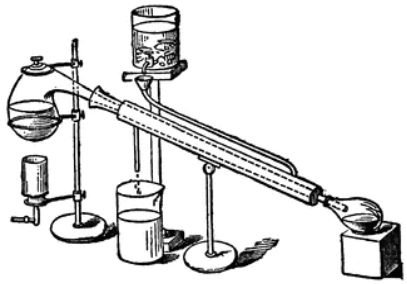
SOUTHWEST RETORT



SIXTY-SIXTH YEAR **NOVEMBER 2013**

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and Chemistry in this area

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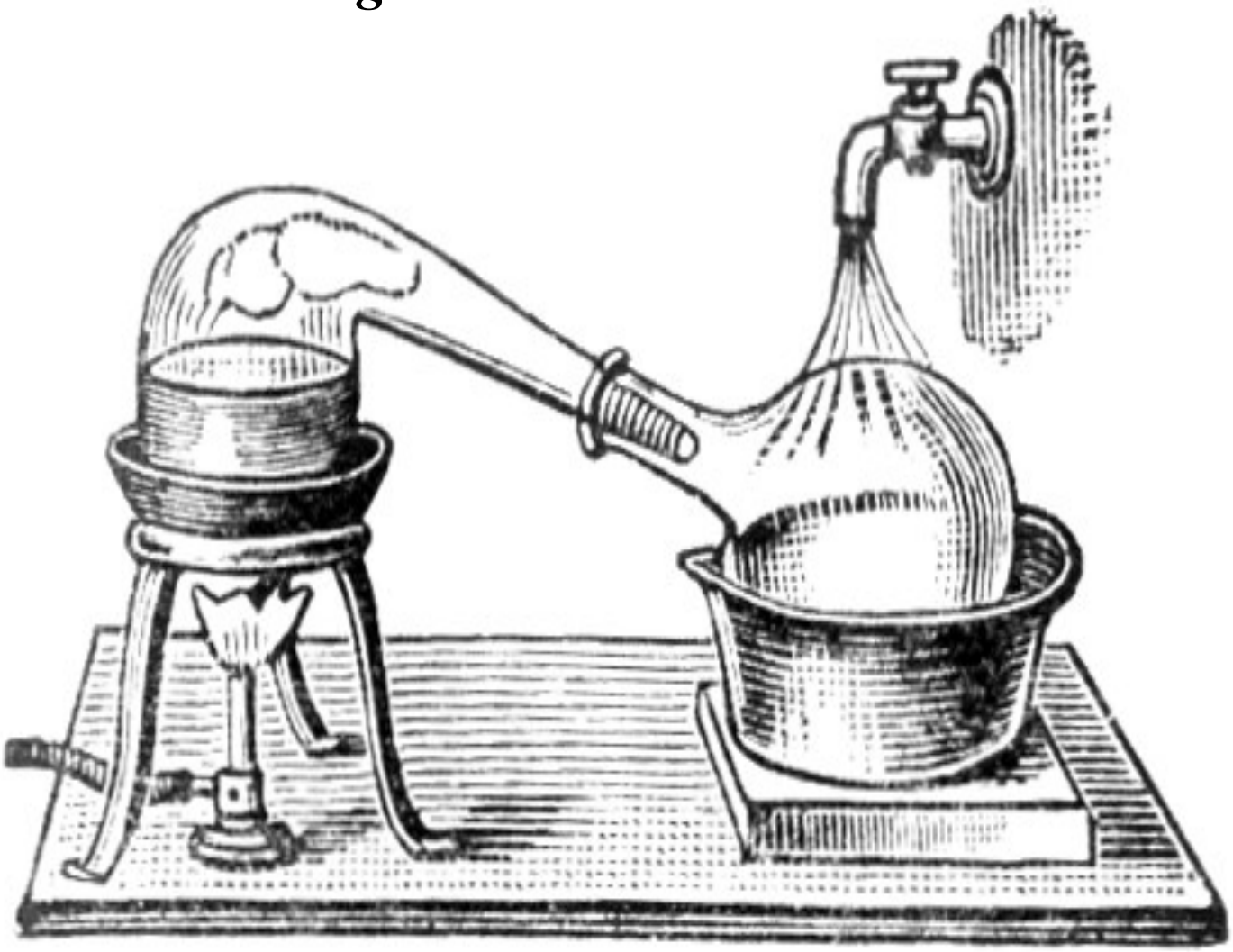
FIFTY YEARS AGO IN THE SOUTHWEST RETORT

There is no FIFTY YEARS AGO this month, as the November 1963 issue is not available. It will return in December.

If anyone has a copy of that issue, please let us know, as it is needed for the digital archive being created at UNT.



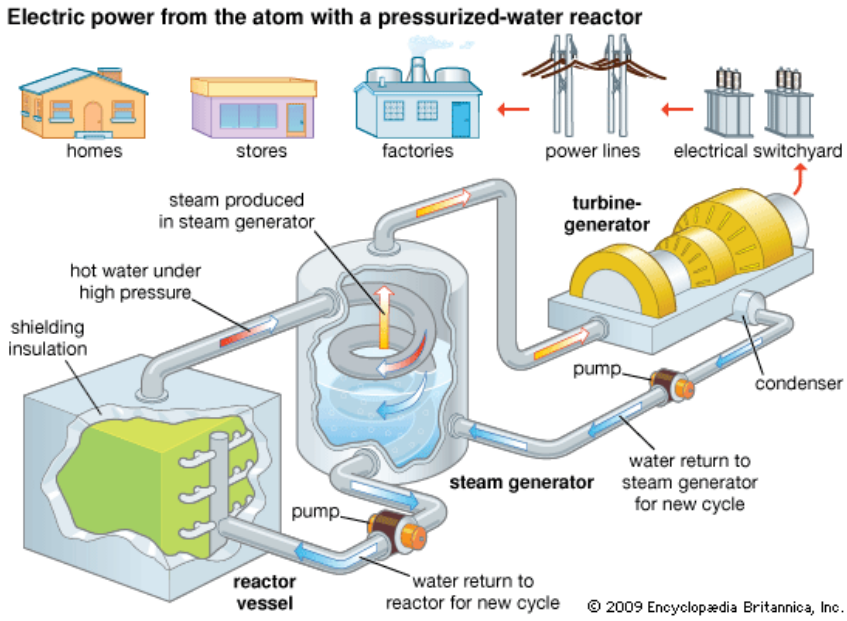
Nuclear Electric Power Plants as Sources of Nuclear Proliferation

by

John E. Spessard, PhD, PE

People have expressed concerns about nuclear electric power plants being potential sources of material for atomic bombs. I will provide evidence that this fear is overstated. Concerns involve both uranium and plutonium. I will first address uranium.

Natural uranium is about 0.72% Uranium 235 (U-235) and 99.28% Uranium 238 (U-238). A nuclear power plant uses uranium enriched to about 4% U-235. Weapons grade U-235 is about 90% U-235. Although, uranium containing 20% U-235 can make a crude inefficient weapon. U-238 absorbs neutrons to become Plutonium 239 (Pu-239): Np239 is a short lived intermediate). Neutron absorption by U-238 inhibits the chain reaction. Thus power plant enriched uranium is far short of the enrichment needed to make a weapon.



The conventional light water nuclear plant produces the plutonium isotopes 238, 239,240, and 242. Plutonium 239 (Pu-239) is the choice for weapons. It is usually made (if Pu-239 is the desired product) in a special reactor where U-238 is irradiated with neutrons. The plutonium from a reactor is unusable as a weapon. Pu -240 and Pu-242 do not fission.Pu-238 and Pu-240 can spontaneously fission providing neutrons before the neutrons are wanted. This can produce a premature detonation of a weapon providing radiation but no explosion (a fizzle). For an efficient weapon, there must be no splitting until the critical mass is achieved. Weapons grade Pu-239 contains less than 7% Pu-240. Fuel grade Pu-239 contains between 7% and 19% Pu-240. Reactor grade Pu-239 contains more than 19% Pu-240. There is no known process for separating plutonium isotopes.

The weapons carried aboard American submarines contained less than 4% Pu-240. This was to protect the crew from

radiation. The Russians were not as careful. A Russian joke was: How can you tell that he is in a nuclear submarine crew? He glows in the dark.

In American nuclear reactors, the fuel rods are used once and become nuclear waste. In European and Japanese reactors, the fuel rods are reprocessed by a solvent extraction process called PUREX (Plutonium-Uranium-Extraction). This allows the fuel rods to be used through two cycles. The recovered plutonium contains too much Pu-240 to serve as a weapon, but it could be used as a radioactivity dispersant by terrorists. A premature detonation would not be an issue for a suicidal terrorist. President Carter banned nuclear fuel rod reprocessing in 1977 even though it is used elsewhere. The economics of reprocessing depend on the price of uranium. Cheap uranium favors one-cycle usage.

Most of the later aspiring nuclear powers use U-235. It is produced by separating U-235 and U-238 as the volatile hexaflouride in high-speed centrifuges. The Manhattan Project used gaseous diffusion, but centrifuges are the superior technology. The North Koreans have used plutonium probably obtained from nuclear reactors. They have produced only very low yield detonations (fizzles).

Possible reasons for the North Korean difficulties include:

A nuclear device requires machining plutonium to very strict tolerances. This is to hold the device together for every possible microsecond and increase the yield. Plutonium is very reactive and reacts with air and water at room temperature. There are six different solid phases of plutonium with differing densities. Machining to assemble a weapon would not be easy.

The trigger that moves the subcritical plutonium components into a critical mass holding together for the maximum time possible is a very sophisticated device and may be beyond them. Los Alamos National Laboratory has spent considerable effort in developing the most effective triggers possible.

The North Korean bombs may contain more Pu-240 than is desirable but North Korea is proceeding anyway.

In a lot of organizations, including some that you may be familiar with, success is achieved by telling the Boss what he wants to hear rather than what he needs to hear. This was particularly true for Stalin's Russia and today's North Korea. In 1936 and 1948 Dmitri Shostakovich became a pariah in Russian musical circles because his music was too decadent. Compared to North Korea, Communist Russia was enlightened. It may have been that North Korean scientists were required to try to detonate a weapon that had too much Pu-240 to be effective.

Fort Worth Life Sciences Coalition

December 4

Brain Mapping

Confirmed speakers:

Mario I Romero-Ortega, PhD
UTA and UT Southwestern,
Bioengineering Dept.

Benjamin Miller, PhD
School of Natural and Social
Sciences, Texas Wesleyan

Arts 5th Avenue
1628 5th Avenue
Fort Worth TX 76104

Live Music

Desserts by Z's Cafe'

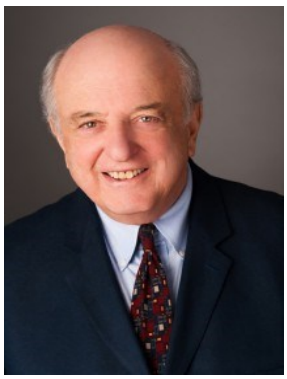
Register here:

FWLSC EVENT

BOOK REVIEW

Prize Fight. The Race and Rivalry to be the First in Science. **by Morton A. Meyers, MD, Palgrave Macmillan, 2012, 272 pp.**

Reviewed by E. Thomas Strom



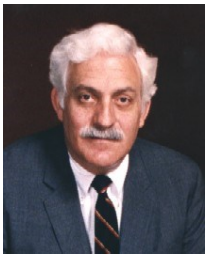
Morton Meyers

Who gets the credit for a scientific discovery? Who gets the award for a scientific discovery? Are such things a big deal for scientists, or are they mainly driven by the desire to advance science with no thought of credit? Author Dr. Morton A. Meyers makes his thoughts known on the topic with his opening quote, attributed to Nobel Laureate Leon Lederman. "Yes, Virginia, scientists do love recognition, but only since Pythagoras."

The first part of the book describes the problems of stolen credit, contributions being ignored, the race for priority, and related matters that show the seamy side of scientific history. It focuses on two prominent cases: the dispute between Selman Waksman and Albert Schatz over the credit for the discovery and use of streptomycin; and the battle between Raymond Damadian and Paul Lauterbur about the invention of magnetic resonance imaging. In these two cases the ultimate prize was the Nobel Prize, so the book title "Prize Fight" is particularly apt.

Past readers of ***The Southwest Retort*** will understand why I choose to focus on the Damadian-Lauterbur dispute. For the September 2002 issue of ***The Retort***, I wrote a feature article titled "The Case of the Missing Nobel Prize", which gave a history of the dispute and bemoaned the fact that the Nobel prize had not yet been given for magnetic resonance imaging. Just one year later such a prize was given to Lauterbur and Peter Mansfield. (I like to think that my article triggered the awarding of the prize; I also like to think that I am good-looking!) Damadian responded to this slight with full page advertisements in prominent newspapers deploring his omission and asking readers to write the Nobel Prize Committee to ask for his inclusion.

I had worked very hard on my ***Retort*** piece, interviewing several NMR specialists, including Lauterbur, but I always had a bad conscience about not doing an interview with Damadian, even though I sought to write a balanced article. In my opinion, Meyers has given such a balanced treatment. His background is ideally suited to treat the matter fairly. Meyers had met Damadian in 1977 when Damadian was still at the Downstate Medical Center in Brooklyn, and he met Lauterbur in 1978 when Meyers became the founding chair of the Department of Radiology in the SUNY Stony Brook School of Medicine. Although Lauterbur was then in the chemistry department at Stony Brook, Meyers arranged an additional appointment of Lauterbur as research professor of radiology. Like Damadian, Meyers is a physician, so he appreciates the differing approaches that MDs have to research as compared with those of PhDs. Furthermore, Meyers had several interviews with Damadian before writing his book.



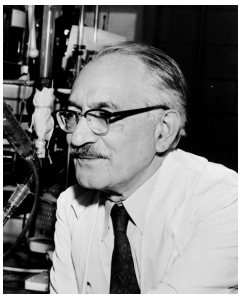
Damadian

Lauterbur

To review the chronology of some of the events, Raymond Damadian made the important discovery that the T_1 and T_2 values for water in cancerous tissues were longer than the values in normal tissues. This work was published in *Science* in 1971. Lauterbur's communication in *Nature* on the use of field gradients in NMR to generate an image was published in 1973. Lauterbur did not refer to Damadian's previous work in his communication, although he was well aware of it, citing Damadian's work in his grant applications. That omission probably started the hostility between the two. Damadian was issued a patent on Feb. 5, 1974 for "Apparatus and Method for Detecting Cancer in Tissue." The patent information had been filed on Mar. 17, 1972. In July, 1977, Damadian and his associates carried out the first NMR imaging of a human torso, and in the next year Damadian started FONAR Corp. to do imaging studies. Patent infringements by others resulted in Damadian winning a $100 million suit. In the interim, Lauterbur was perfecting and publishing the methods for NMR imaging, and additional advances in the area were being made by Peter Mansfield and Waldo Hinshaw.

With his substantial war chest, Damadian carried out an "in your face" campaign to insure that he shared in any awards given in this area. This approach undoubtedly turned off a number of important people. Don't think I'm naïve. I realize that scientists do campaign for awards; they are just more subtle about it than Damadian was. At present Damadian feels that the NMR community is seeing that he is written out of history. Meyers notes that, just prior to the awarding of the Nobel prize in 2003, the 2003 book *MRI from Picture to Proton* cites Damadian for the original application of NMR to imaging. However, Meyers points out that in the second edition of the book published in 2006 those few lines of tribute to Damadian were omitted. Meyers also points out another possible reason for prejudice against Damadian. He was converted into a Christian at a Billy Graham crusade, and in recent years he has come out as a supporter of creation science, believing that the book of Genesis is literally true. The committee members selecting the Nobel prize winners are obviously Swedish. My visits to Sweden and my contacts with my Swedish cousins show me that the Swedes are very indifferent to religion. Would that indifference translate into hostility? I hope not, but who knows?

In my interview with Lauterbur, he told me that "if he were awarded the Nobel Prize under the right circumstances, he wouldn't turn it down." Now think about that a minute. What could possibly be the wrong circumstances? Would you, dear reader, turn down a Nobel Prize if it were awarded to you? I don't think so. Reading between the lines, I think the wrong circumstances were if he had to share the award with Damadian. In any event, Lauterbur did share the award, but not with Raymond Damadian.



Waksman

Space prevents me from saying much about the Waksman-Schatz dispute, but it deals with problems that are still with us today. When a graduate student makes a brilliant discovery working with his mentor, how is the credit partitioned between student and mentor? Typically, when it comes to awards, they go to the mentor.

Continued on page 18

...And another thing…

By Denise L. Merkle

Accountability

Recently, stories with any human component very often include the word 'accountable'. News reports describing projects gone awry prickle with accountables. Sports coaches are encouraged to enroll in programs which teach techniques to instill accountability in players*. Politicians frequently hold others accountable for outcomes good (staff and like-minded colleagues) and bad (opponents). Even pastors in pulpits set goals and relate them to their parishioners: 'I will ask you to hold me accountable'.

When did holding people accountable become so noble—or so necessary? Surely employees/coaches/elected officials/clergy do not suddenly require others' input to ensure that they do their jobs properly? Must one monitor colleagues constantly and advise them when they're not appropriately applying their education and training? How did we arrive at this apparent inability to motivate and assess oneself? And does all this accountability matter? (Answers: I don't know. Who knows? No. I don't know. and No.)

The accountability game is a clever diversion, a misdirection of genuine concern toward some nebulous, unquantifiable parameter. Accountability speak sounds good, but in fact has no value. It's fairly easy to make sure blame falls on someone else while apologizing for one's own lapse, especially if one promises to hold accountable the mistaken/unmotivated/complacent.

In his Luncheon Address at the Nov 7, 2013, IEEE Medical Device Symposium, Chris Chavez, president and CEO of Trivascular, Inc., emphasized the importance of good leadership to the success of any entrepreneurial venture—and stated that *everyone* in a successful venture is a leader. Everyone in the company or on the project team must be dedicated to a shared vision—while demonstrating the skills required to reach the common goals. Chris Chavez, serial entrepreneur and funding guru, did not describe how to hold anyone accountable. On the contrary. It was *understood* that everyone involved in the venture would identify the tasks required. And do them. There was none of this Holding Accountable. People were willing to—and capable of—getting the job done, or their contributions were not needed.

What is the point of all this, you might ask? The point is, The Accountability Police must be furloughed. Enough of this incessant external imposition of behavior. Enough of the inspirational apologies rife with PR spin. Enough with the implications that professionals must be monitored because they cannot otherwise understand how to execute their jobs. The Accountability Police must stop holding others accountable, perhaps by paying attention to themselves.

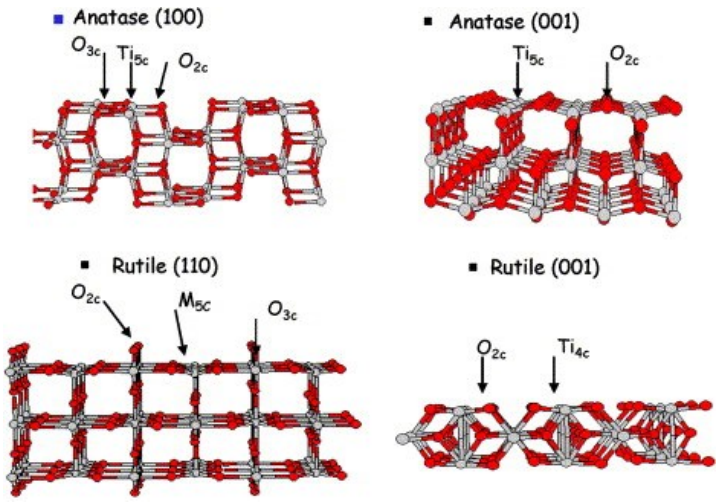
Happiness and effectiveness will follow when intelligent people are allowed to properly do their jobs, but of course, if they don't, I cannot be held accountable.

***'looking to create a culture of accountability: http://www.janssensportsleadership.com/create-a-culture-of-accountability-quotes2/**

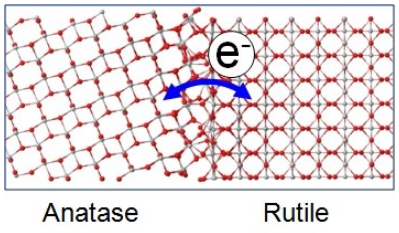
MAKING A COMMON COSMETIC AND SUNBLOCK INGREDIENT SAFER

Crystalline Phase Modulates the Potency of Nanometric TiO2 to Adhere and Perturb the Stratum Corneum of Porcine Skin under Indoor Light
Chemical Research in Toxicology

Using a particular type of titanium dioxide — a common ingredient in cosmetics, food products, toothpaste and sunscreen — could reduce the potential health risks associated with the widely used compound. The report on the substance, produced by the millions of tons every year for the global market, appears in the ACS journal ***Chemical Research in Toxicology.***



Francesco Turci and colleagues explain that titanium dioxide (TiO_2) is generally considered a safe ingredient in commercially available skin products because it doesn't penetrate healthy skin. But there's a catch. Research has shown that TiO_2 can cause potentially toxic effects when exposed to ultraviolet light, which is in the sun's rays and is the same kind of light that the compound is supposed to offer protection against. To design a safer TiO_2 for human use, the researchers set out to test different forms of the compound, each with its own architecture. They tested titanium dioxide powders on pig skin (which often substitutes for human skin in these kinds of tests) with indoor lighting, which has very little ultraviolet light in it. They discovered that one of the two most commonly used crystalline forms of TiO_2, called rutile, easily washes off and has little effect on skin. Anatase, the other commonly used form, however, was difficult to wash off and damaged the outermost layer of skin — even in low ultraviolet light. It appears to do so via "free radicals," which are associated with skin aging.



"The present findings strongly encourage the use of the less reactive, negatively charged rutile to produce safer TiO_2-based cosmetic and pharmaceutical products," the researchers conclude.

The authors acknowledge funding from Regione Piemonte.

DFW Section Meetings

NOVEMBER MEETING:

Robyn Ford (right) with her thesis advisor, Diana Mason, with the Schulz Award

Robyn Ford, DFW Section Schulz Award recipient and winner of the Southwest Regional Award for Excellence in High School Teaching, spoke on November 13 at Sarah and Troy LaGrone Advanced Technology Complex in Denton. Her topic was Elements of Change: Chemistry from the View of a High School Student. Robyn Ford earned her BS in Chemistry and Mathematics from West Texas State University, now West Texas A&M University, a M.Ed. in Educational Administration and MS in Chemistry from The University of North Texas, and is currently working on a Ph.D. in Chemistry Education from UNT. She is currently conducting research in forensic chemistry and chemistry education. Ms. Ford has taught high school chemistry in Amarillo, Texas, five Dallas-Fort Worth area districts and is currently teaching at Denton High School. She has taught AP Chemistry since 1995, has been a test item writer for College Board, and was the revision author for CliffsNotes Chemistry Quick Review. In 2012, she was the R. B. Escue Chemistry Endowment Award winner for Outstanding Scholarship in Chemistry Education. Additionally, Ms. Ford has taught at the college level, most recently at The University of North Texas.

DECEMBER: NO MEETING

JANUARY MEETING:

Save the date for our **DFW Young Investigator's Meeting** on Saturday, January 25, at UT Arlington. The meeting will include research presentations from recent faculty (2009-2011) in the local section, postdoc poster presentations, and lunch! Contact Katie Walker (below) for more information.

For questions or concerns, please contact Chair-Elect Katie Walker at kawalker@austincollege.edu or (903) 813-3159.

UNT National Chemistry Week

Robyn Ford (right), 2013 Winner of the Southwest Regional Award for Excellence in High School Teaching and of the DFW Section Schulz Award, and some kids belonging to the Children of the American Revolution doing the Briggs-Raucher iodine clock reaction at the UNT NCW event.

Kickoff Event

Mean Green Foam Machine

The Hindenberg

Fire and Ice

CHEMISTRY CONNECTIONS 2013

National Chemistry Week at the Fort Worth Museum of Science and History

national chemistry week

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Texas Wesleyan University
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University of Texas Dallas
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HIGH SCHOOLS: Denton, Lamar, and Birdville

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DFW Section Election Results

The results of the DFW Elections for Officers for terms beginning Jan 1, 2014, are as follows:

Chair Elect: Shana M. Santos

Councilor: Linda Schultz

Alternate Councilor: Mary Anderson

Secretary: Trish Smith

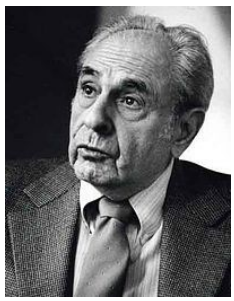
This was our first electronic election and it was a great success! Please consider running for elective office in our section. We could use more dedicated chemists to keep our section active and helpful to our members.

Trish Smith, Secretary DFW ACS

Remember, the Retort is on *issuu.com*. One nice thing about issuu.com is that you can subscribe to your publication; then you will automatically get the Retort when we post it. In order to subscribe, download, or print, you need to register; it's free and you can opt out of extraneous emails.

PRIZE FIGHT continued from page 10

For Waksman, it was the 1952 Nobel prize for physiology or medicine. For Albert Schatz, the result was being effectively blackballed. Schatz took legal action against his mentor and Rutgers when he realized he had been duped into signing away his patent rights for streptomycin to Rutgers, while Waksman was receiving royalties for the invention. Schatz was successful in his suit, but it was a pyrrhic victory. He never was able to obtain a position in a first-class microbiology laboratory. Toward the end of his life, however, Schatz was able to get a small portion of the recognition he desired and deserved.



Schatz

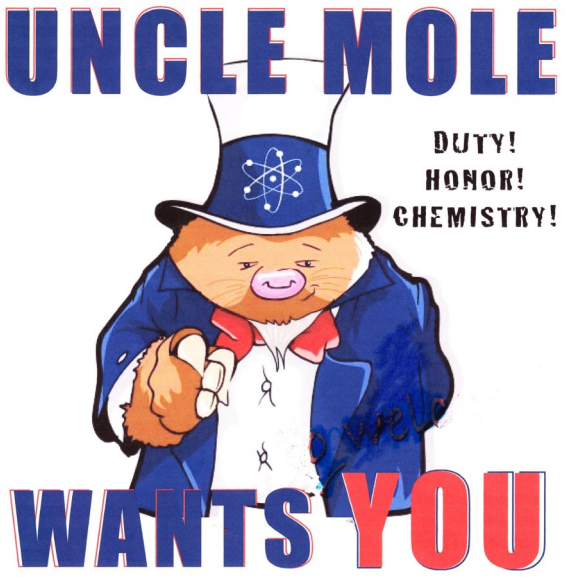
Perhaps I've paid too much attention to the Damadian-Lauterbur dispute, but that material did make up over a quarter of the book. Meyers' discussion of the difficulties in determining who is first to make a discovery and who gets credit sheds light on problems of the past that are still with us today and will be with us in the future. I strongly recommend this book to mentors, to the students they mentor, and to anyone interested in the messy history of science. Remember, not only in wars but in science as well, history is written by the victors.

DFW Section cont.

VOLUNTEERS NEEDED!

The **247th National ACS Meeting** will be here in Dallas on March 16-20, 2014. We need a **local section coordinator** to work with national ACS to help identify a venue for the Saturday outreach activity prior to the meeting. We also need a **coordinator to organize volunteers for the hospitality booth** for the duration of the meeting. If you are interested in either of these positions, please send an e-mail to kawalker@austincollege.edu.

Kirby Drake is planning **the 70th Southwest Regional Meeting** to be held in Fort Worth in 2014. Please email Kirby (kirby.drake@kk-llp.com) if you are interested in serving as the **sponsorship/exhibitors chair**, **undergrad programming chair,** or a **symposium chair**.



To volunteer for the 2014 Southwest Regional ACS Meeting! SWRM 2014 will be held at the Fort Worth Renaissance Worthington Hotel, November 19-22, 2014. If anyone would like to suggest a topic or organize a symposium, please contact Kirby Drake
kirby.drake@kk-llp.com

or Danny Dunn
dannyldunn@sbcglobal.net

National Meeting Symposia
Division of History of Chemistry

by Tom Strom

The ACS Division of the History of Chemistry (HIST) is doing its best to arrange fascinating symposia for next spring's Dallas ACS National Meeting. This small division has organized three interesting symposia for Dallas.

History of Chemistry in North Texas will cover the history of four area chemistry departments and three industrial laboratories. The co-organizers are E. Thomas Strom from UTA and Manfred Reinecke from TCU, with Reinecke as moderator. The speakers and titles for this half-day symposium are as follows:

Manfred G. Reinecke, TCU, ***140 Years of Chemistry at Texas Christian University***

Sean C. O'Brien, TI, ***The History of the Texas Instruments Research Laboratory***

James L. Marshall, UNT, ***Chemistry at the University of North Texas***

E. Thomas Strom, UTA, ***The Mobil Field Research Laboratory in Dallas: An Unexpected World Class Center in Magnetic Resonance***

Thomas J. Cogdell, UTA***, Chemistry at the College in Arlington***

Danny L. Dunn, Alcon Labs (Retired), ***History of Alcon Laboratories***

A. Dean Sherry, UTD and UT-Southwestern, ***A Short History of Chemistry at the University of Texas at Dallas***

The Dallas-Fort Worth ACS Section is a co-sponsor of this symposium to be held on the Tuesday morning (Mar. 18) of the meeting.

Fifty Years of the James Flack Norris Award: The Foundations of Physical Organic Chemistry is co-sponsored by the ACS Division of Organic Chemistry and the Northeastern ACS local section, which funds the Norris Award. The symposium organizers are Tom Strom and Jeffrey I. Seeman of the University of Richmond. This one-day symposium on the Monday of the meeting (Mar. 17) will feature presentations by seven early winners of the Norris Award, a presentation on Norris himself using newly discovered material, and a panel discussion featuring some of the recent Norris Award winners. The presenters and their titles are as follows:

Edward M. Arnett, Duke, ***Some Thermochemical Studies in the 1960s and 70s***

Ronald Breslow, Columbia, ***Aromaticity and Conductivity in Molecular Wires***

Andrew Streitwieser, Jr., UC-Berkeley, ***Hydrogen Isotopes in Physical Organic Chemistry***

John I. Brauman, Stanford, ***Adventures in Physical Organic Chemistry***

Paul Schleyer, Georgia, ***Norbornyl Cations Still Fascinate***

Kendall N. Houk, UCLA, ***Physical Organic Chemistry with Computations: Pericyclic Reactions***

Michael Wasielewski, Northwestern, ***Understanding Electron Transfer Reactions: Case Study in Physical Organic Chemistry***

Arthur Greenberg, University of New Hampshire, ***James Flack Norris, A Pioneer in Chemical Education and Early Contributions in Physical Organic Chemistry***

The panel discussion will feature this year's winner of the Norris Award, Matthew Platz, along with other recent winners: John Baldwin, Ned Porter, and Hans Reich, plus Mike Wasielewski doing double duty.

The third HIST symposium also has roots in Dallas, as it is organized by Dr. Nicolay Tsarevsky of SMU. The topic of this half day symposium is ***Bringing Chemistry to the Public: A Historical Look at the Popularization of Chemistry.*** The purpose of this symposium is to present the various ways of popularizing chemistry through time, including books, science kits, and, more recently, TV programs. The presenters and their titles are as follows:

NicolaTsarevsky, SMU, ***A Historical Overview of Popular Chemistry Books: From the Early Days to the 20th Century***

Pierre Laszlo, Ecole Polytechnique, ***Popularization of Chemistry in France Just Prior to World War I***

William P. Palmer, Curtin University of Technology, ***The Popularization of Chemistry through Little Blue Books***

William B. Jensen, University of Cincinnati, ***Popular 20th Century Books for the Amateur Home Chemist***

Shannon R. Woodruff, SMU, ***Chemistry at Play: A Look at Popularizing Chemistry through Kits and Their Effectiveness Throughout the Years***

Donna J. Nelson, University of Oklahoma, ***Breaking Bad: Getting Good Science to the Public Via TV***

This symposium will be held on the Sunday afternoon (Mar. 16) of the meeting.

If other divisions' programming matches that of HIST, the Dallas ACS meeting will be a meeting to long remember.

If you would like to preview a symposium or symposia, please submit your article to retort@acsdfw.com.

Around the Area

Texas Woman's University

Department of Chemistry and Biochemistry Texas Woman's University Fall 2013 Seminar Series

November 15
Dr. Steve Winkle
Florida International University
Structural Effects in Small Molecule Binding to Different DNA Sequences and Topologies

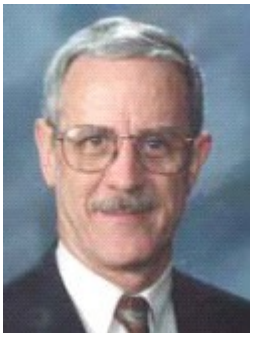
November 22
Dr. Ann Nalley
Cameron University
Research/Experience as a Woman Scientist

All seminars will be presented in 251 ASSC at 12:00 PM.

East Texas Section

East Texas Section November Meeting: on November 21, Dr. **Ann Nalley** will speak at Jarvis Christian College, Hawkins, TX.

On October 29 at Texarkana College, **Joe Jeffers**, Professor of Chemistry and Dean of the J. D. Patterson School of Natural Sciences at Ouachita Baptist University, gave a talk on The Life and Works of Frederick Sanger, Nobel Laureate in Chemistry 1958 and Nobel Laureate in Chemistry 1980. Dr. Frederick Sanger was awarded the Nobel Prize in Chemistry in 1958 for his work in determining the structure of insulin, the first protein molecule sequenced. He became only the third two-time recipient of the Nobel Prize when he shared the 1980 Nobel Prize in Chemistry for developing techniques for sequencing DNA molecules. Dr. Sanger worked first in the Biochemistry Department at Cambridge University in England. Then he worked at the Medical Research Council Laboratory of Molecular Biology in Cambridge. I have interviewed Dr. Sanger and many of his colleagues and family members. I continue research to prepare articles for the Bulletin for the History of Chemistry and to write a biography of Frederick Sanger.



Joe Jeffers

Elizabeth Blackburn was announced as a co-recipient of the 2009 Noble Prize in Physiology or Medicine. She is the third graduate student of Fred Sanger to be so honored. Rodney Porter, Sanger's first graduate student, shared the Nobel Prize in Physiology or Medicine in 1972; and Cesar Milstein shared the 1984 Nobel Prize in Physiology or Medicine. Sir Hans Krebs said in his 1967 Nature paper*, "Scientific distinction develops if nurtured by distinction." No truer words could be said of Fred Sanger.

University of Texas at Dallas

The UT Board of Regents approved the building of a new 4-story, 220,000-square-foot, $100M Bioengineering and Sciences Building to provide research space for 70 faculty members and teaching laboratories for undergraduate science majors at UT Dallas.

University of Texas at Arlington

Professor **Rasika Dias** (UTA Department Chair) and Dr. **Dan Frankel** (Bruker AXS) organized a "Problem Structures Workshop" relating to small molecule x-ray crystallography. It was held on Saturday, Nov. 2, in the W. A. Baker Chemical Research Building on the UTA campus. Close to 30 people attended representing UTA, Texas A&M at College Station, TCU, UTD, and UNT. The workshop was conducted by Dr. **Charles Campana** (Bruker ACS) and Dr. **Joseph Reiberspies** (Texas A&M).

The ACS Symposium Book "Pioneers of Quantum Chemistry" edited by Dr. **E. Thomas Strom** (UTA) and Dr. **Angela Wilson** (UNT) has now come out in hard cover. It had issued earlier this year as an e-book. The book consists of ten chapters with authors Klaus Ruedenberg, W. H. Eugen Schwarz, István Hargittai, E. Thomas Strom, William B. Jensen, Eamonn F. Healy, Weston Thatcher Borden, Paul S. Bagus, Donald B. Boyd, Andrew Streitwieser, Jr., and Janet E. Del Bene.

University of Arkansas

The 2013 Research Conference for the Arkansas IDeA Network of Biomedical Research Excellence (INBRE) was hosted Friday, Oct. 18, and Saturday, Oct. 19, for about 400 attendees from 27 colleges in Arkansas and nearby states. Keynote speaker Professor **Michael F. Summers**, from the University of Maryland, Baltimore County, spoke Friday evening on the topic, "Insights into the Mechanism of HIV-1 Assembly and Genome Packaging." Wide-ranging workshops were offered Saturday morning in the Departments of Physics, Biology, and Chemistry/Biochemistry, on the UA campus.

Undergraduate students competed with oral presentations and poster presentations in the categories of biology, physics, and chemistry/biochemistry. The award winners in all categories are listed here: **http://chemistry.uark.edu/INBRE/3642.htm** .

Arkansas INBRE is funded by a grant from the National Institute of General Medical Sciences, under the Institutional Development Award (IDeA) program of the National Institutes of Health. This conference precedes the 2013 Southeast Regional IDeA Meeting, which will be hosted by the Arkansas INBRE and COBREs, Nov. 15-17, at the Little Rock Marriott and the Clinton Presidential Center in Little Rock.

The 2014 Arkansas INBRE conference is

scheduled for November 7-8, 2014, in Fayetteville. Further updates will be posted at http://chemistry.uark.edu/ INBRE/3642.htm.

Faculty News

On the Go

Gopa Mandal attended the 246th American Chemical Society National Meeting & Exposition in Indianapolis, September 8-12, and presented the poster ***Optical properties and advanced bioimaging applications of copper-indium-chalcogenide quantum dots at the ensemble and single particle level.*** Gopa's advisor is Dr. Colin D. Heyes.

Collin D. Heyes gave a talk at the Midwest Regional Meeting of the ACS in Springfield, MO, October 16-19, **Chemistry at the Ligand-Nanoparticle Interface: How Coordination Geometry, Lability and Photocatalytic Crosslinking of Ligands Affects the Properties of Aqueous Quantum Dots**.

Jordan Haynie presented a poster at the Biomedical Engineering Society meeting in Seattle, Sept. 25-28: **Investigating *in Vivo* Fluorescence Imaging of Microdialysis Sampling**, with Jordan Haynie, Cynthia R. Sides, Jerry A. Havens and Julie A. Stenken.

Samir Jenkins presented a poster at the ACS regional meeting in Springfield, MO, on Oct. 16: ***Monitoring Nanoparticle Aggregation in Complex Biological Environments*** by Samir V. Jenkins, Yongbin Zhang, and Jingyi Chen**.**

Christena Nash presented a poster at the 224th Electrochemical Society Meeting,

San Francisco, Oct. 27-Nov. 1: ***Redox-Magnetohydrodynamic (RMHD) Pumping with PEDOT-Modified Electrodes***. Her advisor is Ingrid Fritsch**.**

Mengjia Hu presented a poster at the 224th Electrochemical Society Meeting, San Francisco, Oct. 27-Nov. 1*:* ***Electrochemical Characterization of Nanoparticles with Different Morphologies***, authored by Mengjia Hu, Eric Taylor, Benjamin Jones, Jingyi Chen, and Ingrid Fritsch.

Publications

Hiroko Takeuchi, Benard Omogo, and **Colin D. Heyes**. ***Are Bidentate Ligands Really Better than Monodentate Ligands for Nanoparticles?*** (2013) ***Nano Letters*** 13**,** 4746-4752.

Emeritus Professor **Lothar Schäfer** has published a new book, ***Infinite Potential***, published by Deepak Chopra Books, an imprint of the Crown Publishing Group, a division of Random House, Inc., New York, 2013. Foreword by Deepak Chopra.

Avinash Srivatsan, Samir Jenkins, Mansik Jeon, Zhijin Wu, Chulhong Kim, Jingyi Chen, and Ravindra Pandey. ***Gold Nanocage-Photosensitizer Conjugates for Dual-Modal Image-Guided Enhanced Photodynamic Therapy***. (2013) ***Theranostics***, accepted for publication.

Achievements

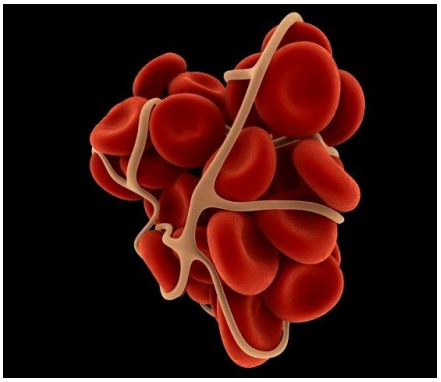
Suresh Kumar has been appointed to the Editorial Board of the Journal of Biological Chemistry (JBC), an official Journal of the American Society for Biochemistry and Molecular Biology. His appointment as the Editorial Board Member of JBC is for 5 years and 3 months, starting from July 1, 2014.

From the ACS Press Room

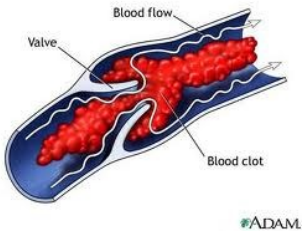
TOWARD A URINE TEST FOR DETECTING BLOOD CLOTS

Nanoparticles That Sense Thrombin Activity as Synthetic Urinary Biomarkers of Thrombosis *ACS Nano*

Detecting dangerous blood clots, which can cause life-threatening conditions such as strokes and heart attacks, leading causes of death for men and women in the U.S., has been a coveted and elusive goal. But scientists are now reporting progress in the form of a simple urine test. Their study, in which they demonstrated that the test works using laboratory mice, appears in the journal *ACS **Nano***.



Sangeeta N. Bhatia and colleagues, including lead author and Ph.D. candidate Kevin Lin and postdoctoral fellow Gabriel Kwong, point out that blood clots — clumps of platelets and fibrin proteins — can threaten to choke off blood flow and lead to a wide range of serious and sometimes fatal conditions including atherosclerosis and stroke. Usually, blood clots are a good thing. They form a plug that stops the bleeding after an injury. But sometimes, a clot forms when it really isn't needed, such as when a person sits too long on a long-distance flight and develops "deep-vein thrombosis." In that case, a clot forms in the leg, blocking blood flow and causing leg pain. But it also can dislodge and move throughout the body to the heart or even the brain, which is life-threatening. Diagnosing a blood clot, or thrombosis, is tricky, however, and current clinical tests aren't always reliable. Bhatia's team wanted to develop a simple and more reliable way to test for these obstructive blood clots. They describe development and testing of "synthetic biomarkers" — lab-made materials for detecting what is going on in the body. They added small pieces of proteins called peptides onto nanomaterials that are similar to those already approved and used in the clinic. They injected the tiny nanomaterials into mice, which are stand-ins for humans. The peptides got chopped up if a blood clot was actively forming in the mice, and those peptide fragments were detected in a simple urine test. "Our results demonstrate that synthetic biomarkers can be engineered to sense vascular diseases remotely from the urine and may allow applications in point-of-care diagnostics," the researchers state.



The authors acknowledge funding from the Koch Institute Frontier Research Program, the Kathy and Curt Marble Cancer Research Fund, the Mazumdar-Shaw International Oncology Fellows Program, MIT Deshpande Center, CCNE, Ruth L. Kirschstein National Research Service Award, the Burroughs Wellcome Fund and the Howard Hughes Institute.

MAXIMIZING BROCCOLI'S CANCER-FIGHTING POTENTIAL

Influence of Seasonal Variation and Methyl Jasmonate Mediated Induction of Glucosinolate Biosynthesis on Quinone Reductase Activity in Broccoli Florets
Journal of Agricultural & Food Chemistry

Spraying a plant hormone on broccoli — already one of the planet's most nutritious foods — boosts its cancer-fighting potential,

and researchers say they have new insights on how that works. They published their findings, which could help scientists build an even better, more healthful broccoli, in ACS' *Journal of Agricultural & Food Chemistry*.

John Juvik and colleagues explain that diet is one of the most important factors influencing a person's chances of developing cancer. One of the most helpful food families includes cruciferous vegetables, such as broccoli, kale and cabbage. In fact, eating broccoli regularly has been linked to lower rates of prostate, colon, breast, lung and skin cancers. In that super food, glucosinolates (GSs) and the substances that are left when GSs are broken down can boost the levels of a broccoli enzyme that helps rid the body of carcinogens. One way to increase GSs is to spray a plant hormone called methyl jasmonate on broccoli. This natural hormone protects the plants against pests. Juvik's team wanted to determine which GSs and their products actually boost the enzyme levels when broccoli is treated.

They tested five commercial types of broccoli by spraying them in the field with the hormone and found that, of the GS breakdown products, sulforaphane is the major contributor toward enhanced cancer-fighting enzyme levels, although other substances also likely contribute, say the researchers. Environmental conditions played a role, too. They say that this information could be used to identify superior broccoli and to breed even more healthful broccoli plants.

Letter from the Chair-Elect

Dear colleagues,

The semester and year is drawing to a close!

We had a great National Chemistry Week with our Mole Day Celebration and PhD Comics Movie screening at the Alamo Drafthouse in Richardson. Our 3rd annual National Chemistry Week outreach event at the Fort Worth Science Museum reached 5,786 people from Oct. 22-26! Thanks to Sandi Dang for coordinating this event as well as all of the volunteers who participated!

Congratulations to Robyn Ford, Denton High School, the 2013 Werner Schulz Award winner. Along with the local section Schulz award, Robyn has been selected to receive the 2013 Southwest Regional Award for Excellence in High School Teaching. Congratulations, Robyn!

The 247th National Meeting will be here in Dallas on March 16-20. Keep an eye out for a call for volunteers for the outreach event on Saturday, March 15, at the Perot Museum. Also, we'll need volunteers for the hospitality booth for the duration of the meeting. Help us show off our local section and DFW to chemists from across the nation!

Our own Kirby Drake is working on planning the 70th Southwest Regional Meeting to be held in Fort Worth in 2014. Please email Kirby (**kirby.drake@kk-llp.com**) if you are interested in serving as the sponsorship/exhibitors chair, undergrad programming chair, or a symposium chair. I encourage you to take advantage of these opportunities to get involved at the regional and national level!

Save the date for our DFW Young Investigator's Meeting on Saturday, January 25, at UT Arlington. The meeting will include research presentations from recent faculty (2009-2011) in the local section, postdoc poster presentations, and lunch!

See you all in January!
Katie Walker
2013 Chair-Elect

FIVE QUESTIONS FOR...

Our November 2013 participant is Courtland Imel, CEO of Ceutical Laboratories, Inc. Mr. Imel earned his BS at Baylor University, and has used his experience to guide his company through significant expansion over ten years. Ceutical Laboratories, Inc. provides a wide range of services—from formulation development and analytical services through product distribution—to industries too numerous to list. Regulatory, compliance, documentation and training services are also provided.
http://www.ceuticallabs.com

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

17. I was planning to attend medical school or law school. My high school chemistry teacher turned my interest to chemistry, however my real passion did not occur until my freshman year in college, when I had chosen chemistry as my major and had to give the subject my all.

2) What was your most daunting challenge in starting your business, and how did you overcome it?

The buyout of my partners. I sought a long term business opportunity, but the partners were interested in immediate gains. Their efforts to reap short-term benefit caused a variety of problems; I had to immediately step in to halt their activities and regain clients who had sought other service providers. Increased income was also needed, so I had to develop the consultancy to earn enough cash to keep going. Today, the challenge is to grow at the right pace and not exceed cash flow. Growing at 20% is easy, but growing at 30% a year is a challenge.

3) Your company handles diverse functions—including regulatory affairs- for many different types of chemical and scientific manufacturers. How do you and your employees stay current with the rapidly changing US and international regulations?

The management team reads a lot of information daily to stay ahead, and we provide training. We've been in the regulatory business for some time, so we tend to predict where the direction is heading and make proper course corrections early. Our quality systems that we provide to manufacturing sites are ~7 years ahead of the regulation - when regulatory agents audit, they are pleasantly surprised. We also participate in active concerns and feedback sessions for FDA and other regulatory bodies, such as AFDO*, and we provide FDA feedback on their latest ESG** changes. Further, by providing site services for clients undergoing audits as a consultancy, we stay attuned to FDA's direction.

4) What advice would you give to a scientist who is interested in pursuing a career as CEO of a company such as Ceutical Labs?

If you pursue your own business, be prepared to work harder than you can ever im-

agine. The work is around the clock, 24/7. Global opportunities don't occur on a Central Time clock, and business is not 8:00 AM to 5:00 PM; you must be wide awake when international clients are working. You must have a deep desire to be the best, and you must develop a passion for service to others. Read constantly to better yourself and improve your knowledge. Lastly, pray continuously.

5) Who is your Science Hero? And why?

Cliff Nielsen, who started my pursuit of owning a regulated laboratory. I have worked with Cliff since 1993, when I was with Allergan, Inc. and Cliff's company provided testing services to us. Through the different phases of my career, Cliff has been my off-site right arm, partnering to pursue drug development projects, as well as an advisor and mentor in many aspects of business. Manuals that Cliff wrote were invaluable in my early career as a young supervisor at Allergan—during my tenure, Allergan never had a single FDA observation. (We continue that same course at Ceutical Laboratories—not a single 483 observation in over 10 years!)

* Association of Food and Drug Officials, **http://www.afdo.org**

** FDA's Electronic Submissions Gateway, **http://www.fda.gov/ForIndustry/ElectronicSubmissionsGateway/**

Many thanks, Courtland Imel, for participating in 5 Questions!

Interesting Scientists Wanted! To volunteer to be interviewed for 5 Questions, contact retort@acsdfw.org.

From the editor

National Chemistry Week made a big bang in this section—literally. On Mole Day, there was a 6:02 am explosion at the University of Dallas (one mole of hydrogen makes a big bang). At the University of North Texas, the Mean Green Chem Demo team lit up pickles and made various other objects glow in the dark. The National Chemistry Week activities at the Fort Worth Museum of Science and History were a blow-out. There were demos every day during the week of October 22-26 and hands-on activities all day Saturday October 26. Lots of kids (of every age), lots of things to do, and—last but by no means least—

THE PERIODIC TABLE OF CUPCAKES!

Why, you ask? WHY NOT?!! say all the student affiliates and helpers…there's nothing an ACS Student Affiliate likes more than a good cupcake after a hard day of chemistry demos. Participants included student affiliates from Texas Christian University, Texas Wesleyan University, University of Dallas, University of North Texas, Texas Woman's University, University of Texas at Dallas, and Eastfield College. Students from several local high schools—Denton, Lamar, and Birdville— also helped out. Attendance was phenomenal, with an average of 1100 attendees daily and an attendance of 1.967 on the demo day on Saturday.

GOOD JOB!

Best regards,
Connie