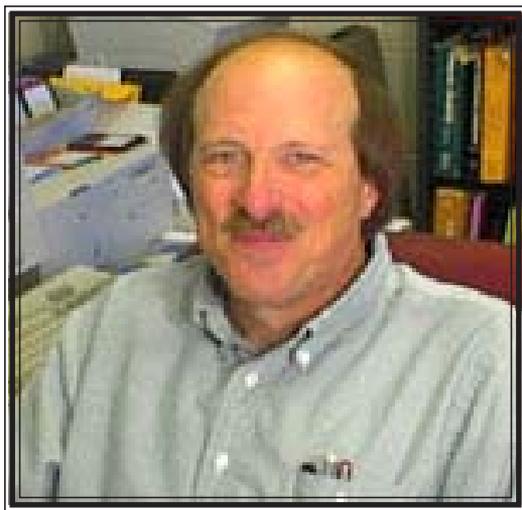




Chemical Bond

**Volume 56
Number 3
March/April 2005**

St. Louis Section, American Chemical Society



**2005 St. Louis Award Winner
Wesley Harris**

The St. Louis Section of the American Chemical Society announces a

Member Picnic

Saturday, June 11, 2005

Tower Grove Park

12:00 pm

Featuring New Members of the Section!

If you are a member of the St. Louis Section and have never been to a section event this one is for you.

Face Painting, Favors, Games, Ballons, Surprises

Do not miss this event!

**Bring the family. Enjoy food, friends, and fine Spring weather.
Just \$5 per person. Kids under 12 are free.**

Questions & Reservations (by May 26th, please) contact:

Sue Dudek, susan.dudek@pfizer.com, or at: Pfizer, Inc.

700 Chesterfield Parkway West

Mail Code A2G

Chesterfield, MO 63017

phone: (314) 274-2464

fax: (314) 274-4426

Pfizer Teacher Fellowship Program

The Pfizer Teacher Fellowship Program was designed to provide an opportunity for science teachers from area schools to perform scientific experimental work with the support and supervision of Pfizer scientists, while receiving financial compensation from Pfizer during the summer months.

The program aims to improve the delivery of science education by:

- Educating teachers as to the relevance of their curriculum in the real world and aiding them in making science more relevant to their students.
- Creating greater enthusiasm for science among teachers and students.
- Improving the teachers' laboratory skills and confidence.
- Providing a perspective for teachers, which enables them to provide career guidance to students who show an interest in pursuing an academic or industrial science career.

If you know of a teacher who would be interested, please contact Sue Dudek (contact information listed above) and she can put you in contact with the correct people.

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ACS

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Meeting & Seminars

Board of Directors

St. Louis Section–ACS Board of Directors meets on the second Thursday of each month, at the **Glen Echo Country Club** (map available on website). Meetings are open to all members, and all are encouraged to attend. Elected officers and chairs of major committees have the right to vote; others in attendance have voice but no vote. If you want to attend the dinner, please contact Ted Gast (ted@cfgastco.com) at least one week prior to the meeting date. The cost of dinner is \$18. Members wishing to become active in section activities are welcomed to their first dinner for free, compliments of the section.

Date: April 14

Social hour: 5:30 pm

Dinner: 6:30 pm

Business meeting: 7:15 pm

Future meeting: May 12

Washington University

Seminars are in McMillen 311 at 4 pm unless otherwise noted. Coffee is available 20 minutes prior to the talk, and refreshments follow. For information, contact:

Amy Walker

walker@wuchem.wustl.edu

An up-to-date list of seminars is

available at:

[www.chemistry.wustl.edu/
~seminars/seminars.html](http://www.chemistry.wustl.edu/~seminars/seminars.html)

University of Missouri- St. Louis

Seminars are held on Mondays at 4:00 pm in Room 451 Benton Hall unless otherwise specified. Refreshments 15 minutes prior to seminar time. (www.umsl.edu/chemistry)

April 4

Helena Malinakova

University of Kansas

*New Palladium-Mediated
Reactions for Asymmetric
Organic Synthesis*

April 11

Nikolay Gerasimchuk

Southwest MO State University
*Chemistry and Applications of
Cyanoximes and Their Metal
Complexes*

April 18

Michael Ashby

University of Oklahoma

There's Bleach in my Blood!

April 25

Jennifer Hovis

Purdue University

*Studies of Things That Move,
Bend, and Aggregate in
Lipid Bilayers*

May 2

Rajiv M. Banavali

The 18th Annual

Distinguished Alumni Lecture

Career Corner

Employment for Chemists in St. Louis

Interested in knowing what's going on in the chemistry community in St. Louis? Want to find out what other employment options there might be? Need to hire a chemist and don't know where to go? Do we have the answers for you!



Check out the new yahoo group **chemjobsstl!**

Go to <http://groups.yahoo.com/group/chemjobsstl/> and join.

Once you join, you can search past postings, and set your preferences for how you want to receive new ones. If you have any questions, contact Lisa at lisa@balbes.com or 314-966-5298.

Marcus Award Competition to be Held at Saint Louis University

On: Wednesday, April 13, 2005

Time: 4:00 PM

Location: Lee Hall (Lecture Hall 1)

The Leopold Marcus Award was established by the late Jack and Gertrude Marcus in memory of his father. It is administered by the Department of Chemistry at Saint Louis University and the St. Louis Section of the American Chemical Society.

The competition consists of presentations based on the undergraduate research projects of senior chemistry majors at Saint Louis University. The candidates, chosen by the faculty, will be making fifteen minute presentations. The winner of the award is determined by vote of the professional chemists in the audience. All ACS members are invited to attend. Refreshments will be available after the competition. For further information, contact Bruce Kowert at (314) 977-2837 or kowertba@slu.edu.



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The Big Inch - Petroleum Lore

by Jack Bornmann

On August 28th 1859 former railroad conductor Edwin Drake struck oil. Using the techniques used to drill salt wells, Drake had drilled down nine feet on a patch of land in Titusville, Pennsylvania. He produced a steady flow of twenty five barrels of oil per day. Drake began marketing his oil for heating and lighting.

Letters & More Words & More

Edwin Drake did not discover petroleum in the United States. Native Americans had used petroleum for various purposes for many years, particularly medicinal. It seeped from the ground and was quickly put to use. European settlers first used it as a medicine to cure blindness. It was also believed to have healing properties to combat the effects of rheumatism, coughs, colds, sprains and even baldness. The oil was skimmed from creeks in its crudest form. Apart from serving as a curative, the crude oil proved a good source of lighting. An unpleasant side effect, though, was that it gave off an unpleasant odor. So, the oil was distilled into a satisfactory lighting fuel by a chemist.

Edwin Drake was the first person in America to successfully drill for petroleum. Many people had been drilling for water or brine, which were things Drake did not want in his well. His technique was to drill down to bedrock and insert a casing that would keep the water and brine from seeping in as he drilled through the bedrock for oil. Prior to drilling for oil people had

simply collected oil from surface seepage. I remember during World War II, when gasoline rationing was very tight, there were some people in West Virginia who used "drip gas" to run their cars. They usually found the drip gas at places where the hillside had been cut away to build a road. Since small molecules flow easiest, it was the gasoline that seeped out of the hill. Drip gas was not good for the engine, but during the war we had only old broken down cars anyway, so who cared what it did to the engine.

When petroleum was distilled the most important distillate was kerosene, used primarily in kerosene lamps. (There was one oil company in West Virginia who put a penny's worth of purple dye in the kerosene and increased the price of the kerosene by a quarter. Purple kerosene looked very attractive in the old lamps, which were saved for special use when the family had visitors.)

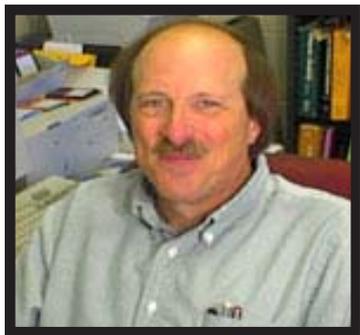
The remainder of the petroleum after the kerosene was removed had very little value. The heavy stuff was so gummy that it was sprayed on the dirt roads to keep down the dust. When Henry Ford made automobiles cheap enough for many people to afford one, the distillation of petroleum shifted to gasoline. About this time electricity was becoming available and people shifted from kerosene lamps to electrical lamps.

This led to a problem with the remaining distillate after the gasoline cut had been taken out. A progressive move forward came when *thermal cracking* was invented, which is when a large hydrocarbon molecule is split in to two smaller, nearly equal molecules by heating the oil to a high temperature. The next big step forward was the development of "cat crackers" (i.e. catalytic crackers) which operated at a lower temperature. The cracking of a twenty carbon molecule produced two

Continued on page 8

Wesley Harris

2005 St. Louis Award Winner



Wesley R. Harris was born in Vero Beach, Florida, and raised near Wichita Falls, Texas. He attended Texas A&M University where he received both baccalaureate and doctoral degrees in chemistry. His training at Texas A&M was with the late Professor A. E. Martell and from there Wes moved to the University of California-Berkeley to do postdoctoral research with Professor K. Raymond. He spent almost three years as an Adjunct Assistant Professor at the Laboratory for Energy-Related Health Research at the University of California-Davis

and another four years as Assistant Professor at the University of Idaho, prior to joining the faculty at UM-St. Louis as Associate Professor of Chemistry in 1988. In 1995 he was promoted to Full Professor of Chemistry.

Dr. Harris is an inorganic chemist with interests in classical coordination chemistry and also in applications of coordination chemistry to biological problems. The combination of training in classical coordination chemistry with Martel and the study of coordination chemistry related to microbial iron transport with Raymond led to his current activities and expertise. Most of Wes' work in recent years has centered on serum transferrin, the transport protein that carries iron as ferric ion between sites of assimilation, storage, and utilization in animals. It is in this area of study that Dr. Harris has developed his reputation and it was during the period he was at UC-Davis that he published the first of his many very substantial contributions in this area. An early paper, which appeared in *Biochemistry*, described a very careful measurement method devised by Dr. Harris, and it corrected data in the literature on the binding of transferrin to gallium. These data are relevant to the use of gallium radio-pharmaceuticals. Related work on transferrin chemistry, published when he was at UC-Davis, involved both kinetic and thermodynamic studies of iron removal from transferrin. Since his arrival at UM-St. Louis, Dr. Harris has continued his productive research program in bioinorganic chemistry.

Dr. Harris is an expert in speciation and biodistribution of metals in humans and has developed excellent models to study this. His principal research contribution, however, continues to be the study of iron transport by serum transferrin and extensions to the transport of other metals in humans. Since the metals involved are toxic, the focus of the work relates to human health, and has been funded by the National Institutes of Health and companies involved in life science and biomedical areas. His record includes almost 100 refereed publications, half of which were published since he came to St. Louis. In addition to his research at UM-St. Louis, he has been instrumental in developing the biochemistry emphasis area and designing the new degree programs in biochemistry and biotechnology. Wes and his wife Marion and son Jonathan live in Creve Coeur.

Continued from page 6

molecules about ten carbons each. But there was not enough hydrogen available to make two alkanes, so one of the smaller hydrocarbons received a double bond. This problem could then be corrected by introducing hydrogen during the cracking process. But that double bond was reactive and became the source of the petrochemical industry.

Some people have the mistaken idea that oil wells stand over a pool of oil. That is not true. The oil is interspersed in the pores of rocks, sand and shale. Before geologist became so successful at locating underground oil, it was simply discovered by “wild catters,” – men who said they could smell the oil deep underground or could judge from the lay of the land on the surface. There were also drillers who bought land surrounding a known producing oil well hoping they would tap into the same oil bed as the producing well. But there were many who sunk dry wells in the neighboring land. Some of them developed the sneaky procedure of drilling straight down for a short distance and then turning the drill head to drill into the known oil field. There is a town in California that now benefits from this technique in a legal manner because there is oil under the city but the citizens do not want “those ugly oil wells” in their back yards. For that reason, the oil drillers went out to sea and used a slant drill to reach the oil pool under the city.

Oil “recovery” is a special branch of pumping for oil. If the original driller is lucky, there is natural gas present that forces the oil up the drill hole to give a “gusher”. The well is then capped with a “Christmas tree” that allows multiple pipes to be attached to the wellhead. When the pressure runs out or there was none to begin with, it is necessary to pump the oil out. One has a good pumping well if the petroleum diffuses

through the rock at a good rate. But when the diffusion slows down, the driller pumps the opening dry, shuts down, and waits for diffusion to bring more oil to the bottom of the well.

Some drillers have used explosives to break up the rock at the bottom of the well to improve the diffusion rate. Another technique is to drill an adjacent well not too far from the original and pump water down the second well, hoping that it will push the oil toward the original well. A variation of this is to inject superheated steam into the second well. The heat and the pressure work together to push the oil toward the first well.

Secondary and tertiary oil recovery has become important, but each new step raises the cost of operations for the well, as well as the cost of a barrel of oil up to a price that no one is willing to pay. There is still oil in the ground, but it costs too much to remove it. Thus, we will never run out of oil; we will run out of money – until someone discovers a significantly cheaper method of removing the remaining oil.

In the earliest days of oil wells, wooden wagons were used to transport the crude oil to a refinery. When trucks became available they displaced the horse and wagons. Trucks with wooden barrels carried refined gasoline to the homes and filled the gas tanks of the automobiles. Next came gasoline stations where the gasoline was transported in bulk and the gasoline stations became the distributor. Trucks were still being used to transport the crude oil to the distant refinery. Later refineries were built near the large oil deposits and pipelines were used to transport the crude from the wellhead to the refinery.

Pipelines were cheaper and safer to operate than trucks, but railroad tank cars were even cheaper. Cheapest of all were river barges or sea-going tankers.

During the Second World War much of the petroleum and the distilled petroleum were transported from the Oklahoma-Texas area to the northeastern states or to England and Russia. After the surprise attack at Pearl Harbor the American civilians were concerned about additional attacks on the American mainland, even the Eastern coastline. To allay these fears no cities on the east coast were blacked-out. Metropolitan New York City was ablaze with lights of all types. Landings of small groups of German espionage crews did occur, but there were no large landings of massive groups of soldiers. The American newspapers voluntarily held back negative news unless it had been released by Washington. Most people on the east coast felt relatively safe.

But German submarines were safely sitting off shore waiting for our tankers to sail north fully laden with petroleum products. These tankers were brightly outlined by the on-shore lights and it was a simple matter to torpedo them with

huge losses of life, material and ships. Those tankers being blown up by German torpedoes were vital for our own defense efforts and were supposed to join the convoys forming between New York City and Boston on their way to England and Russia, which desperately needed our oil. The answer was pipelines. I was only 12 at the time but I remember the urgency of building the "Big Inch" and the "Little Inch." These pipe lines ran from the Texas-Oklahoma oil fields to New England. The work on these two pipelines can be compared to the urgency of the construction of the Canadian-Alaskan Highway. My father was an oil company executive, who was well aware of the pipeline construction, but he never mentioned the terrible loss of oil tankers right there on our southern Atlantic seacoast. I learned about the sinkings many years later and then it took a few more years before I connected the sinkings with the construction of the "Little Inch" and the "Big Inch."



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Angela Jaboor

Chemical Technology Student is Awarded ACS Scholarship



Angela Jaboor, ACS Scholar

Angela Jaboor, a student in the Chemical Technology Program at St. Louis Community College at Florissant Valley, has been awarded a scholarship through the American Chemical Society Scholars Program. The program is designed to encourage African-American, Hispanic-Latino, and American Indian students to pursue degrees in the chemical sciences and chemical technology. Scholarships are for up to \$2,500 for freshman and up to \$3,000 for sophomores, junior, and seniors per academic year. The scholarships are renewable for all four or five years of an undergraduate degree so long as the student maintains a GPA of 3.0 in an approved major (chemistry, biochemistry, chemical engineering, or other chemically related fields such as environmental science, materials science, or toxicology). Students

planning careers in medicine or pharmacy are not eligible for this program. The application form is available on the American Chemical Society's web site: www.chemistry.org/scholars.

After graduation with an Associates Degree in Applied Science, Angela plans to work as a chemical technician and to continue her education. Her ultimate goal is to become a forensic chemist.

Make a Difference!

Career Awareness Fair

Did you remember to mark your calendars for the 22nd Annual CAREER AWARENESS FAIR? The St. Louis City & County Public Schools will hold this annual event for 8th grade students on Tuesday - Wednesday, May 10-11, 2005 in Halls 1 & 2 - America's Center. Help invest in a world-class workforce by joining other section members as we continue our participation in this program sponsored by the St. Louis Public Schools Career & Technical Education Office and the Career Awareness Fair Business Advisory Committee. For more information or to volunteer, contact Greg Wall at 1-800-325-5832 ext. 3139 or e-mail: gwall@sial.com.

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Please Join Us - All are Welcome!
9th Annual Women Chemists Luncheon

Guest and Speaker:

Arthur B. Ellis

*Director, Division of Chemistry
National Science Foundation*

“New Chemical Bonds: Partnerships with the NSF”

1:00 pm, Sunday April 17 2005
St. Louis History Museum

*Reservations requested by April 10
To Leah O'Brien, cost \$10
(618-650-3562 or lobrien@siue.edu)*

St. Louis Award Symposium
Friday, April 22, 2005
451 Benton Hall
University of Missouri-St. Louis

2:00 - Welcome and General Introductions.

Ted Gast, Chairman, St. Louis Section ACS

2:05 - Introduction of Wesley Harris, 2005 Winner of the St. Louis Award

2:10 - Symposium moderator - Dr. Wesley R. Harris - General Remarks

2:15- 3:00 - Professor Alvin L. Crumbliss, Duke University

How a bacterial transferrin transports iron.

3:00-3:45 - Prof. Michael J. Welch, Director, Division of Radiological Sciences
at Washington University School of Medicine

The use of metal complexes in medical imaging.

Refreshment Break, 3:45-4:15

4:15-5:00 - Professor Kenneth N. Raymond, University of California-Berkley
From macrocycles to megacycles: nanoscale, chiral flasks.

5:30-6:30 - Reception, hosted by Dr. Thomas F. George, Chancellor,
University of Missouri-St. Louis and Professor of Chemistry
and Physics at the Chancellor's residence.

(Parking for the Symposium is available in the West Drive Garage.
West Drive is off Natural Bridge Road.)

2005 Chemical Progress Week

(April 17-23)

Schedule of Events

- April 13 - Marcus Award (See ad in this issue.)
- April 16 - Chemistry Olympiad*
- April 17 - Women Chemists Luncheon (See ad in this issue.)
- April 18 - Awards Night Banquet will be held at Kemoll's Restaurant
Honors winners of the High School Chemistry Contest, the Leopold Marcus Award, the High School Teaching Award, Chemical Technician of the Year Award, and Outstanding Junoir Chemistry Students at area colleges and universities.
\$20.00/person; 5:30pm - Social Hour, 6:30 - dinner, 7:30 - program
Contact Samir El-Antaby (314-664-5522) or Ted Gast (314-993-2870)
- April 19 - ADACIOM Luncheon at the Sheraton in Clayton
Contact Chris Palazzola (314-965-6006) for reservations
- April 22 - Chemistry Career Day at the University of Missouri - St. Louis
in Benton Hall at 9:00 am - 12:00 pm
Contact Jim O'Brien or Keith Stine (314-516-5311)
- April 22 - St. Louis Award Symposium (See ad in this issue.)
Contact Joseph Ackerman (314-935-6593) for more information
- April 23 - St. Louis Award Banquet at Kemoll's Restaurant
Honors winner of the St. Louis Award
\$35.00/person; 6:00pm - Cocktails, 7:00 - banquet, 8:00 - program
Contact Samir El-Antaby (314-664-5522) or Ted Gast (314-993-2870)
- April 30 - Undergraduate Research Symposium*
St. Louis Community College at Florissant Valley
3400 Pershall Road
All undergraduate student involved in research projects in the St. Louis area are invited to attend the symposium and present their work in either a poster or an oral session.
Contact: Donna Friedman, dfriedman@stlcc.cc.mo.us

* This was listed incorrectly in the previous issue of the Chemical Bond.

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Awards Night 2005

Date: April 18

5:30 pm Cocktails, 6:30 pm Banquet, 7:30 pm Program

Cost of dinner: \$20.00 per person

St. Louis Award Banquet

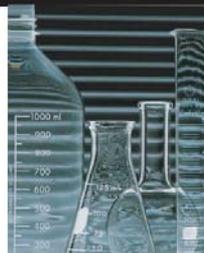
Date: April 23

6:00 pm Cocktails, 7:00 pm Banquet, 8:00 pm Program

Cost of dinner: \$35.00 per person

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Chemical Progress Week 2005

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Make checks payable to:
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*Please make your reservations
by April 15.*

Awards Night Dinner Reservation

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name _____

Number attending _____ x \$20.00 = Amount remitted \$ _____

Please mail with check payable to St. Louis Section - ACS

St. Louis Award Banquet Reservation

Member
name _____

Number attending _____ x \$35.00 = Amount remitted \$ _____

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