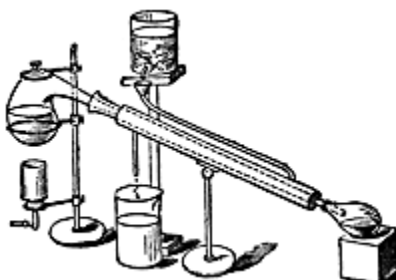




# ***SOUTHWEST RETORT***



**SIXTY-FOURTH YEAR**

**MAY 2012**

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

**published by**

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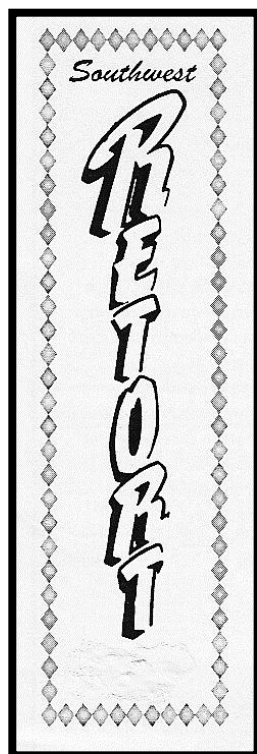
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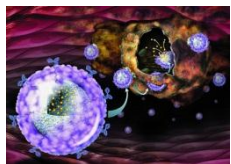
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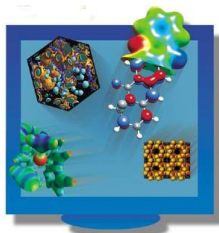
**TEXAS EASTMAN**

## 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](mailto:retort@acsdfw.org). Deadlines are the 7<sup>th</sup> of each month.



**Positions Available:** Two (2) qualified doctoral level scientists to work on a recently-funded project in nanoscale materials, effective immediately. Due to the nature of the funding source supporting these positions, US citizenship/permanent residency status is required. Interested individuals contact **Jeff Coffey** ([j.coffey@tcu.edu](mailto:j.coffey@tcu.edu)) or by phone at (817)257-6223.



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## ***FIFTY YEARS AGO IN THE SOUTHWEST RETORT***

The final ACS tour speaker for the academic year is **Dr. John R. Van Wazer** of Monsanto Chemical Co. in St. Louis. His four available talks include "The Five Major Problems of the Human Race Today," "Inorganic Polymers," "Functions and Applications of Phosphorus Compounds," and "Structural Reorganization of Molecules and Molecule Ions."

**Dr. Ogden Baine**, Head of the SMU Chemistry Department, died April 24 in Baylor Medical Center. He was 52 years old. Although he had been ill for more than a year, he continued to teach until about four weeks before his death. Dr. Baine received his undergraduate training at Southwestern College in Memphis. He received his master's and Ph.D. degrees from New York University. He also did graduate study in Germany before becoming a professor at Southwestern in 1935. He joined the SMU faculty in 1944, becoming Department Head on July 1, 1945. At SMU he played a major role in planning the new science library, and he helped in designing the chemistry facilities in Fondren Science Building.

A new position, Senior Scientist, has been established at TI to recognize the

achievements of outstanding scientists at TI. The first appointees to this position are **Morton Jones**, **Dmetro Andrychuk**, and **King Waters**. **Mrs. Joy Terry** of Tarleton State University has received an NSF grant to attend the University of the Pacific in Stockton, CA, June 18 through July 20. At North Texas State University **Dr. Price Truitt** has received a \$10,500 NIH grant for research on the synthesis of potential anti-tumor agents. North Texas faculty **Drs. Carico, Truitt**, and **Schimelpfenig** attended the spring ACS national meeting in Washington. **Dr. Robert W. Higgins** of Texas Woman's University attended the API Project 48 Meeting April 10-11 in Bartlesville. At TCU **Drs. W. H. Watson** and **J. E. Hodgkins** attended the Washington ACS national meeting. The Student Affiliate Chapter at East Texas State College took a trip to Texas Eastman at Longview. **Dr. Vernon Cates** is joining the ETSC faculty in the fall as assistant professor.

**Dr. Robert W. Taft, Jr.** of Penn State was the speaker at the April meeting of the Central Arkansas ACS Section. His topic was "Structure-Reactivity Relationships."

The ACS national meeting in Washington drew a large contingent from the University of Texas. Those attending were **Drs. G. J. Ayres, P. S. Bailey, N. Hackerman, L. F. Hatch, R. M. Hurd, M. Lichtenwalter, and G. W. Watt.** **Dr. Nathan Bauld** has received a three year grant of \$21,200 to study “Mechanisms of Metalation Reactions at Carbon-Halogen and Carbon-Oxygen Bonds.” **Dr. Royston Roberts** gave a talk on “Reactions of Aromatic Hydrocarbons with Lewis Acids” at the Institute of Technology and Higher Studies in Monterrey, Mexico.

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**The DFW Section needs a logo and a slogan of its own, so the section is sponsoring ...with prizes!...a contest for each. Submit entries to [retort@acsdfw.org](mailto:retort@acsdfw.org) as pdf or jpeg for logo and word format for the slogan.**

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in the September RETORT.**

**NOTE:  
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## ...AND ANOTHER THING...

DENISE MERKLE, PHD

In, "The Madame Curie Complex: The Hidden History of Women in Science"<sup>1</sup> author Julie des Jardins presents a well-researched and in-depth view of women scientists, their significant contributions, and the mind-boggling, marginalizing treatment they received at the hands of established science. Given that many female scientists lived in societal structures that prevented them from owning property, buying their own reference books, attending university classes, receiving credit for their work, filing patents in their own names, or even voting (after all, it's been less than a century since the 19th amendment was ratified in the USA), it's amazing that any woman was able to value her brain enough to slog through the impediments strewn in her path. But slog, they did - and bravely. Waves and waves of determined women continued to press on regardless, and now, it's not at all unique for a woman to pursue the career she chooses, or to establish a laboratory, purchase her own house, and own her own \*car\* - which she's allowed to drive without a man walking in front, waving a red warning flag.<sup>2</sup>

What is the point, you ask? We all know - or should know - that professional women can pretty much achieve their goals, with the exception of those whose faces are disfigured by

the pressure against the glass ceiling. This barrier too, one can only hope, will degrade with only a bit more time.

The point is actually a proposal: Allow yourself some radical thinking. No need to rip your electrons apart: If you don't already, consider, just consider, treating the world as a gender-neutral place. Try to see scientists as scientists, not as female scientists, or male scientists - just scientists. Don't emphasize the gender of award recipients. Think of them as Award Recipients, and fete them for the highly talented, deserving professionals they are. Don't refer to authors as women - or men - they're authors. Teachers, coaches, students, lab techs, professors, administrators, administrative assistants, children - everyone - think of them as people. Treat them as people, and not as beings to define and limit by the DNA encoded in chromosome 23.

Although as a society, we're still not beyond the gender-specific mindset, we can all make an effort to be. It hasn't been centuries, but it's been long enough. If you can't remove the gender-biased thoughts from your perceptions, at least make an attempt to recognize them for what they are. A high percentage of female scientists over the age of 50 have been told that they are abnormal for pursuing a scientific career. Many were ridiculed and discouraged from pursuing education beyond high school. A Ph.D.? You're kidding, right?

Well, no. No then. Not now. This type of repression has no place in the modern world.

Scientists are scientists. Unless your intent is to personally engage in behaviors that can lead to survival of the species, gender is irrelevant - or should be. Stop the bias, stop the societal constraints, and help people -all people- reach their goals. The world will be a better place.

References:

<sup>1</sup>*des Jardins, J. ; "The Madame Curie Complex: The Hidden History of Women in Science" (2010) The Women Writing Science Project, Feminist Press and NSF.*

<sup>2</sup><http://dmvamercia.com/blog/2010/06/30/crazy-traffic-laws/>

*And Another Thing...is meant to inspire thought and discourse. In no way is it intended to criticize the efforts of those who devote their time and energy to improve others' opportunities.*

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## AN INTERVIEW WITH ACS PRESIDENT-ELECT MARINDA WU

Interviewer E. Thomas Strom

I know when you interview people, you are supposed to take an objective, neutral approach. With a warm, bubbly person such as Marinda, that's very hard to do. Furthermore, Marinda and I have a history (not that kind of history!). When I was a newly minted councilor, my fellow councilor Urszula Wettermark introduced me to Marinda, at that time Chair of the ACS Committee on Economic and Professional Affairs (CEPA). I thought that CEPA was probably the most important ACS committee, and I wanted to be on it. For an entire year Marinda let me sit in on the closed meetings of CEPA, even though I was not yet a member, and she saw to it that I was appointed to CEPA the very next year. I serve on the committee to this day. Consequently, most anything Marinda proposes is all right with me.

My interview with Marinda took place on March 25, and she allowed me one hour and 15 minutes out of her very busy schedule. Since Marinda's English is perfect, I was surprised to find out that her first language was Mandarin Chinese, even though she was born in Pasadena. She still retains her skills in Chinese and uses that language in visits to China or Taiwan. Both her parents came from Beijing, and in those days before the Communist takeover, they

separately traveled to the US for further education, expecting to go back to China after receiving their degrees.



Her father was in graduate school at Cal Tech; her mother in graduate school at Illinois. Her mother had been given a book back in China about Madame Curie, and one of her professors had inspired her to go on to do graduate work.

Their parents (Marinda's grandparents) knew each other back in Beijing. Hearing about this pretty girl in Champaign-Urbana, her dad drove all

the way from Pasadena to court her. After a year of courtship, they got married in Champaign-Urbana. After the marriage, her mother moved to Pasadena. She had already received a master's degree from Illinois, so she intended to continue on at UCLA. When she approached a professor to take her on, he asked, "What do you need two Ph.D.s in the family for?" Then within a year Marinda was born. Three other children (two girls and a boy) followed. Her father was an outstanding aeronautical engineer, moving through the academic ranks rapidly to full professor while changing institutions several times. Her mother tried several times to go back for her Ph.D. after the children were all in school, but the discrimination that women faced was still there. The various programs all discounted her mother's master's degree in horticulture, insisting instead that she start over. However, her four children earned five Ph.D.s among them. Marinda's sister has both a Ph.D. from Harvard and one from Stanford, so Marinda jokingly said she had earned one for her mom. Marinda is the only chemistry Ph.D. in the group. Even though Marinda's mother never obtained her Ph.D., she made it possible for her husband and her children to all achieve their dreams. Since both Marinda's parents were scientists, from the time she was a little girl Marinda always dreamed of being a scientist. Her mother cautioned her,

though, that while family was important, you don't ever give up your career.

Her parents had been planning to go back to China after her father received his Ph.D. They would have gone back in 1950 just before Marinda was born. Then the Korean War broke out, which kept Marinda's parents in the US. A Chinese custom is that one of your names is taken from the town you were born in. As a result of her parents remaining in the US, Marinda's middle name is Pasadena. Until she started school, Marinda had only spoken Mandarin at home. Fortunately, her parents both spoke English without a trace of an accent. Her father had grown up in Nanking, and his father owned an interest in a movie house. Therefore Marinda's father learned American English while watching Humphrey Bogart and Gary Cooper in the movies. Once Marinda started school, her parents switched to English at home. Consequently Marinda speaks English without a Chinese accent, although she says she probably speaks Chinese with an American accent.

Marinda did well in all of her courses in high school. For a time her interest in languages led her to think of becoming an ambassador. Her father's academic career had brought him to Ohio State, so Marinda became a chemistry major at that institution. There she did undergraduate research with Devon

Meek. Those experiences resulted in her interest in inorganic chemistry. In 1971 she was accepted at UC-Berkeley and at the University of Illinois. She had spent many summers in California when her father consulted summers with Rand Corp. in Santa Monica. The pull of California was strong, but she wanted to work with Russell Drago at Illinois. When she entered graduate school at Illinois, she was shocked to learn that Drago didn't take women. However, Marinda had been awarded a three year fellowship at Illinois. Drago came up to her and said, "Marinda, forget all those rumors you have heard about me. I welcome you to my group." She completed her Ph.D. with Drago and had two prestigious post-docs lined up. Instead she went into industry, and she loved it!

When she was job hunting, she did her research on the various companies before ever visiting---a procedure she recommends to anyone interviewing for a job. She was able to finally get to California, taking a job with Dow's Western Division in Walnut Creek, CA. She had a great career there, essentially becoming a polymer chemist. She did spend two years with Dow in Wayland, MA, in the 1978-80 time period, while her husband, an electrical engineer, was getting an MBA at Harvard. At Dow she continually interacted with the outside, and she feels that in one sense she really was an ambassador. She interfaced with the Electric Power Research Institute and with Corning

Glass on various projects. When Herbert Dow came to visit Dow's Western Division, Marinda was his guide.

Eventually Marinda was recruited out of research by Dow Plastics to help them in the plastics versus paper battle--a battle that is still going on today. Dow Plastics wanted someone with a technical background who could hold his/her own with environmentalists. They wound up creating a new job titled "Environmental Advisor." Marinda was one of a group of three wearing that particular hat. She was a liaison with the CEOs of Dow's customers. She worked with the marketing and sales folks plus the media. She later went back to doing some research plus the outreach position. Then came a downturn in the economy coupled with an increasing hostility in California toward the traditional chemical industry. When Dow's California Ag Group was not allowed to expand, Dow shipped the Ag Group to Indianapolis. The handwriting was on the wall. In the early '90's, Dow decided to close all West Coast research. With the closure of the Walnut Creek research center, 400 people were impacted. Dow was very good about transferring employees to other Dow locations, but this is not easily done by dual career families. After thinking about it over the weekend, Marinda turned in her resignation to Dow on Monday, as there were no good job prospects for

her husband in Midland, MI. Thus Marinda began the second half of her career after almost 20 years with Dow.

Fortunately Marinda had been involved with ACS in California, so when the Dow facility closed she already had a network. (*Note to readers. Establish your network before you need it! Afterwards may be too late.*) The second half of her career involved small business. One of her fellow members on the local section executive committee had a small business and needed a Ph.D. polymer chemist. She went to work there and wore many hats. After a few years the small company was acquired by a large company. The new company took a different direction, so Marinda and a fellow chemist started a new company called Adametrics. The company worked with novel polymer surface modifications. However, the small business that is dearest to her heart is her company “Science is Fun.”

The impetus for starting the company came when Marinda’s daughter came home from school and said, “Mom, science is so boring.” Marinda thought, “How sad!” She decided to try to make a difference. She started teaching after school science enrichment classes for little kids. Since elementary school teachers normally have no science background, what they teach in elementary school is really not science; and this is not their fault. She developed hands-on science materials--

-astronomy, biology, geology---rocks and minerals, lights and colors, etc., all for little kids. Marinda says if you can teach it on their level, they can learn it. They are like little sponges, soaking it all up. Basically the two aspects of “Science is Fun” are science enrichment for young students and outreach for science education. The



public outreach to promote science is something for which she has had a passion for almost 20 years now. She was bringing groups of educators and scientists to visit Nancy Pelosi years before Pelosi became famous. She has never made a huge amount of money from “Science is Fun,” and she doesn’t care. She has wanted to give back to her profession and to make a difference. She is also very proud of her **science cafes**. You have to have



over the past five years.

champions to get things to work, and she has been a champion of science cafes

I think you readers will agree that, because of Marinda's experience in science outreach, she is well qualified to be the public face of the ACS. What will be her priorities? When she was running for president, she said they would be to (1.) serve the members' interests (2.) promote science literacy and education (3.) build bridges for strategic collaborations and (4.) advocate for jobs and professional growth. Those last two items lead to the new presidential task force, which she just appointed less than a month ago. The task force name is "Vision 2025—Helping ACS Members Thrive in the Global Chemistry Enterprise." The title year is a long ways off, because Marinda wants the task force to be very forward looking. The group is dealing with two areas. One area is globalization, and the other is jobs and advocacy. This group is to take the next step---not reinvent the wheel but think outside the box. Marinda visited many groups at the San Diego meeting to get their ideas. She finished by saying she welcomes any suggestions from members. She would like to know what more ACS can do to help

members with jobs and professional development and how ACS can be further improved. Her e-mail address is ([marindawu@gmail.com](mailto:marindawu@gmail.com)).

My personal opinion is that the problems showing up in chemical employment and in national employment have been developing over a long period of time, so correcting them will also take a long time. I do think Marinda's priorities are right on, but progress will come slowly. There will be no clear return to the good times during Marinda's three years in the presidential succession, but if Marinda, her successors, and all of we ACS members keep plugging away, things are bound to get better. It turns out that Marinda really has become an ambassador, an ambassador from ACS to the general public. I am very happy to have an upbeat, bright, and articulate Marinda Wu as the public face of ACS.



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# AROUND-THE-AREA

## DFW SECTION

### Elections Approaching

It is time to start solicitations for section members to become candidates for local office. The DFW section will need:

Chair-Elect  
Councilor  
Alternate Councilor  
Treasurer

Candidates should send a short (1/3 page tops) bio (indicating for which position they would like to be considered) to Dr. Trish Smith at [trishsmithtx@gmail.com](mailto:trishsmithtx@gmail.com). For examples of bios, contact Dr. Smith. Description of duties and election information are available at [acsd fw.org](http://acsd fw.org); click on **Officers** in the top right hand bar.

### Meeting in Miniature Winners

The winners of the 45<sup>th</sup> annual Meeting-in-Miniature are listed below. Thanks to the faculty and students of the University of Dallas, who put on a spectacularly organized event, and all those who volunteered as judges!!

#### Graduate Section A

- 1 - Andra Carter: UTA
- 2 (tie) Margarita DeJesus: TWU
- 2 (tie) Udayana Ranatunga: UTD

#### Graduate Section B

- 1(tie) Cong Liu: UNT
- 1(tie) Sanjaya Perera: UTD

- 3 (tie) Leila Fidelino: UTD
- 3 (tie) Sajani Basnayake: UTD

### Undergraduate

- 1 Nigel Gwini: ACU
- 2 Holland Korbitz: Baylor
- 3 Do Nguyen: UTD

## EAST TEXAS SECTION

**Congratulations** to the student chapters at **the University of Texas at Tyler**, and **Texarkana College**, who each received **Outstanding** chapter activity awards at the ACS national meeting in San Diego. **Texarkana College** was also chosen as a **Green Chemistry** chapter. The next meeting of the East Texas Section will be Thursday, April 26, at Eastman Chemical in Longview. Our speaker will be Eastman chemist **Tom Puckette**. The title of his talk will be, "*The Use of Halophosphite Ligands for the Rhodium Catalyzed Low Pressure Hydroformylation Reaction*". The East Texas Section will also vote on the **revised section bylaws** submitted to ACS.



## UTA

**Professor Sandy Dasgupta** was honored last month by Texas Senate Proclamation No. 350, noting his winning of the 2012 Dal Nogare Award.

**Welch Professor Daniel Armstrong**



last month received the UTA Distinguished Record of Research or Creative Activity Award. He received a plaque, honorarium, and a research

enhancement program grant.

Armstrong's comments on the use of ionic liquids as GC stationary phases were recently quoted in the April 3, 2012, issue of *C&EN*.

Department Chair **Rasika Dias** was one of two inductees to the UTA Academy of Distinguished Scholars. He received a plaque and medallion.

Lecturer **Seiichiro Tanizaki** received the Provost's Award for Excellence in Teaching. He received a plaque and an honorarium.

**Subhra Mandal** and **Krishnan Rajeshwar** were honored for their contributions to the faculty mentoring program.

**Brad Pierce** received a research enhancement program grant for "A Proton-Inventory Study of Substrate-Binding in Cysteine Dioxygenase."

**Kevin Schug** spent April 27-May 11 in the Czech Republic and in Austria to attend the 30<sup>th</sup> Informal Meeting on Mass Spectrometry and to give lectures at area institutions. He gave talks at the

University of Vienna, the Institute of Microbiology at the Czech Academy of Sciences in Prague, and Palacky University in Olomouc, CZ.



In May, **Fred MacDonnell** received the UTA College of Science Outstanding Teaching Award, while **Carl Lovely**

received the College of Science Outstanding Research Award.

A book co-edited by **E. Thomas Strom**



on "100+ Years of Plastics. Leo Baekeland and Beyond" was published last month as Vol.1080 in the ACS Symposium Series. Tom's co-

editor was **Seth Rasmussen** of North Dakota State University.

A number of UTA students were honored on May 11 for their accomplishments. The CRC Handbook Award for Outstanding Freshman went to **Daria Zhukova**. The Robert F. Francis Award for Outstanding Sophomore and the R. L. Hoyle Award for Outstanding Junior went, respectively, to **John Gurak** and **Jonathan Thacker**. **Sara Hughes** was the winner of the John T. Murchison Award for Outstanding Senior. The

ACS Award for Outstanding Chemistry/Biochemistry Major went to **Jon Babbitt**, and the Outstanding Chemistry Clinic Tutor Award went to **Chris Parikh**.

The Chemistry and Biochemistry Society Outstanding Member Award



came to **Catrina Campbell**, while **Steven Poteet** earned the Undergraduate Teaching Award. The Undergraduate Research Award was

given to **Omobonike Osunloye** working for Professor Dias. The Graduate Teaching Award was received by **Charles Phillip Shelor** working with Professor Dasgupta, and the Graduate Teaching Award was given to **Josh Crowell**, who works with Professor Pierce.

## TCU

**DFW ACS Earth Day event**  
**Erika Zimmermann** and **Katelynn Poole**, undergraduate students from TCU, served as co-Chairs for the DFW ACS Earth Day event. The DFW local-section event was a collaborative effort with Earth Day Dallas, an organization based out of Dallas for Earth Day. The

initiative was a first for the local section in hopes of building participation in the future. Volunteers staffed the information booths scattered throughout Fair Park during the Earth

Day festival on Sunday, April 23 and were responsible for answering patrons' questions and directing them to various events. The majority of volunteers were student affiliate members and graduate students from across the DFW local-section. They included

## SMU

Michael Blasingame  
David Zugell  
Shannon Woodruff  
Cemile Kumas  
Tanja Kmecko  
Clifford Bautista  
Robert Kalescky  
Marissa Tyro  
Priyanka Prashar  
Pia Vogel

## TCU

Erika Zimmermann  
Katelynn Poole  
Thomas Hale  
Abby Moore  
Danielle Bishop

## UTA

Diego Lopez  
Leticia Loredó

Thank you to all volunteers as well as Erika and Katelynn for their hard work organizing the event and coordinating volunteers.

## TCU Student Affiliate of the American Chemical Society: Earth Day Magic Show

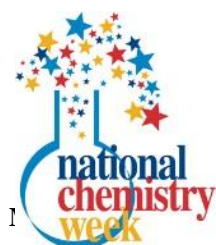
TCU Chemistry Club Members performed a science show at the pre-

school of the club's three-year-old mascot (sponsor's daughter) for about 30 preschool children (Age 2-5). The theme of the presentation revolved around recycling and using recycled items in honor of earth day. For instance, "snake races" utilized packing peanuts repurposed and strung together with string in the form of a snake. These were made in various lengths and then races were held to dissolve them in acetone. Edible candles were also made where the wax was actually a sculpted piece of apple (made using an apple coring utensil) and the wick was a lightly toasted almond. The kids loved it once they realized it wasn't a real candle. The grand finale was the always popular elephant toothpaste.



*TCU SAACS member Nick Bigham shows off elephant toothpaste as Katelyn Poole and local pre-school students watch during an Earth Day Science Show.*

## National Chemistry Week 2012



TCU Chemistry Club will be again working with the Fort Worth Museum of Science and

History, spearheading National Chemistry Week! Last year's event brought in over 4,000 guests and over 120 volunteers! If you're interested in participating for Fall 2012, please contact TCU Chemistry Club at [chemistryclub@tcu.edu](mailto:chemistryclub@tcu.edu).

## TCU Student Affiliate of the American Chemical Society attend March 2012 ACS National Meeting



*(L to R) Nicola Welch, Katelyn Poole, Erika Zimmermann, Thomas Hale. Sandi Dang* Five undergraduate members from TCU along with sponsor Kayla Green attended the National ACS Meeting in San Diego to accept their honorable mention award at the Undergraduate Affiliate Ceremony. The students presented two posters summarizing the International Year of Chemistry Event as well as National Chemistry week activities on the TCU campus.

## TEXAS TECH

### Professor Publishes Number One Most Read Article



The Journal of Chemical Physics has recognized Professor



**Bill Poirier** from Texas Tech University for having published its number one most read article for the month of January, 2012. The Rapid Communication, entitled "Quantum Mechanics Without Wavefunctions", was also the second most read J. Chem. Phys. article in the month of February, and the seventh most read article in March. The Journal publishes well over 2000 articles per year, and has an impact factor of 2.928. It was recently rated the Most Highly Cited Journal tracked in the Atomic, Molecular & Chemical Physics category, by Thomson Reuters.

#### **Dr. Robert Shaw Awarded 4th Patent for Discovery of Metallo-**

#### **$\beta$ -Lactamase Inhibitors**



**Dr. Shaw** and former graduate student **Mitchel Cottenoir** have been awarded a patent for the development of a nucleic acid based inhibitor of metallo-

$\beta$ -lactamase. It is the fourth patent in a series issued to Professor Shaw dealing with technology that is aimed at reducing the serious medical and pharmaceutical problem of antibiotic resistance in pathogenic bacteria.

**Ed Quitevis**, Professor in the Department of Chemistry & Biochemistry, gave an invited presentation entitled, "Understanding

the Role of Nanostructural Organization in the Intermolecular Dynamics of Ionic Liquids Using Optical Kerr Effect Spectroscopy," at the 32nd Annual Philippine-American Academy of Science and Engineering Meeting and Symposium in Houston, TX on May 5, 2012.

**Ronald Pyle** presented a poster at the American Society of Biochemistry and Molecular Biology (ASBMB) National Meeting in San Diego, entitled *Antibiotic resistance in bacteria: structure of a novel ss-DNA metalloenzyme inhibitor.*

### **UTD**

Members of the Alan G. MacDiarmid Nanotech Institute at the University of Texas at Dallas partnered with the Fort Worth Museum of Science and History in a celebration of the extremely small called **NanoDays** in which they prepared a variety of hands-on activities, interesting exhibits, and informative chats that demonstrate and explain the nanoscale and nanoscale science and nanotechnology.

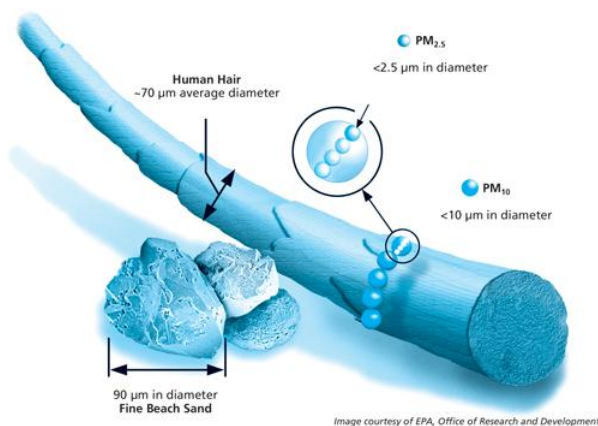
## **ISSUES IN ENERGY AND THE ENVIRONMENT**

By John E. Spessard

### **PARTICULATE MATTER**



Particulate matter is small particles suspended in air that can be breathed in. The particles can be either liquid (sulfuric acid particles for example) or solid (metals or soot as examples). There are two somewhat arbitrary levels; 10 microns and larger and between 2.5 microns and 10 microns. The differentiation is in part due to the technology to accurately measure the 10 micron particles was developed first. There is ample peer reviewed medical evidence that ingesting small particles is a health hazard. As a point of reference, a human hair is about 70 microns thick.



Suspended particles can settle out of air. Those that pass through the nose can either be caught by the nose hairs or settle in the throat. The smallest particles can reach the lungs and may be ingested into the body. These are the particles that are the most dangerous. The particle size differentiation is somewhat arbitrary. A ten micron lead particle will settle faster than a ten micron carbon (soot) particle.

EPA has established a ten micron standard of not to exceed 150 micrograms per cubic meter measured over a 24 hour period. The 2.5 micron standard is not to exceed 35 micrograms per cubic meter measured over a 24 hour period and not to exceed 15 micrograms per cubic meter measured on an annual basis.

Particulate matter is measured by trapping the particles on a filter while passing air through the filter at a measured and controlled flow rate. When measuring the 2.5 micron particles, the 10 micron particles must first be removed. EPA requires an accuracy of measurement for ten micron particles of 5 micrograms per cubic meter for ten micron levels of 80 microgram per cubic meter or lower and seven percent for levels above 80 micrograms per cubic meter. For 2.5 micron particles, the required accuracy must be a coefficient of variation of not more than ten percent. The coefficient of variation is the standard deviation divided by the average concentration.



Fracking has provided us with cheap and abundant natural gas supplies. Electric power plants are powered by both coal and natural gas. Do lower

natural gas prices render the coal-fired electric power plant obsolete?



You will not shut down a coal-fired plant that is operating and in good condition to build a new natural gas-fired plant. Both plants have large capital intensive costs. Capital-related costs such as depreciation, cost of capital and return on investment are the major costs in operating an electric power plant. The money has already been spent for the existing coal plant. That investment can be recovered only by keeping the plant running. So the existing coal plant competes with the new natural gas plant on the basis of the coal plant having zero capital cost. Whether to build either a new coal or natural gas plant is another story.

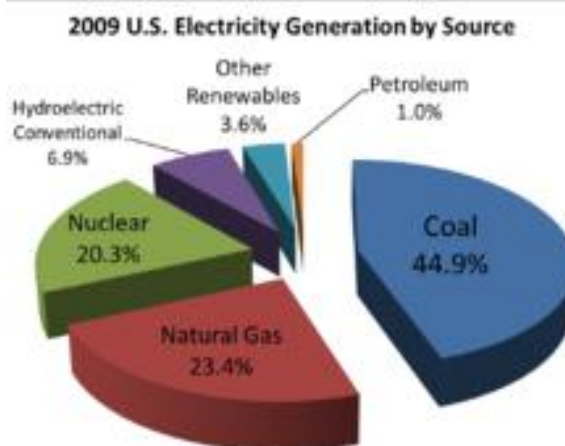
The four principal factors affecting the competitiveness of coal and natural gas plants are capital costs, thermal efficiency (BTU's required to produce a kilowatt of electricity), operation and maintenance costs and fuel costs.

Capital costs are the most important and they are heavily in favor of natural gas. For main line units on a single site, in dollars per kilowatt, it is \$3,167 for coal and \$978 for natural gas. This was more of a difference than I had expected. But the natural gas plant has

no coal handling, crushing, storage and conveying to the fire box facilities. The firebox is simpler (and cheaper) in that coal is a solid rather than a gas and there is no ash to deal with.

Additionally, a scrubber to control sulfur oxides, an electrostatic precipitator to control fly ash and mercury controls are not needed.

Assuming an 8% cost of capital and a 20 year plant life, the annual capital recovery factor is 10.2% of the capital investment. Recovering the capital investment is the biggest cost of operating a power plant and heavily favors the natural gas-fired plant.



The gas fired plants are more efficient. They require an average of 7,920 BTU's (average value) to produce a kilowatt [equal to 3412 BTU]. The 20 most efficient coal fired plants require an average of 9400 BTU's to produce a kilowatt. Much of this difference is due to it requires electricity to run the coal crushing and handling facilities, ash handling facilities, the scrubber, the ESP and the mercury controls. This subtracts from the power plant output.

Operation and maintenance costs for operating coal plants are about \$40 per kilowatt and about \$18 a kilowatt for gas plants. All of these costs were provided by the Federal Energy Information Agency.

Natural gas currently sells for about \$2.75 per million BTU's (1,000 cubic feet). You can add about \$1 for pipeline shipping costs for a total of about \$3.75 per million BTU's. Building new pipelines will cost about \$3 million per mile and building them can be a political and environmental adventure.

A typical coal runs about 13,000 BTU's per pound or about 26 million BTU's per ton. Arch Coal, Inc. reported a 2011 average price of \$26.12 per ton or about \$1 per million BTU's. Arch Coal reported an average cost of \$2.22 per million BTU's delivered to the power plant. Coal is shipped long distances from the mines to power plants. The cheapest rail shipping is by unit train where there is a 100 to 120 car train that goes only between the mine and the power plant. If you have gone to Amarillo, you have seen such trains. Those shipping costs run about \$20 per ton or about \$0.78 per million BTU's. That is why some Texas power plants have been built adjacent to lignite mines.

Assuming that fracking has no overriding environmental consequences and it continues to provide an assured

source of natural gas, the choice has to be building new natural gas-fired power plants due to capital and lower operation and maintenance costs...

## CORN INSECTICIDE LINKED TO GREAT DIE-OFF OF BENEFICIAL HONEYBEES

[*Assessment of the Environmental Exposure of Honeybees to Particulate Matter Containing Neonicotinoid Insecticides Coming from Corn Coated Seeds*, **Environ. Science and Tech.**, 2012, 46 (5), pp. 2592–2599.  
DOI: 10.1021/es2035152]

New research has linked springtime die-offs of honeybees critical for pollinating food crops — part of the mysterious malady called



**colony collapse disorder** — with technology for planting corn coated with insecticides. The malady appears on the eve of spring planting seasons in some parts of Europe where farmers use the technology and widespread

deaths of honeybees have occurred in the past. In the study, Andrea Tapparo and colleagues explain that seeds coated with so-called neonicotinoid insecticides went into wide use in Europe in the late 1990s. The insecticides are among the most widely used in the world, popular because they kill insects by paralyzing nerves but

have lower toxicity for other animals. Almost immediately, beekeepers observed large die-offs of bees that seemed to coincide with mid-March to May corn planting. Scientists thought this might be due to particles of insecticide made airborne by the pneumatic drilling machines used for planting. These machines forcefully suck seeds in and expel a burst of air containing high concentrations of particles of the insecticide coating. In an effort to make the pneumatic drilling method safer, the scientists tested

different types of insecticide coatings and seeding methods. They found, however, that all of the variations in seed coatings and planting methods killed honeybees that flew through the emission cloud of the seeding machine. One machine modified with a deflector to send the insecticide-laced air downwards still caused the death of more than 200 bees foraging in the field. The authors suggest that future work on this problem should focus on a way to prevent the seeds from fragmenting inside the pneumatic drilling machines.

**JOIN US for OUR NEXT EVENT!**  
**Wednesday, June 13<sup>th</sup>, 7:30pm – 10:30pm**



**Topic TBA, With Scroll-A-Rama**

**@A5A 1628 5th Ave FW 76104 \$10/\$5 students**  
**(cash or check to FWLSC )**

**Co-Sponsored by FTI**

**rsvp: [info@fwlsc.org](mailto:info@fwlsc.org) [www.fwlsc.org](http://www.fwlsc.org)**

**FWLSC is a non-profit grassroots organization founded to educate, & to promote & support all aspects of the DFW Metroplex Life Sciences. Informative and Interesting programs in a jazz club setting.**



# FIVE QUESTIONS FOR.....

Our May volunteer is Margaret R. (Meg) Fraelich, Ph.D., who is a Chemist and Member of Technical Staff at Fresnel Technologies, Inc. in Fort Worth, TX.  
ACS Activity: Member

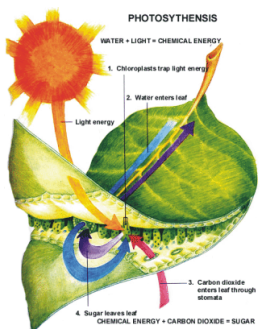
## 1) How old were you when you realized you wanted to be a scientist?

Five -- if you count wanting to be an engineer. We were watching Apollo 11's TV broadcast and my Dad (an EE) told me that the engineers got us to the moon.



## 2) What event first triggered your interest in science?

My grandfather was a machinist with Westinghouse's Bettis Atomic Power Laboratory. He brought home some scrap UHMWPE and told me how it was made, while he carved it into sculptures of flowers. I thought it was pretty cool that we could make flowers from a gas. When I told my Mom about this, she told me real flowers were in part made from gas



by the process of photosynthesis. A poetic explanation, even if it omits much.

## 3) What aspect of chemistry most intrigues you?



I'm probably still mostly engineer, since what I love is the really spiffy

ways we've come up with to probe the interaction of light and matter.

## 4) Is there something you wish you'd studied, but didn't? And how did you learn what you needed to know?

Diff-eqs (aka Differential Equations ---*dln*). Jumped in and hoped I didn't sink.

## 5) Who is your science hero, and why?



Gene Kranz. He and the whole NASA program, at least as it was then, epitomized achieving human aspirations through science and

technology.

*Thank you, Dr. Fraelich, for your interesting remarks! To volunteer to be interviewed, e-mail to [retort@acsdfw.org](mailto:retort@acsdfw.org).*



*Ladies and Gentlemen: LAST CALL!*

## Do Not Miss...

### The 24<sup>th</sup> International Symposium on Chiral Description



June 10<sup>th</sup> – 13<sup>th</sup>, 2012  
Hilton Downtown, Ft. Worth, TX

#### Do Not Miss... Scientific Highlights

- Special session and panel discussion on the evolution of chiral drug development and ensuing litigation: The science behind the legal decisions
- The archeological controversy involving racemization dating vs carbon-14 dating
- Origin of chirality in our solar system
- Traps, artifacts, and precautions in the spectroscopic determination of absolute configuration
- Enantioselective synthesis and catalysis
- Enantiomeric screening and separations
- Chiral polymers and supramolecular chemistry
- Computational chirality and symmetry breaking

#### Do Not Miss... Other Highlights

- Short courses on: Enantiomeric separations; Chiroptical determination of absolute configuration; Chiral NMR shift reagents
- Award lecture by the 2012 Chirality Medal Award winner, Eric N. Jacobsen, and reception
- Poster presentations and awards
- Vendor exhibition and lunch seminars
- Special author book signings
- Pharma Job Bureau: submit your CV online

#### Do Not Miss... Social Program

- Arranged excursions to the Kimble Art Museum and to the Amon Carter Museum of American Art
- Ft. Worth Stockyards Rodeo (Sat. 6/9)
- Chirality Medal Reception (Sun. 6/10)
- Sundance Square - night clubs, comedy clubs, music, western shops, restaurants, and more
- Conference Gala Dinner (Tues. 6/12)
- Baseball excursion - Texas Rangers vs. Arizona Diamondbacks (Wedn. 6/13)

**Poster abstracts can still be submitted  
through June 1<sup>st</sup>**

[www.chirality2012.com](http://www.chirality2012.com)



**PRINT AND POST !**

## **MAY DFW ACS MEETING**

Honoring the  
**DFW National ACS Award Recipient**

**Thursday, May 24th, 2012** , 6:00 to 8:30 P.M.  
Student Union/Galaxy Room C at University of Texas Dallas  
*800 W. Campbell Road, Richardson, Texas 75080*



## **YVES CHABAL**

recipient of the ACS award  
**Encouraging Women into Careers in the Chemical Sciences**

*TI Distinguished University Chair in Nanoelectronics*  
Department of Materials Science & Engineering  
University of Texas Dallas

### **Chemical functionalization of silicon surfaces**

Although Yves Chabal has formally received his award during the national ACS meeting in March, this is a rare opportunity for local section members to hear short overviews of his work.

**Social Hour:** 6:00-6:30 P.M. (hosted by UTD)

**Dinner:** 6:30-7:30 P.M.    **Lectures:** 7:30-8:30 P.M.

**Reservations:** email to [julieta.terry@utdallas.edu](mailto:julieta.terry@utdallas.edu) or 972-883-5755 by Friday, May 18, 2012. Dinner is \$15. Chicken Forestiere (roisserie style chicken), Scalloped potatoes, Fresh Seasonal vegetables, House Salad (Ranch and Italian Dressings), Baguettes and butter, New York Style Cheesecake (strawberry topping), Iced tea, water and coffee

- Payment by cash or check will be accepted at the meeting. Please note that you are financially responsible for reservations made but not used.
- It is **not** necessary to attend the dinner in order to attend the lecture.
- Directions in May meeting email

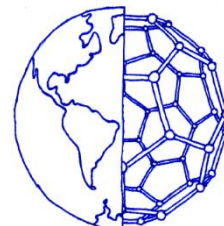


**PRINT AND POST!**



## **ACT<sub>2</sub> BIENNIAL CONFERENCE**

*Chemistry Makes the World Go Round*



**When:** June 24-28, 2012

**Where:** The University of Baylor Mary Hardin in Belton, TX  
(173 miles from Houston, 140 miles from Dallas, 61 miles from Austin, 140 miles from San Antonio)

**Cost:** \$250 (early bird pricing until May 25<sup>th</sup>) includes registration, all meals from Sunday night through breakfast Thursday, and lodging from Sunday night until Thursday (or \$125 for registration and all meals except breakfast-no lodging) \*\*  
Presenters save \$50 off the above prices!!!

### **Why should I go:**

1. Get all of your Professional Development hours for the year!
2. The lowest cost chemistry conference you will find anywhere!
3. The University of Mary Hardin Baylor is a small beautiful campus with FREE PARKING!
4. Many workshops covering all levels of chemistry, from your lowest academic students to your brightest AP students!
5. It will be 5 days of Chemistry Fun!
6. Gets tons of ideas to implement in your classroom!
7. Door Prizes: everyone will win something!
8. Come see old friends and meet lots of new friends for networking!
9. World-renowned presenters Robert Becker and Ken Lyle!
10. Demos in the Dark: all the demos you can't do inside because they are too big or dangerous (you won't want to miss this)!

**For more info and to register:**

**<https://sites.google.com/site/act2tx>**

**Click link at bottom of webpage to register and/or present**



## ***From the editor:***

It hasn't seemed that long, but my calendar insists that it has been almost an academic year since I took over as editor and the **RETORT** went online. Starting a new project of this sort is always filled with a lot of glitches, a lot of *Whoops! shoulda done that one different...* and so on. Hopefully, we have most of that worked out now, and I hope you have enjoyed it.

This month, I had not planned on including an article from the ACS press room. We already had a lot of interesting material (and we don't want it to get too long and dull...oh geez, there's that dang **RETORT** again...). However, the article on honeybee decline is particularly relevant to me; last week, I was discussing this very topic with an orchard owner in Crete. Crete is a subtropical microclimate; about 200 species of plants grow only on Crete, and, of course, plants all have one thing in common: they need pollinating, usually by bees. However, even in that isolated environment—subtropical island—bee colony decline has been observed. Petros and his brothers raise oranges, almonds, and olives, the staples of Cretan agriculture. In an isolated environment such as this, a plant-borne disease would be geographically limited, but some farmers on the island have observed this mysterious bee disease. Colony decline has been attributed to various microorganisms, climate change, etc., but nothing solid has emerged until recently. The authors of this article attribute colony decline to use neonicotinoid insecticides. These have been used on Crete since the late 1990's to counter the silverleaf whitefly, which, ironically, is becoming resistant (***Pest Manag. Sci. 61:577–582, 2005***). No amount of caution in use of an insecticide can limit its effect to one species, one location; this instance can serve only to emphasize the importance of never underestimating potential side effects of such usage. This was certainly brought home to me last week, looking at the dead and dying bees—part of the essential cycle—in Petros' hives.

Best regards,



Left to right: Orange, almond, and olive blossoms

