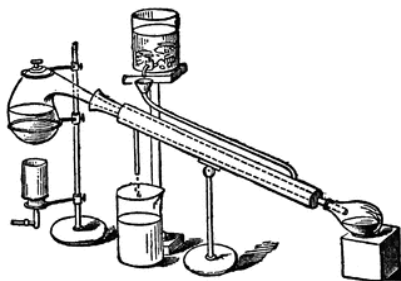




SOUTHWEST RETORT



SEVENTY-SECOND YEAR

February 2020

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

published by

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FIFTY YEARS AGO IN *THE SOUTHWEST RETORT*

Compiled by E. Thomas Strom

The February ACS tour speakers were **Mr.**



James F. Cosgrove from General Telephone and Electronics Labs, Bayside, New York, and **Dr. Philip J. Elving** from the University of Michigan. Mr. Cosgrove's topic was "Activation Analysis in the Modern Analytical

Laboratory," while Dr. Elving spoke on "Electrochemistry of Purines and Pyrim-

idines."

The ACS National Meeting in February, 1970, was held in Houston. It had been 16 years since ACS had held a national meeting in Texas. There were a variety of special events for spouses and also many plant tours. The whole of the *Retort* February issue served as the visitor's guide for the national meeting, so there was no ACS local section news to report.

Stay tuned for next month!



About

Please mark your calendars for **The 2020 Meeting in Miniature at UT Dallas**. This meeting will be hosted by The University of Texas at Dallas in Richardson, Texas on April 18th.

We look forward to seeing you at UT Dallas! WHOOSH!

Location

The University of Texas at Dallas
800 West Campbell Rd
Richardson, TX 75080

To volunteer as a presentation judge or for other inquiries please reach out to Dr. Jeremiah Gassensmith.

From the ACS Press Room

Comparing Heirloom and Modern Wheat Effects on Gut Health

“A Comparative Study of Modern and Heirloom Wheat on Indicators of Gastrointestinal Health”

Journal of Agricultural and Food Chemistry

Amid concerns about gluten sensitivity, increasing numbers of people are avoiding wheat. Most have not been diagnosed with a wheat-related medical condition, yet they seem to feel better when they don't eat gluten-containing foods. A possible explanation is that modern varieties of wheat are responsible. But now, researchers reporting in ACS' *Journal of Agricultural and Food Chemistry* have shown that a popular modern variety does not impair gastrointestinal health in mice compared with heirloom wheat.

When people with celiac disease or other forms of gluten sensitivity eat wheat, they experience



gastrointestinal distress and inflammation. However, little is known about whether eating wheat could cause gastrointestinal problems in healthy people. Some have speculated that selective breeding of wheat might have altered the grain in a way that negatively affects gut health. From the late 1800s to 1940s, a variety known as “Turkey” was the major wheat grown in the U.S. Then,

selective breeding created new types with higher yields and resistance to pests and pathogens. The “Gallagher” variety, introduced in 2012, is now one of the most widely grown bread wheats in the U.S. Great Plains region. Brett Carver, Brenda Smith and colleagues wondered whether eating the modern Gallagher variety would increase gastrointestinal problems in healthy mice relative to a blend of two heirloom wheats, Turkey and “Kharkof.”

To simulate a Western-type diet, which has itself been linked to chronic inflammation and disease, the researchers fed mice chow that was high in sugar and fat. Then, they added either heirloom or modern wheat to the food, at a level that resembled normal-to-high human consumption. Signs of gut inflammation were similar between mice fed the heirloom and modern varieties, although heirloom wheat slightly reduced levels of the pro-inflammatory cytokine interleukin-17. However, modern Gallagher wheat improved the structure of villi — fingerlike projections that absorb nutrients — in a specific region of the small intestine compared with heirloom wheat. These findings indicate that a modern wheat variety did not compromise gut barrier function or contribute to inflammation in healthy mice compared with its heirloom predecessors, the researchers say.

The authors acknowledge funding from the Oklahoma Wheat Research Foundation.

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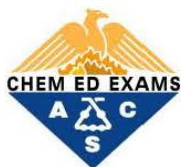
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Call for Papers for BCCE 2020

Abstract submission is now opened through the American Chemical Society (ACS) Meeting Abstract Programming System site (ACS MAPS) through February 24, 2020. Registration and housing for the conference will open after March 30, 2020.

<https://bcce2020.org/call-for-abstracts/>

The BCCE 2020 will be held on the beautiful Campus of Oregon State University July 18 - 23. The program will feature 186 technical symposia and 137 workshops, two poster sessions, four plenary sessions, and an exhibition area with over 70 booths. Oregon State University is home of the Linus Pauling Collection. Conference participants will be able to view some of Professor Pauling's historical documents, artifacts, and rare letters.

Plus, unique to the BCCes - a Wednesday evening social and dance with live music from Al D. Hyde and the Key Tones -

From the ACS Press Room

Finer Particulate Matter (PM1) Could Increase Cardiovascular Disease Risk

“Higher Risk of Cardiovascular Disease Associated with Smaller Size-Fractionated Particulate Matter”

Environmental Science & Technology Letters

In addition to harmful gases such as carbon monoxide, air pollution contains tiny particles that have been linked to health problems, including cardiovascular disease and asthma. Most studies have analyzed the potential health effects of larger-sized particulate matter (PM), such as particles less than 2.5 μm in diameter (PM2.5). Now, researchers report in *Environmental Science &*

Technology Letters that particles with diameters less than 1 μm (PM1) are even more strongly correlated with cardiovascular disease.

To better understand air pollution, a nationwide PM1 monitoring campaign was recently



performed in China. Zhaomin Dong, Maigeng Zhou and colleagues analyzed the data, which came from 65 Chinese cities, to determine if PM1 exposure correlated with the number of non-accidental deaths in each city during the same time period. They found that for every 10 $\mu\text{g}/\text{m}^3$ increase in PM1, there was a 0.29% increased risk of cardiovascular disease, which was 21% higher than the risk related to PM2.5 (0.24%). The finer PM1 could more easily deposit in the lungs and circulation than larger particles, which might explain the increased health risks, the researchers say.

The authors acknowledge funding from the Ministry of Science and Technology of the People’s Republic of China, the National Natural Science Foundation of China and the Fundamental Research Project of Beihang University.

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From the ACS Press Room

Color-Changing Bandages Sense and Treat Bacterial Infections

“Colorimetric Band-aids for Point-of-Care Sensing and Treating Bacterial Infection”

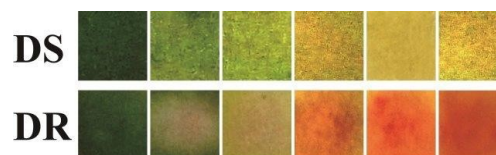
ACS Central Science

According to the World Health Organization, antibiotic resistance is one of the biggest threats to global health. Sensing and treating bacterial infections earlier could help improve patients’ recovery, as well curb the spread of antibiotic-resistant microbes. Now, researchers reporting in *ACS Central Science* have developed color-changing bandages that can sense drug-resistant and drug-sensitive bacteria in wounds and treat them accordingly.

Xiaogang Qu and colleagues developed a material that changes color from green to yellow when it contacts the acidic microenvironment of a bacterial infection. In response, the material, which is incorporated into a bandage, releases an antibiotic that kills drug-sensitive bacteria. If drug-resistant bacteria are present, the bandage turns red in color through the action of an enzyme produced by the resistant microbes. When this happens, the researchers can shine light on the bandage, causing the material to release reactive oxygen species that kill or weaken the bacteria, making them more susceptible to the antibiotic. The team showed that the bandage could speed the healing of wounds in mice that were infected with drug-sensitive or drug-resistant bacteria.

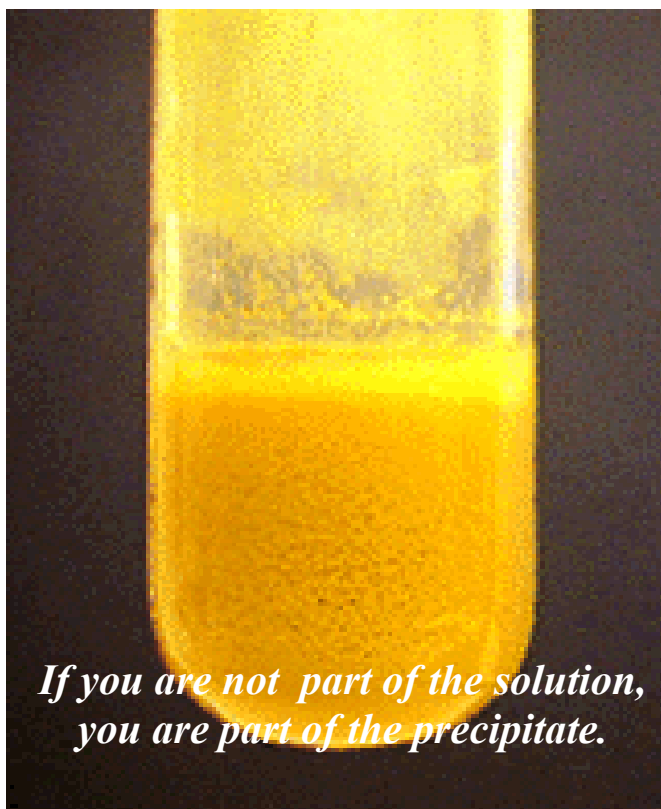
The authors acknowledge funding from the

National Natural Science Foundation of China and the Key Research Program of Frontier Sciences of the Chinese Academy of Sciences.



A bandage changed color from green to yellow, and from green to red, in the presence of increasing concentrations of drug-sensitive (DS) and drug-resistant (DR) *E.coli*, respectively.

Credit: Adapted from *ACS Central Science* 2020, DOI: 10.1021/acscentsci.9b01104



#IYPT Still has Events



ELEMENTAL ART: A CONTEST

To celebrate the 150th anniversary of the Periodic Table,

The Division of the History of Chemistry (HIST) announces a contest OPEN TO ALL for ORIGINAL ART in one of the following categories with themes related to the chemical elements, their discovery, or uses:

1. Poem
2. Cartoon
3. Photograph

The three best works in each category (selected by a professional panel of judges) will receive certificates, monetary awards (\$250, \$200, or \$150 for 1st, 2nd, and 3rd place, respectively), and will be published in the HIST Newsletter and Website. Depending on the number of submissions, a volume with the works may be published as well.

Please submit your original art by **July 1, 2020** to the HIST Program Chair (nicksarevsky@gmail.com) as an attachment to an email, the subject line of which reads **"Elemental Art Competition – XYZ"** (where "XYZ" stands for the name of the person who created the artwork).

1

The winners will be notified in August 2020.

We all know that it is a challenge to fit an event like this into your AP curriculum, but most of us have some Chemistry I kiddos as well, and perhaps a little more flexibility with that schedule.

Some students are not very good at traditional pen/pencil tests and this type of contest allows kids

that are more artistically inclined to demonstrate their skills and learn something about chemistry at the same time. One suggestion is to have it be optional, for a few extra points on a quiz or test. Set up a short rubric that combines the contest elements with your own learning criteria and it is quick and easy to "grade." Just an FYI, a student in the Houston area was 2nd place in the ACS poetry contest for National Chemistry Week in 2019, so you never know.



Biennial 2020

We are in the process of updating this website with information for the 2020 conference!!

Please be patient and know that we are updating it as quickly as we finalize plans!!

Who: (Chemistry) Teachers

What: ACT2 Biennial 2020

Where: Texas A&M University - San Antonio

San Antonio, TX

When: Mon, 15 June - Thurs, 18 June, 2020

Why: share best practices

Got questions? please email them to act2biennial@gmail.com

Early Registration fees:

- staying in the dorm (assuming you are sharing a room) - \$ 325
- not staying in the dorm (all meals are included) - \$ TBD

If you are the primary presenter of a session, you receive a \$25 discount off the above fees.

Registration cost includes:

- meals (light breakfast, lunch and dinner)
- conference t-shirt
- Banquet
- goodies
- 2 year membership in ACT2
- housing in the dorms (assuming you select that option at registration)
- ESSENTIALLY EVERYTHING EXCEPT TRAVEL TO AND FROM THE CONFERENCE!

Forms (registration, presentation proposal, scholarship application, etc) can be found on the [Forms 2020](#) page, link.

<https://sites.google.com/site/act2biennial/biennial-2014>

From the ACS Press Room

Microplastics from Ocean Fishing can ‘Hide’ in Deep Sediments

“Underestimated Microplastic Pollution Derived from Fishery Activities and ‘Hidden’ in Deep Sediment”

Environmental Science & Technology

Microplastic pollution in the world’s oceans is a growing problem, and most studies of the issue have focused on land-based sources, such as discarded plastic bags or water bottles. Now, researchers reporting in *ACS’ Environmental Science & Technology* have linked microplastics in China’s Beibu Gulf with heavy fishing activities. Surprisingly, many of the particles were hidden in deep sediments on the ocean floor, which could have led scientists to underestimate the extent of the contamination.



Fishing gear, such as nets, ropes and pots, is a potential sea-based source of microplastics. The tiny particles could be worn away from fishing gear during use, or they might arise when the gear is lost or discarded in the ocean. Yinghui Wang and colleagues wanted to measure microplastics in surface sediment samples from different sites in Beibu Gulf, a traditional fishing ground of

China and the China-Indo peninsula that lacks substantial industrialization and urbanization. They also wanted to look for this type of contamination in deep sediments, up to 2 feet below the surface, which have not been well studied with respect to microplastic pollution.

The researchers collected 52 sediment samples from Beibu Gulf and adjacent rivers in July 2017. Microplastics were separated from sediment samples and counted under a microscope. Most of the particles were made of polypropylene (PP) or polyethylene (PE), which are materials widely used in fishing nets and rope. The team found a strong correlation between the intensity of fishing activities, such as capture fishing or mariculture, and the abundance of PP and PE fibers. Unexpectedly, microplastics were detected even one foot below the surface, which corresponds to about the year 1913 (before the observed plastics were invented). The particles could have been transported to deep sediment layers by marine worms. Because most previous studies have considered only microplastics in surface sediment, this type of pollution in ocean sediments worldwide could be greatly underestimated, the researchers say.

The authors acknowledge funding from the National Natural Science Foundation of China and the Science and Technology Major Project of Guangxi.

From the ACS Press Room

Residues in Fingerprints Hold Clues to Their Age

“Determining Fingerprint Age with Mass Spectrometry Imaging via Ozonolysis of Triacylglycerols”

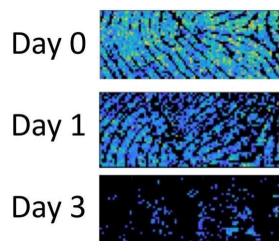
Analytical Chemistry

Police have long relied on the unique whorls, loops or arches encoded in fingerprints to identify suspects. However, they have no way to tell how long ago those prints were left behind — information that could be crucial to a case. A preliminary new study in ACS’ *Analytical Chemistry* suggests that could change. Researchers report that they could link compounds contained in fingerprints with their age.

By determining the age of fingerprints, police could get an idea of who might have been present around the time a crime was committed. This information could, for example, contradict a suspect’s explanation that he or she had visited earlier. Scientists have already begun mining fingerprint residues for clues to the identity of the person who made them, but timing has proven more difficult to reliably pin down. Notably, past research has shown that a gas chromatography-mass spectrometry method succeeded in determining if prints were more or less than eight days old; however, investigators often need more precision. To get a better idea of when prints were deposited, Young Jin Lee and colleagues looked to reactions already suspected to take place in these residues, when ozone in air reacts with unsaturated triacylglycerols left by a fingertip.

Using prints collected from three donors, the researchers tracked shifting levels of triacylglycerols using mass spectrometry imaging, a technique that leaves the evidence intact. They found they could reliably determine the triacylglycerol degradation rate for each person over the course of seven days. But the rate differed among individuals, with one person’s triacylglycerols declining more gradually than the others. The researchers attribute this difference to higher levels of lipids in that individual’s fingerprints. The method also worked on residues that had been dusted with forensic powder. The researchers say that although a large-scale study is needed to better understand how lipid levels affect triacylglycerol degradation, this analysis is a first step toward developing a better fingerprint aging test.

The authors acknowledge funding from the National Institute of Justice.



Levels of an unsaturated triacylglycerol decline in fingerprints from an individual from day 0 (top) to day 1 (middle) and day 3 (bottom).

Credit: Adapted from *Analytical Chemistry* 2020, DOI: 10.1021/acs.analchem.9b04765

From the ACS Press Room

Preventing, Healing Tooth Decay with a Bioactive Peptide

“Constructing an Antibiofouling and Mineralizing Bioactive Tooth Surface to Protect against Decay and Promote Self-Healing”

ACS Applied Materials & Interfaces

Cavities, or dental caries, are the most widespread non-communicable disease globally, according to the World Health Organization.



Having a cavity drilled and filled at the dentist's office can be painful, but untreated caries could lead to worse

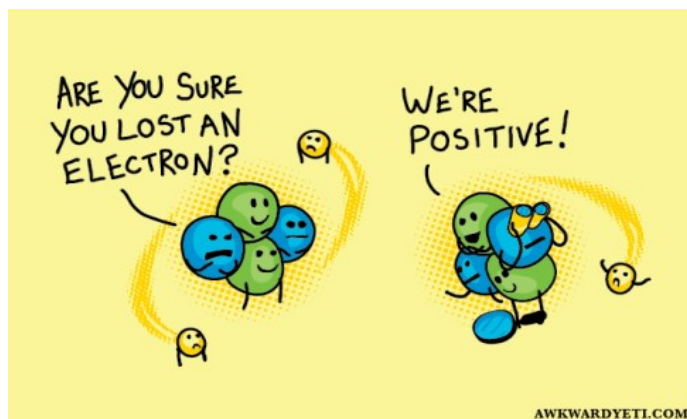
pain, tooth loss, infection, and even illness or death. Now, researchers in *ACS Applied Materials & Interfaces* report a bioactive peptide that coats tooth surfaces, helping prevent new cavities and heal existing ones in lab experiments.

Conventional treatment for dental cavities involves removing decayed tissue and filling the hole with materials, such as amalgam or composite resin. However, this procedure can damage healthy tissue and cause severe discomfort for patients. Hai Ming Wong, Quan Li Li and colleagues wanted to develop a two-pronged strategy to prevent and treat tooth decay: 1) prevent colonization of the tooth surface by the plaque-forming bacteria that cause cavities, and 2) reduce demineralization, or the dissolving of tooth enamel,

while increasing remineralization, or repair.

The researchers based their anti-cavity coating on a natural antimicrobial peptide called H5. Produced by human salivary glands, H5 can adsorb onto tooth enamel and destroy a broad range of bacteria and fungi. To promote remineralization, the team added a phosphoserine group to one end of H5, which they thought could help attract more calcium ions to repair the enamel than natural H5. They tested the modified peptide on slices of human molars. Compared with natural H5, the new peptide adsorbed more strongly to the tooth surface, killed more bacteria and inhibited their adhesion, and protected teeth from demineralization. Surprisingly, however, both peptides promoted remineralization to a similar degree. After brushing, people could someday apply the modified peptide to their teeth as a varnish or gel to protect against tooth decay, the researchers say.

The authors acknowledge funding from the National Natural Science Foundation of China.



American Chemical Society, Dallas-Fort Worth Section

Announces the

Local Qualifying Exam

for the National Chemistry Olympiad

Saturday, March 21, 2020

8:30 a.m.—11:00 a.m.

University of Texas at Arlington

Chemistry Research Building (CRB), Room 114

University of North Texas

**For more details
and to register:**



Alternatively, you may also register at

or

https://docs.google.com/forms/d/e/1FAIpQLSd_Vl58iyH9_GxS4cvRB4_D5li7BDVO_3B8t1KqGNWCIdEeAQ/viewform?usp=sf_link

<https://forms.gle/L4TYMjKA18kTvdgv9>

The DFW section of the American Chemical Society will be conducting its local qualifying exam for the

2020 National Chemistry Olympiad on Saturday, March 21, 2020 (8:30 a.m).

The exam will be given simultaneously at the following locations:

The University of North Texas; Chemistry Building, Room 109

The University of Texas at Arlington; W. A. Baker Chemistry Research Building, Room 114 Parking information and maps for the above sites are available at: <http://www.unt.edu/transit/pdf/parkingmap.pdf> or <http://www.uta.edu/maps/>

PLEASE NOTE: There is no cost to students or teachers for this or the national exams. Copies of previous years' exams are available www.acs.org for practice (*Education à High School à Chemistry Olympiad*)

While 'walk-ins' are welcome as long as testing documents are available, students are strongly encouraged to pre-register for the local qualifying exam. Pre-registration assures that students will have test documents at the selected location. The registra-



US National Chemistry Olympiad (NCO) Testing Requirements

Students must be U. S. citizens or legal, permanent residents of the United States (green card holders) to take the U. S. National examination.

Students must be younger than 20 years old.

Only regularly enrolled high school students, graduating no earlier than Spring semester 2020, are eligible.

No more than two students per teacher or per high school may be selected to take the national exam. In the case of magnet programs or split enrollment, a student's school is defined as the high school where the student takes their science courses. For example, TAMS counts as a single high school for these purposes.

Students who have taken advanced placement courses in chemistry are eligible. Likewise, students who have received credit for college-level courses (limited to no more than two semesters or three quarters beyond general chemistry) are eligible.

Programmable calculators and cellular phones are **NOT** permitted during either the local or national exams. This means that **ABSOLUTELY NO GRAPHING CALCULATORS** are permitted during the exam regardless of whether the memory is cleared. Students **MUST** bring nonprogrammable scientific calculators with them to the exam, as the testing locations have NO calculators to loan. Students may bring pencils and erasers for marking their answers.

Local selection will be based upon student scores on the local NCO qualifying exam to be administered simultaneously at multiple locations in the DFW section on **Saturday, March 21, 2020**. There is only one day and time for the local test. **THERE ARE NO MAKE-UP EXAMS!** In case of tie scores, the criterion for selection of a tie-breaker system will be announced prior to the beginning of the exam on March 21. (Historically, this has been based on correct answers to selected questions). All exams will be collected for scoring as a single group, so there is no advantage to testing at a particular site. Participants are encouraged to take the exam at the testing site closest to them.

For those students selected for advancement, the National Exam will be held on **Saturday, April 25, 2020**, at the University of Texas at Arlington (location/time TBA). **NOTE:** Once all preliminary exams are scored, we will verify the availability and participation of qualifying students for the local NCO examination. When this is complete, we will notify the remaining students of their score. As a courtesy we also mail back each student's exam to their chemistry instructor so they can see what how they did on the exam. **Please keep in mind that administering the national NCO examination is our first priority.** Therefore, it is not unusual that these exams are not mailed out until after the DFW NCO exam is complete in April. Please be patient!

2020 USNCO Coordinator--Kathleen Holley, Ph.D.--Dallas/Fort Worth Section, ACS--kholley@yahoo.com

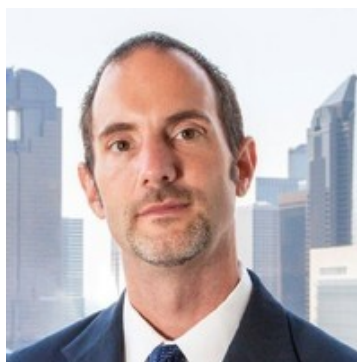


ACS Local Section
Dallas-Fort Worth

Dr. Mihaela C. Stefan was elected as Chair for the ACS DFW local section. She is Eugene McDermott Professor and Associate Dean for Graduate Studies in the School of Natural Science &



Mathematics at the University of Texas at Dallas. Her research group is developing novel organic semiconductors for organic electronics, biodegradable and biocompatible polymers for drug delivery applications, and rare novel catalysts for polymerization of dienes and cyclic esters. As a Chair she plans to increase the involvement of undergraduate and graduate students in the activities organized by the ACS DFW local section.



Dr. Trey Putnam was elected as chair elect for the 2020 calendar year for the ACS DFW local section. He is a Professor of Pharmaceutical Sciences and Pharmacy Practice at Texas Tech

University Health Sciences Center's Jerry H. Hodge School of Pharmacy in Dallas. His research group has the following specific areas of interest: (1) clinical pharmacology in special populations (e.g., pediatrics and obese patients); (2) biomarker identification and validation; (3) altered metabolism in disease states; and (4) advanced analytical techniques to investigate the above.

DFW Section March Meeting:

March 13 at 6 pm

Professor Nick Tsarevsky from the Southern Methodist University will give a talk entitled "Early Success Stories of Analytical Chemistry" at the University of Texas at Dallas (room SLC 2.303)



Around the Area

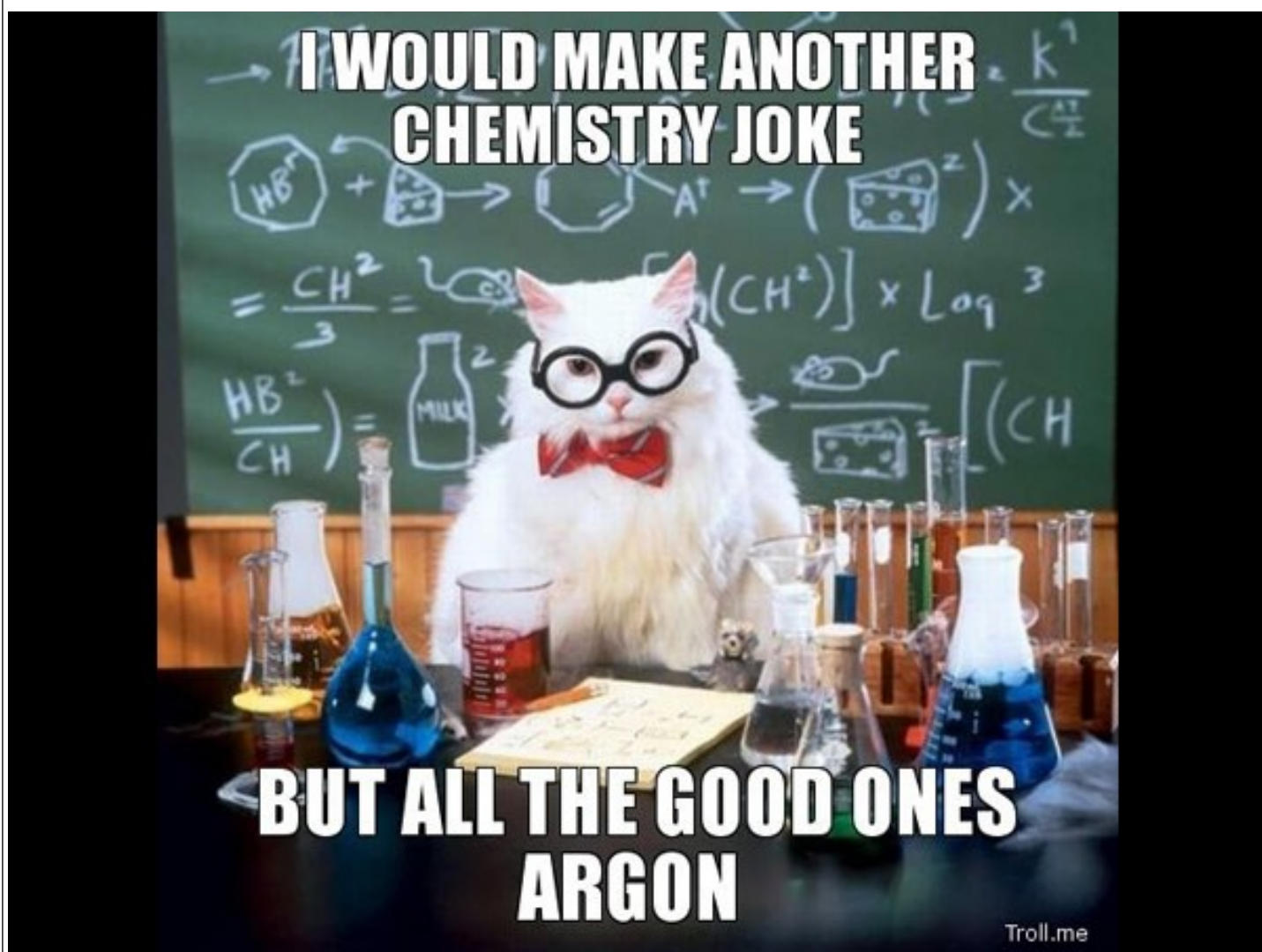
Dr. Subhra Mandal has been promoted to full professor. He is a biochemist who has published more than 60 peer-reviewed articles in top journals plus writing numerous book chapters and reviews.



Welch Professor Dr. Daniel Armstrong has won the 2020 Lifetime Achievement in Chromatography Award from LCGC. LCGC is the largest global chro-

matography multi media platform dedicated to the separation sciences. Dr. Armstrong along fellow faculty members **Dr. Sandy Dasgupta** and **Dr. Kevin Schug** were selected by *The Analytical Scientist* magazine to be on the 2019 Power List, a grouping of the top 100 analytical scientists in the world.

Dr. Krishnan Rajeshwar has received the 2019 Research Award from the Electrodeposition Division of the Electrochemical Society.



From the editor

As always at this time of the year, we have a number of events coming up:

National Chemistry Olympiad in March;

Meeting-in-Miniature in April;

ACT2 Biennial in June;

Biennial Conference in Chemical Education in June; and

Elemental Art Contest in July.

Details are all available here in the Retort or using the hyperlinks.

The March Section meeting will be at UTD, with Nick Tsarevsky of SMU speaking on “Early Success Stories of Analytical Chemistry”.

The Fort Worth Opera will be presenting Puccini’s *La Bohème* in April; we appreciate their support of the Dallas-Fort Worth Section, and the support of our other long-time advertisers: Huffman Laboratories and Ana-Lab.

*Best regards,
Connie*