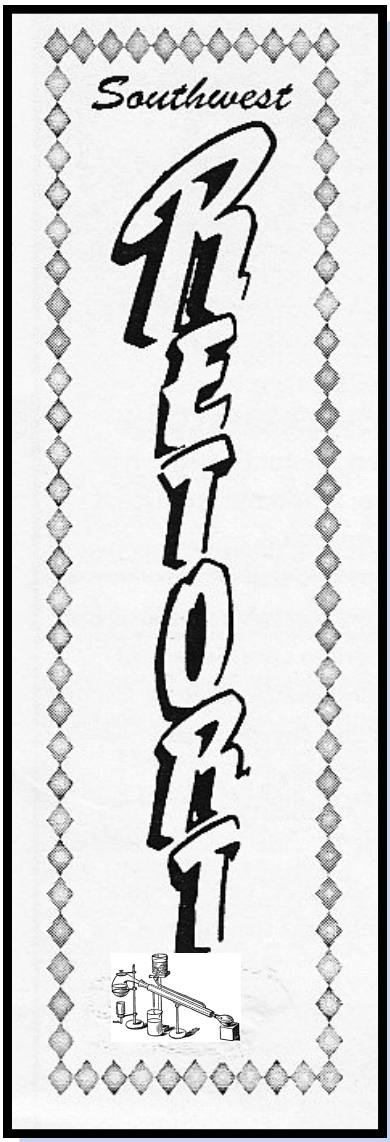

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Elections: candidates@acsdfw.org
Facebook: DFWACS
Twitter: acsdfw

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

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Position Available:
Sales and Marketing Assistant

Job Type: Full-time
Location: United States, Texas, Plano
Additional notes: Must be legally authorized to work in the United States. Local candidates preferred, as no relocation benefits are provided for the position.

Responsibilities:
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.

Requirements:
Bachelor's degree or higher (Chemistry/Biology/Biochemistry or similar background preferred); 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. Prior sales, marketing, or accounting experience are considered a plus.

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FIFTY YEARS AGO IN THE SOUTHWEST RETORT

The Southeastern Texas ACS Section (greater Houston) celebrates its 50th anniversary this year. During its 50 years the section has grown from 43 members to more than 1300 members and has spun off groups now associated with three surrounding ACS sections. The Golden Anniversary will be commemorated at the annual Ladies 'Night dinner meeting on Sept. 27. The guest speaker will be Mr. Harry M. Schwalb, curator of the Fisher Collection of Alchemical and Historical Pictures.

There will be two ACS tour speakers in October. Dr. W. E. Tatum from the Film Department of Circleville Research and Development Laboratory in Circleville, OH, will speak on "Polymers That Like It Hot." Professor E. S. Amis of the University of Arkansas, Fayetteville, will present "Some Chemical Phenomena in Solution."

Professor Harold Jeskey of SMU was publically honored earlier this year with the establishment of an SMU scholarship fund in his name. The fund was proposed last year by a group of Dallas physicians who had studied under Dr. Jeskey at various times during his career at SMU. These former students are honoring Jeskey in the midst of his career, not at its conclusion, in recognition of his dedication to his students, his intense involvement and interest in them as human beings, and his ability to inspire them.

From UT-Austin: Welch Prof. Michael J. S. Dewar was an invited speaker at the International School on Quantum Chemistry at Herceg Novi, Yugoslavia; Prof. Rowland Pettit gave a series of lectures on organometallic chemistry at the Universities of Michigan and Colorado; and Dr. Norman Hackerman served as Technical Advisor at the U. S. Trade Mission on Metal Finishing held in Stockholm, Sweden.

In the DFW ACS Section, at UT-Arlington, Chemistry Head John T. Murchison has been appointed Assistant Dean of the School of Science. The new Acting Head will be Dr. Raymond L. Hoyle. At Texas Woman's University Dr. and Mrs. Lyman P. Caswell had a son Timothy Omar on June 11. Dr. Caswell received the renewal of a grant from the Army Medical Corps Antimalarial Drug Search Program. At the Mobil Field Research Laboratory, Drs. Donald E. Woessner, Wilson L. Orr, and E. Thomas Strom all attended the Miami Beach ACS National Meeting, where all presented papers.

At the University of Arkansas, Dr. Walter Meyer has been appointed Chair of the Chemistry Department. His predecessor Dr. Arthur Fry had completed his term and returned to full-time teaching and research.

Contributed by E. Thomas Strom

And Another Thing...

Denise Merkle, PhD

Optimism and the Waves

Obviously, the Summer of the Nerd, so blithely described in the last 'And Another Thing' of the 2016-2017 school year, did not anticipate category 5 hurricanes, or multiple hurricanes, or hurricanes with terrifying inland effects that are the stuff of nightmares. No matter what joy graced the early summer, Harvey and Irma rubbed a lot of the shine off the beach ball. Since weather-related topics have already been discussed to the point of becoming distracting background noise (although Investigate Charities' Use of Funds Before Giving is worth yet another mention), here are a few Really Good Things that might not have received the press they deserve. Enjoy the positivity, for a little while, at least:

August 30, 2017: FDA announced approval of Kymriah (tisagenlecleucel)[1], the first gene therapy available in the USA. The CAR-T biologic can be used in children and young adults with Acute Lymphoblastic Leukemia (ALL), which is especially significant due to the dearth of treatments for pediatric and young adult malignancies. Kymriah's Chimeric Antigen Receptor T-cells are generated from T-cells collected from the patient, modified so that they present synthetic CD-19 receptors to the cancerous cells. Binding of the CAR-T therapeutic to the antigens recruits antibodies to the cancer cells and initiates an immune response to the complex[2].

August 1, 2017: Medical Design Technology reported on anti-biofilm-formation technology developed in the laboratory of Colorado State University Assistant Professor Melissa Reynolds[3]. The novel copper and chitosan-based material reduced P. *aeruginosa* adhesion by 85%, a significant decrease in the virulent microbes' ability to assemble into biofilms[4]. Biofilms are notorious for being robust surface coatings comprised of a network of multicellular structures that protect the biofilm from just about any antimicrobial treatment. Lower biofilm mass means more bacterial vulnerability to immune systems, antibiotics, and other therapies.

September 5, 2017: Blood viscosity is an important indicator of circulatory health, but standard testing is cumbersome and time-consuming. University of Connecticut mechanical engineering associate professor George Lykotrafitis and grad student Kostyantyn Partola have filed a provisional patent on a Point of Care device designed to use disposable microfluidics to measure blood viscosity. Access to real-time data has the potential to improve immediacy of patient care by allowing medical professionals to quickly and accurately determine actual risk of cardiac and brain events[5].

[1] https://www.fda.gov/newsevents/newsroom/pressannouncements/ucm574058.htm

[2] https://www.cancer.gov/about-cancer/treatment/research/car-t-cells

[3] https://www.mdtmag.com/news/2017/08/bacterial-biofilms-begone?cmpid=horizontalcontent

[4] Neufeld *et al*., Metal-Organic Framework Material Inhibits Biofilm Formation of Pseudomonas aeruginosa. ***Advanced Functional Materials, 2017***; 1702255 DOI: 10.1002/adfm.201702255

[5] http://today.uconn.edu/2017/09/new-device-testing-heart-health/

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NATIONAL CHEMISTRY WEEK
30 YEARS

2017 NCW Illustrated Poem Contest

CHEMISTRY ROCKS!

The American Chemical Society (ACS) is sponsoring an illustrated poem contest for K-12th grade students.

Local Section: Dallas-Fort Worth
Contest Deadline: Friday, October 27th 2017
Prizes: $10 gift card and chemsitry goodie bag
Contact: Dr. Stephanie Taylor, ChemistryPoetryDFW@gmail.com

Winners of the ACS Local Section Illustrated Poem Contest will advance to the National Illustrated Poem Contest for a chance to be featured on the ACS website and to win $300 or $150 in cash prizes!

INSTRUCTIONS

Write and illustrate a poem using the NCW theme, "Chemistry Rocks!"
Your poem must be no more than 40 words and in the following styles to be considered:
HAIKU - LIMERICK - ODE - ABC POEM - FREE VERSE - END RHYME - BLANK VERSE

Possible topics include rocks, minerals, gemstones, salts, crystals, magma, mantle, sediment, stalactites, and stalagmites. Entries will be judged based upon relevance to and incorporation of the theme, word choice and imagery, and colorful, creative artwork

CONTEST RULES

- Poems must conform to a particular style. No poem may be longer than 40 words.
- The topic of the poem and the illustration must be related to the NCW 2017 theme.
- All entries must be original works without aid from others.
- Each poem must be illustrated on an unlined sheet of paper (of any type) not larger than 11" x 14". The illustration must be created by hand using crayons, watercolors, other types of paint, colored pencils, or markers. The text of the poem should be easy to read and may be printed with a computer before the hand-drawn illustration is added, or the poem may be written on lined paper which is cut out and pasted onto the unlined paper with the illustration.
- Only one entry per student will be accepted.
- All entries must include an entry form.
- All illustrated poems and/or digital representations of the poems become the property of the American Chemical Society.
- Acceptance of prizes constitutes consent to use winners' names, likenesses, and entries for editorial, advertising, and publicity purposes.

www.acs.org/NCW

2017 Environmental Engineering Symposium

Join AIChE-Dallas for our First Annual Engineering Symposium. We have a great slate of speakers and this is a great opportunity to get several PDHs. This year's topic is Environmental Engineering. Email jason.ballengee@gmail.com for more details!

October, 27th 2017

Richardson Civic Center, 11:00-4:00pm

Sponsored by the Dallas Section of the American Institute of Chemical Engineers

Cost: $20 in advance ($30 at the door). A light lunch will be provided

11:00 – 12:00pm	Arrival, Registration, and Lunch pick-up
12:00 – 12:10pm	Opening Remarks, Jason Ballengee, Dallas AIChE Chair
12:10 - 12:50pm	Regulatory Pipeline, Brian Burdorf, Director, Trinity Consultant
12:50 – 1:40pm	Sustainability in Process Engineering, Dr. Debalina Sengupta, Texas A&M
1:40 – 2:10pm	Coffee and Networking Break
2:10 - 2:50pm	Municipal Solid Waste Gasification, John Kiser, SDL Citadel
2:50 – 3:30pm	Corrosion of glasses for nuclear waste disposal, Dr. Jincheng Du, U. of N. Texas
3:30 – 3:40pm	Concluding Remarks, Jason Ballengee, Dallas AIChE Chair
3:40 – 4:00pm	Networking and Departure

From the ACS Press Room

Biosensor could help diagnose illnesses directly in serum

Direct, Label-Free, and Rapid Transistor-Based Immunodetection in Whole Serum
ACS Sensors

In this age of fast fashion and fast food, people want things immediately. The same holds true when they get sick and want to know what's wrong. But performing rapid, accurate diagnostics on a serum sample without complex and time-consuming manipulations is a tall order. Now, a team reports in ***ACS Sensors*** that they have developed a biosensor that overcomes these issues.

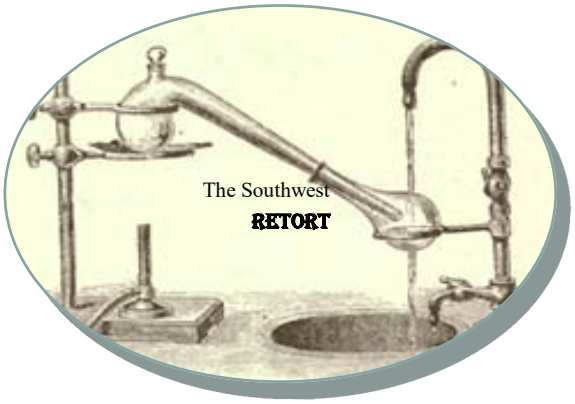
Field-effect transistor (FET)-based biosensors are ideal for point-of-care diagnostics because they are inexpensive, portable, sensitive and selective. They also provide results quickly and can be mass produced to meet market demand. These sensors detect the change in an electric field that results from a target compound, such as a protein or DNA, binding to it. But serum has a high ionic strength, or a high concentration of charged ions, that can mask the targets.

Previous research has reported use of pretreatment steps, complex devices, and receptors with different lengths and orientations on the sensor surface, but with limited success. Alexey Tarasov and colleagues wanted to develop a new approach that would make it easier for FETs to be made as point-of-care diagnostic devices for serum analyses.

The researchers developed a FET sensor that included antibody fragments and polyethylene glycol molecules on a gold surface, which they linked to a commercially available transducer. In this configuration, different sensor chips can be swapped out for use with the same transducer.

As a proof-of-principle, they tested the sensor with human thyroid-stimulating hormone. The team found that they could detect the hormone at sub-picomolar concentrations, well below the detection limit previously reported with FETs, when testing it at elevated temperatures. They say that the device could be modified to diagnose many conditions and illnesses, and is inexpensive and easy to use.

The authors acknowledge funding from the Roche Diagnostics GmbH.



Councilor's Report

Councilor Report on Washington, DC, National ACS Meeting

Linda Schultz

Councilor, DFW Local Section

I attended the 254th Annual Meeting of the ACS in Washington, DC, August 20-24, accompanied by two Tarleton State University undergraduate students. The flights with the most attractive timing were to Dulles Airport instead of Reagan, so I booked one of those. Big mistake, but we got to see a lot of interesting scenery as we bused in from 26 miles away in Virginia. My fellow councilors Mary Anderson, Jason McAfee, and Tom Strom arrived on different flights and had a good laugh at my expense.

As always, Washington, DC was impressive. The Convention Center was within walking distance of the Capitol, the White House, the Smithsonian, and many famous national monuments and museums. As an additional bonus, the solar eclipse occurred on August 21st, and the coverage was about 80% in Washington, DC.

The theme of the meeting was "Chemistry's Impact on the Global Economy". Overall attendance was about 13,000, about average for a fall meeting. (Spring meetings tend to be larger; last spring the San Francisco meeting set an all-time record at around 19,000). Over 9,370 papers and 2,720 posters were presented in DC in more than a thousand half -day oral sessions and almost 150 poster sessions. When one factors in the governance meetings, special presentations, the Exposition, and numerous social events, the overwhelming scope of these meetings becomes evident.

Some highlights were as follows:

I attended the ACS Board of Directors Open Meeting. We heard a summary of the business items which had been decided along with brief reports of their activities over the past year from ACS President Allison Campbell, President-Elect Peter Dorhout, and Past-President Donna Nelson. This was followed by a box lunch and two 'TED type' talks - one on new developments in 3D printing and one on neuroscience discussing possible future developments of nanoscience to explore brain function.

One concern of the ACS, shared by many other scientific societies, is effective communication of the importance of science to governmental officials. A "Speaking with Congress Workshop" was attended by my fellow Councilor Tom Strom.

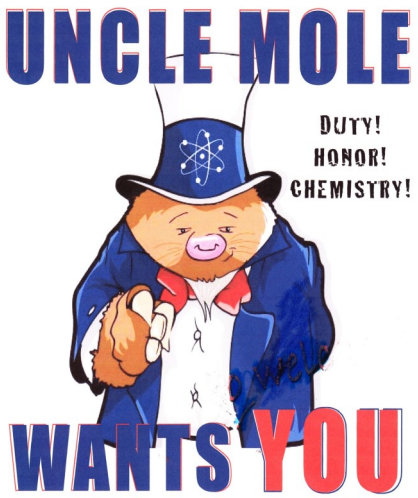
I attended the District IV Councilor's Caucus to become familiar with issues to be addressed in Council. ACS membership as of May 2017 was 152,580 – down 1,422 from May 2016. Strategies to reverse this trend are being considered. The business side of ACS is healthy, with income from operations (primarily informational activities) exceeding expenses. One item of concern is the rising cost of National Meetings (note my above remarks on size), which will necessitate a

Member Advance Registration Fee increase from $445 to $475. The main driver for this cost increase is technology requirements, but it is actually not out-of-line with those of sister societies.

I attended the presentation "Healthy, Tasty, or Toxic: A Chemist's View of Drinking Water". This was an attempt to surpass the Guinness World Record for the World's Largest Chemistry Lesson. It fell short, but the lecture is now available online.

I attended the Chemluminary Awards ceremony. The Dallas-Ft. Worth Local Section was nominated in the category "Most Innovative New Activity or Program" for the "Comet Chemistry Camp" for Middle School Girls hosted by UT-Dallas. Although we did not win, we did have an impressive poster on display at the accompanying social. As I sat through the ceremony and listened to the descriptions of the various winning activities, I could not help but reflect on the fact that our section has many activities that would be very competitive if they were included in the annual report, which is the basis on which these nominations are made and judged. I encourage you to be sure to notify your sectional officers of any novel or successful activities – especially those connected with National Chemistry Week or Earth Day - which your academic institution or industrial entity performs this year so that they can be included in the next annual report (January).

I attended the Council Meeting, which only lasted 3 hours this time. The last item on the agenda was a short presentation about the next National Meeting. It will be in New Orleans, LA, March 18-22, 2018. The theme is "Nexus of Food, Energy & Water". Abstract submission is already open and closes in October, with the actual closing date varying by division. This is within driving distance and promises to be a great meeting, and I encourage you to consider attending, both to have a good time and to obtain a greater appreciation of the scope of and opportunities offered by the American Chemical Society.



TO SEND YOUR ARTICLES and VIDEOS to the SOUTHWEST RETORT!

DFW Section of ACS Awards

On behalf of the DFW ACS Committee, Chair Moji Bonakdar has announced the 2017 winners of the Wilfred T. Doherty Research & Service award and Werner Schulz Award, respectively. They are Dr. **Laszo Prokai**, University of North Texas Health Science Center, and Mrs. **Jo King**, Heritage High School, Frisco, TX.

Dr. **Laszo Prokai** is Professor and the Robert A. Welch Chair in Biochemistry at UNT HSC. For almost three decades his major focus in medicinal chemistry has been targeting therapeutic agents to the central nervous system through prodrug approaches. He has an active research program in bioanalytical chemistry and has numerous publications, and teaches graduate and professional (medical) courses at the Graduate School of Biomedical Sciences and the Texas College of Osteopathic Medicine. He has been an active member of the DFW ACS section for many years and has served the local section in many activities.

Mrs. **Jo King** teaches Pre-AP and AP courses for Heritage High School in Frisco. What makes Jo unique and someone who emulates Werner Schulz is her dedication to the American Chemical Society at the national level. As a team member, she has traveled across the US promoting and exciting audiences (young and old) about the wonders of chemistry. She is the current ACS Co-Chair of the High School Committee for the Division of Chemical Education.

Save the date!

Saturday, October 7

Schulz Award Dinner

Honoring Mrs. **Jo King** of Heritage High School, Frisco, TX

Stay tuned for more details on how to register!

Location

Blue Mesa Grill, 8200 Dallas Parkway, Plano, Texas 75024

Schedule

6pm-7pm Happy hour

7pm-8pm Dinner

7:45pm Local Section Announcements

8pm-9pm Award Presentation

Mrs. Jo King Biography:

Jo King has taught chemistry for almost 30 years and currently teaches Pre-AP and AP courses at Heritage High School in Frisco, Texas. She has been involved in various aspects of ACS and currently is the Co-Chair of the High School Committee for the Division of Chemical education. She received her BS in psychology with a chemistry minor from Midwestern State University and her MS in chemistry/chemistry education from the University of North Texas.

Around the Area

DFW SECTION

DFW SENIOR CHEMISTS
ACS Local Section Kick-Off Event
Luncheon at the
University of Dallas in Irving
Supported by Funding from
the National ACS
MARK YOUR CALENDARS!
Saturday, October 21, 2017
Watch for Details in the October Retort
And Special Invitations from
Bob Landolt (rlandolt@txwes.edu)

UT-Dallas

Associate Professor Dr. **Gregg Dieckmann** received the President's Teaching Excellence Award in Undergraduate Instruction (tenure-track).

In addition to this year's President's Award, Dr. Gregg Dieckmann, associate professor of chemistry, has twice won Outstanding Teacher Awards from the School of Natural Sciences and Mathematics. A faculty member since 1999, he has taught inorganic chemistry, physical biochemistry and general chemistry, a course he has coordinated since 2006.

Dieckmann said he enjoys the challenge of teaching general chemistry, which is typically populated with first-year students and usually is a prerequisite for other courses.

"Most students don't take general chemistry because they want to," he said. "I love stepping into that arena and taking on the challenge of instilling an appreciation of how general chemistry impacts most aspects of these students' lives."

Incorporating interesting stories gives students a personal connection to the material, Dieckmann added.

"People are naturally inquisitive. I enjoy tapping into that to make these required courses some of their most enjoyable. I am motivated by those one-on-one interactions that occur. I love it when a student smiles because something just clicked, or when they simply tell me that they appreciate the time I've invested in helping them from point A to B."

UT-Arlington

Dr. Purnendu "Sandy" Dasgupta has been awarded the 2017 Talanta Medal for analytical chemistry. The Talanta Medal was initiated in 1961 by Pergamon Press, later acquired by Elsevier, as a prestigious gold medal for outstanding contributions to analytical chemistry. Dasgupta is the fourth American academic to win the award and the first of Indian origin. A special issue of Talanta, an acclaimed international journal devoted to analytical chemistry, will be published to coincide with the awards ceremony.

Dasgupta is currently the holder of the Hamish Small Chair in Ion Analysis, and he is the winner of numerous awards. They include the Eastern Analytical Symposium's Award for Outstanding Achievement in the Fields of Analytical Chemistry, the ACS Analytical

Division's Giddings Award for Excellence in Education, the 2012 Del Nagare Award in Chromatography, the 2012 ACS Southwest Regional Award, the 2012 Doherty Award of the Dallas-Ft. Worth ACS Section, and the 2011 ACS Award in Chromatography.

"This is a tremendous honor, and I'm very grateful for this recognition by my peers," said Dasgupta. "By recognizing me, they are also honoring several generations of my students from all over the world, who are so involved and committed to my work and form a cornerstone of my success."

Associate Professor Brad Pierce has received an NSF grant to study the relevant structural factors influencing the extent of biological oxidations catalyzed by a widespread class of iron-containing enzymes. The grant is for $419,400 for three years.

Assistant Professor Alex Bugarin has received a $110,000 ACS PRF New Directions grant. Drs. Kayunta Johnson-Winters and Junha Jeon have been promoted to Associate Professor with tenure. Prof. Krishnan Rajeshwar gave keynote talks on "Photoelectrochemistry, Solid State Chemistry, and Solar Fuels, A Nexus?" at the June Conference on Solid State Ionics in Padua, Italy and at the Aug./Sept. meeting of the International Society of Electrochemistry in Providence, RI.

University of Arkansas

On the Go

Matt McIntosh attended the 45th National Organic Symposium in Davis, CA, June 25-29. Kay Brummond, University of Pittsburgh, was the meeting organizer; McIntosh was the co-organizer. The National Organic Symposium is the premier organic chemistry meeting of the ACS Division of Organic Chemistry, and has been held biannually

J. Sakon, R Bauer, J. R. Roeser, J. Sanders, D. Weir, O Matsushita, K Tanaka, K. Janowska, Structural Basis for processive cleavage by Clostridial Collagenase. Gordon Research Conference, July 16-21, 2017, Colby-Sawyer College, New London, NH.

P. Caviness, O. Matsushita, J. Sakon. Structural from polycystic kidney disease domains from Clostridial Collagenases. Gordon Research Conference, July16-21, 2017, Colby-Sawyer College, New London, NH.

J. Sakon, R Bauer, J.R. Roeser, J. Sanders, D. Weir, O. Matsushita, K. Tanaka, K. Janowska. Activation and binding mechanism of a clostridial collagen-binding segment with pseudo-twofold symmetry. Gordon Research Conference, July 29-August 4, 2017, University of New England, Biddeford, ME.

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K. Immadisetty, J. Hettige, and M. Moradi. What can and cannot be learned from molecular dynamics simulations of bacterial proton-coupled oligopeptide transporter GkPOT? *J. Phys. Chem. B*, 121(15):3644-3656, 2017. DOI: 10.1021/acs.jpcb.6b09733.

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Bryson, David; Chenguang Fan; Li-Tao Guo; Corwin Miller; Dieter Söll; David Liu. Continuous Directed Evolution of Aminoacyl-tRNA Synthetases to Alter Amino Acid Specificity and Enhance Activity. *Nat. Chem. Biol*. 2017, Accepted.

Venkat, Sumana; Caroline Gregory; Qinglei Gan; Chenguang Fan. Biochemical Characterization of Lysine Acetylation of Tyrosyl-tRNA Synthetase in Escherichia coli. *ChemBioChem*. 2017, Accepted.

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COMING SOON!

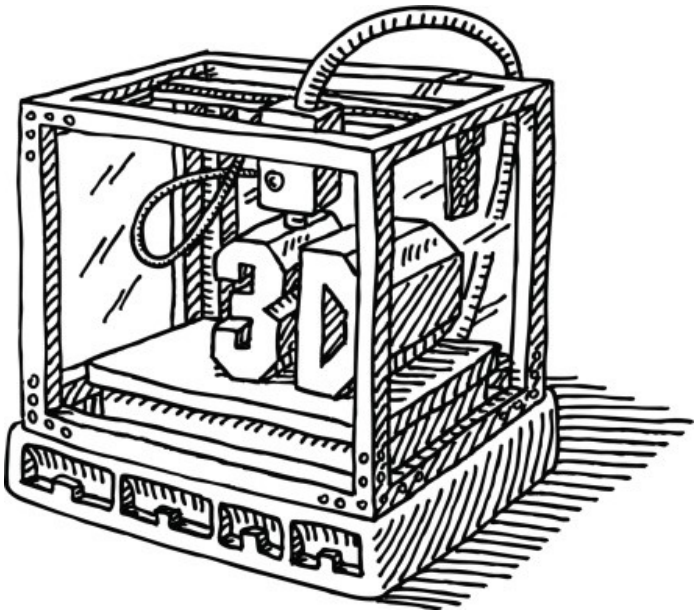
national chemistry week

From the ACS Press Room

Making 3-D Printing Safer

Characterization and Control of Nanoparticle Emission during 3D Printing
Environmental Science & Technology

Within the past decade, 3-D printers have gone from bulky, expensive curiosities to compact, more affordable consumer products. At the same time, concerns have emerged that nanoparticles released from the machines during use could affect consumers' health. Now researchers report in CS' *Environmental Science & Technology* a way to eliminate almost all nanoparticle emissions from some of these printers.



Recent studies on 3-D printers have found that when operating, the devices can release volatile organic compounds, aldehydes and nanoparticles into the air. All of these substances have the potential to harm human health. But no research had been reported on strategies for preventing or reducing pollution from the machines. So Chungsik Yoon and colleagues decided to focus on testing various approaches for controlling the devices' nanoparticle emissions.

For their study, the researchers worked with a 3-D printer based on fused-deposition modeling technology, the most commonly used process among commercially available models. They tested seven "inks" made out of thermoplastic materials under different temperatures. Of these, high-impact polystyrene and nylon had the highest nanoparticle emission rates; polylactic acid had the lowest. Printing at the manufacturer-recommended temperatures resulted in fewer emissions than doing so at higher temperatures. The researchers also analyzed eight methods for controlling pollution from the printers using varying combinations of fans, filters and enclosures. All of the designs removed at least 70 percent of nanoparticle emissions. The most efficient approach eliminated 99.95 percent of such pollution, and involved enclosing the printer and installing a high-efficiency particulate air (HEPA) filter. Based on their results, the researchers recommend using low temperatures, low-emitting materials and enclosing 3-D printers with a HEPA or similar filter to reduce the release of nanoparticles.

The authors acknowledge funding from the National Research Foundation of Korea.

From the ACS Press Room

LIGHTS, CAMERA, ACTION!

RAPID LOW-COST ANALYSIS OF TAP WATER

https://www.acs.org/content/acs/en/pressroom/newsreleases/2017/august/coffee-ring-effect-harnessed-to-provide-rapid-low-cost-analysis-of-tap-water-video.html

WIPING UP SUNBLOCK FROM OCEANS TO SAVE CORAL REEFS

https://www.acs.org/content/acs/en/pressroom/newsreleases/2017/august/sopping-up-sunblock-from-oceans-to-save-coral-reefs-video.html

CYBORG BACTERIA TURN SUNLIGHT INTO USEFUL COMPOUNDS

https://www.acs.org/content/acs/en/pressroom/newsreleases/2017/august/cyborg-bacteria-outperform-plants-when-turning-sunlight-into-useful-compounds-video.html

From the ACS Press Room

House dust spurs growth of fat cells in lab tests

Characterization of Adipogenic Activity of House Dust Extracts and Semi-Volatile Indoor Contaminants in 3T3-L1 Cells
Environmental Science & Technology

Poor diet and a lack of physical activity are major contributors to the world's obesity epidemic, but researchers have also identified common environmental pollutants that could play a role. Now one team reports in ACS' journal ***Environmental Science & Technology*** that small amounts of house dust containing many of these compounds can spur fat cells to accumulate more triglycerides, or fat, in a lab dish.

Endocrine-disrupting chemicals, or EDCs, are synthetic or naturally occurring compounds that can interfere with or mimic the body's hormones. EDCs, such as flame retardants, phthalates and bisphenol-A, are known for their potential effects on reproductive, neurological and immune functions. But animal studies also suggest that early life exposure to some EDCs can cause weight gain later in life, and, as a result, have been called "obesogens." Some manufacturers have reduced the use of EDCs in products, but many are still ubiquitous in consumer goods. And they wind up in indoor dust that can be inhaled, ingested, or absorbed through the skin. The U.S. Environmental Protection Agency estimates that children consume 50 milligrams of house dust each day. Concerned about the potential effects EDCs in dust might have on children's health, Heather Stapleton and colleagues wanted to see if the compounds in house dust might have an effect on fat cells.

The researchers collected samples of indoor dust from 11 homes in North Carolina and tested extracts from the samples in a mouse pre-adipocyte cell model, 3T3-L1 cells, often used to test compounds for potential effects on the accumulation of triglycerides, a type of fat. Extracts from seven of the 11 dust samples triggered the pre-adipocytes to develop into mature fat cells and accumulate triglycerides. Extracts from nine samples spurred the cells to divide, creating a larger pool of precursor fat cells. Only one dust sample had no effect. Additionally, among the 44 individual common house dust contaminants tested in this model, pyraclostrobin (a pesticide), the flame-retardant TBPDP, and DBP, a commonly used plasticizer, had the strongest fat-producing effects. This suggests that the mixture of these chemicals in house dust is promoting the accumulation of triglycerides and fat cells, the researchers say. Amounts of dust as low as 3 micrograms — well below the mass of dust that children are exposed to daily — caused measurable effects. Thus, the researchers also suggest that house dust is a likely exposure source of chemicals that may be able to disrupt metabolic health, particularly in children.

The authors acknowledge funding from the National Institute of Environmental Health Sciences, Fred and Alice Stanback, the Nicholas School of the Environment at Duke University and the Duke Cancer Institute.

From the editor

What is a cyborg? The term, coined by Manfred Clynes and Nathan S. Kline (both of Rockland State University) , a cyborg (short for "cybernetic organism") is a being with both organic and biomechatronic body parts. In an article called "Cyborgs and Space," in the September 1960 issue of *Astronautics*, they wrote "...For the exogenously extended organizational complex functioning as an integrated homeostatic system unconsciously, we propose the term *Cyborg*."

Why am I talking about cyborgs? Check out the video/article on page 18. When *Moorella thermoacetica,* a ***non***-photosynthetic bacteria which produces acetic acid, were fed cysteine and cadmium, they synthesized cadmium sulfide (CdS) nanoparticles, which essentially function as solar panels. The hybrid organism, called *M. thermoacetica-CdS*, can then produce acetic acid from CO_2 and water and **light**...it is now photosynthetic (K. Sakimoto and P. Yang at UC Berkely). Theoretically, then, a bacterial species that produces compound XYZ non-photosynthetically can be fed the components of a solar panel and become photosynthetic.

Save the date for the Schulz award dinner honoring Jo King of Heritage High School...it's October 7.

Best regards,
Connie