



UNIVERSITY OF MISSOURI-ROLLA

Chemistry Department
2005 Fall Semester

NEWSLETTER CHEMMUNICATOR

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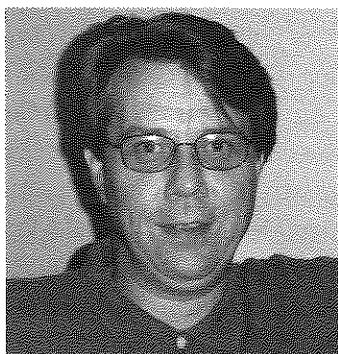
Alumni Updates

New Chemistry Department
Chair

Upcoming Events

UMR will be hosting the 2005 Homecoming. The Chemistry Department will host a social hour starting at 3:00 p.m. on Sept. 30, 2005 in Room 121 Schrenk Hall and a Seminar will be given by: Dr. Jeffrey G. Winiarz at 3:30 p.m. in room G-3 Schrenk Hall. Also, there will be a host of other activities going on around the UMR campus.

Chemistry Department Welcomes

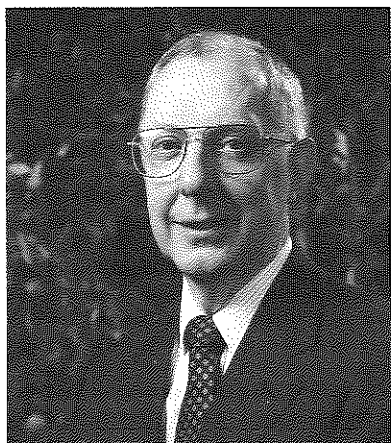


Dr. Jeffrey G. Winiarz

joined the faculty of the UMR chemistry department in August of 2005. He received his Ph.D. in physical chemistry in 2003 from the State University of New York at Buffalo. During that time he was a Research Assistant at the Institute for Lasers, Photonics and Biophotonics, located at the SUNY at Buffalo.

As a graduate student under the advisement of Prof. Paras N. Prasad, Dr. Winiarz was privileged to work in a world renowned laboratory using the most current instrumentation available as well as learning the most up-to-date techniques from some of the most prolific scientists in the field. His thesis work focused on the photosensitization of photorefractive polymeric composites through the inclusion of semiconductor nanocrystals and the manner by which charge-transfer and transport occurs in such materials. This work resulted in numerous novel composites and several publications. Dr. Winiarz then began his post-doctoral work at the Laser and Optics Research Center at the United States Air Force Academy in Colorado Springs, CO where he worked in collaboration with Prof. Fasil Ghebremichael. Focusing on the development of high-speed photorefractive polymer composites and their application in the restoration of aberrated laser beams and image restoration, this work also resulted in several important publications. As a result of a very fruitful collaboration Dr. Winiarz had established with Prof. Nasser Peyghambarian's group at the Optical Sciences Center at the University of Arizona in Tucson, AZ, he again had the good fortune to return to a world-class laboratory where he was a visiting scholar. His work here concentrated on extending the operating range of all-organic, high-speed photorefractive and photoconductive polymeric composites to near infrared wavelengths.

Chemistry Department Establishes the Richard K. Vitek/FCR Endowed Chair of Biochemistry



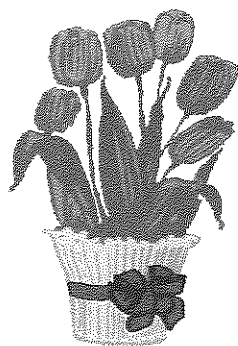
Richard K. Vitek

The Department of Chemistry is pleased to announce the new Richard K. Vitek/FCR Endowed Chair in Biochemistry. The chair was made possible by the generous donations of Richard K. Vitek, a 1958 UMR chemistry alumnus, and the Foundation for Chemical Research Inc. (FCR). The chair carries a very generous endowment of \$2.8 million dollars, which will be used to help support the research of a distinguished scientist in modern biochemistry. We are presently advertising the new position, which we plan to fill by September, 2006. The new chair will provide important guidance for UMR's targeted growth in the Biosciences. We seek an individual who will attract and inspire superior graduate students, maintain external support for a vigorous research program, serve as a standard of excellence in teaching, and collaborate with faculty and students in other departments and research centers at UMR. The successful candidate will have a doctorate in Chemistry, Biochemistry, or a related field, and a substantial record of extramural funding and publications in leading scientific journals.

Richard K. Vitek has a long history of distinguished service to UMR and the Chemistry department. He served as Vice President and President of the UMR

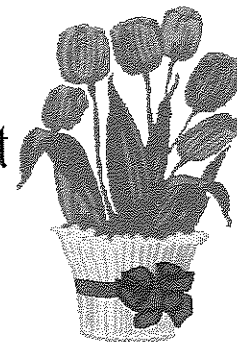
Board of Trustees, and as the Chairman of the Advisory Board for the Foundation for Chemical Research Inc. Dick received his M.S. in Chemistry from UMR in 1958, following his B.S. degree in Chemistry from Albion College in 1956. He was awarded the Professional Degree in Chemistry in 1994. Dick worked as an Analytical Chemist for the Atomic Energy Commission on the production of uranium from ore. In 1959 he joined Allied Chemical Corporation where he worked on solid oxidizers for U.S. rockets and missiles. In 1964 he joined what is now Sigma-Aldrich Chemical Company. Dick created and was publisher of *Aldrichchemical Acta* which today, with few modifications, is the most highly regarded commercial chemical publication in the world. Another career shift occurred in 1968 when Dick Vitek established his own company to represent a Swiss scientific instrument manufacturer. In 1980 he started a new venture of manufacturing and marketing laboratory scientific instruments primarily targeted towards biotechnology. Until his retirement in 2002, he was the principal owner and Chief Executive Officer for well-known FOTODYNE Incorporated. His rapidly growing company entered into the listing of the top 10% in revenues of all corporations in the State of Wisconsin.

The chemistry department is very proud of the accomplishments of alumnus Dick Vitek, and we are very appreciative of his generosity in providing the funds to establish the Richard K. Vitek/FCR Endowed Chair in Biochemistry. We are certain that the Richard K. Vitek/FCR Endowed Chair in Biochemistry will allow us to attract a superstar Biochemist to the UMR Chemistry Department.



Spring Awards Banquet

April 22, 2005



The Spring Awards Banquet was held on April 22, 2005 at Zeno's. Many of the faculty and students in our department received awards. Paula J. Lutz was the speaker at the awards banquet that night. Dr. Frank Blum and Dr. Ekkehard Sinn received the Outstanding Teaching Award for 400-level Chemistry. Dr. Shubhender Kapila (not present) received the Outstanding Teaching Award for 300-level Chemistry. The Wilbur Tappmeyer Excellence in Teaching Undergraduate Award was presented to Dr. Yinfa Ma.

The recipients of the Outstanding Senior Awards were: Julie Breckenridge, Norman Horn (not present), Stephanie Maiden, and Katherine Durham (not present). The recipients of the Outstanding Junior Award were: Elizabeth Miller (not present), Miranda Ceballos, Marc Armbruster, and Emily Hackworth. The recipients of the Outstanding Sophomore

Awards were: Kylee Hyzer, Tracie Kost, Elyse Hendrickson and Lynricia Lizama (not present). Yi-jen Su won the Outstanding Freshman Student Award. Julie Breckenridge received the American Institute of Chemists Foundation Student Award. Receiving the Pietsch Distinguished Scholar Award was Kevin Day. On behalf of CRC Press, the winner of the 2004 Freshman Chemistry Achievement Award was Emily Speorl. The Distinguished Alumnus Award was presented to Dr. Paula Lutz, Dean, College of Sciences, University of Missouri-Rolla.

The Best Graduate Teaching Assistant Award was presented to Amala Antony Samy. The Outstanding Graduate Teaching Assistant Awards were presented to Stephen Gibbons, Isaac Stayton and Ranjith Kolli.

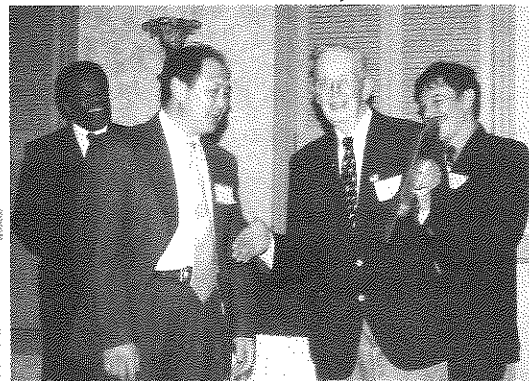
Congratulations to all of our winners who received Awards!



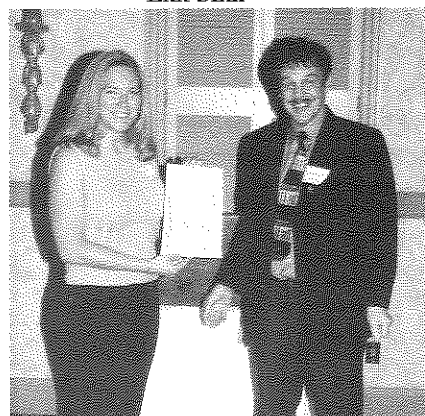
Paula Lutz, Frank Blum and Ekk Sinn



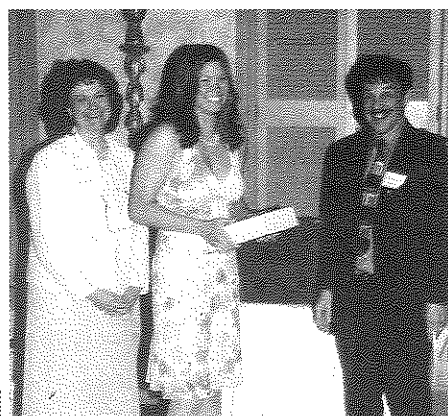
Harvest Collier and Ekk Sinn



Harvest Collier, Yinfa Ma, Wilbur Tappmeyer and Ekk Sinn



Julie Breckenridge and Ekk Sinn



Paula Lutz, Emily Speorl and Ekk Sinn

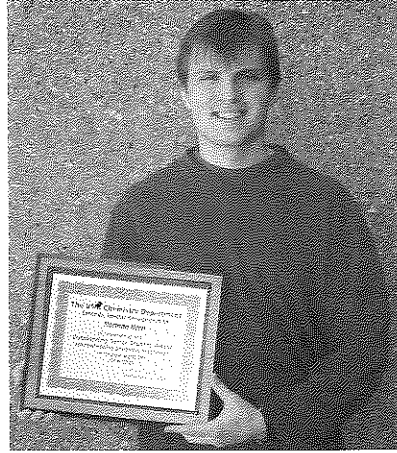


Paula Lutz, Kevin Day and Ekk Sinn

Outstanding Senior Recipients



Paula Lutz, Stephanie Maiden,
Julie Breckenridge and Ekk Sinn



Norman Horn



Katherine Durham

Outstanding Junior Recipients



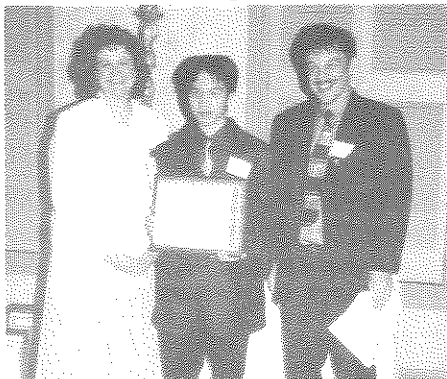
Marc Armbruster, Emily Hackworth,
Miranda Ceballos and Ekk Sinn

Outstanding Sophomore Recipients



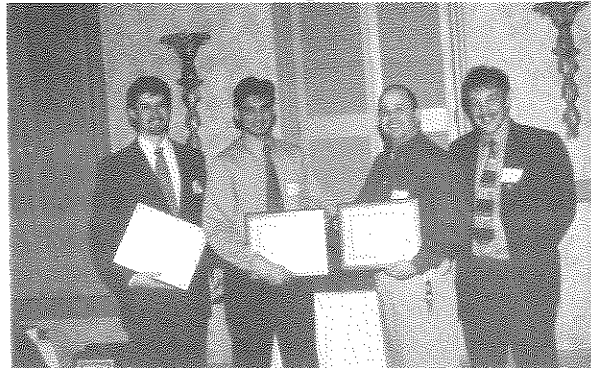
Paula Lutz, Tracie Kost, Kylee Hyzer,
Elyse Hendrickson and Ekk Sinn

Outstanding Freshman

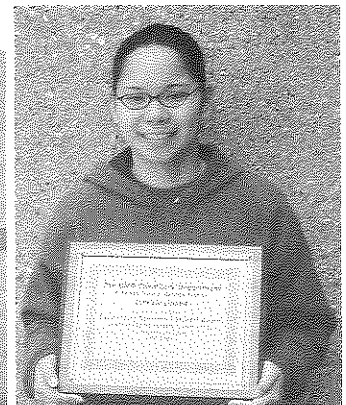


Paula Lutz, Yi-jen Su and Ekk Sinn

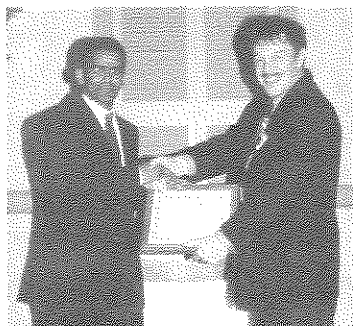
Outstanding GTA's



Isaac Stayton, Ranjith Kolli, Stephen Gibbons
and Ekk Sinn



Lynricia Lizama



Amala
Antony
Samy and
Ekk Sinn

Ekk Sinn
and
Paula Lutz



CHEMISTRY UNDERGRADUATE AWARDED GOLDWATER SCHOLARSHIP

Kylee Hyzer, a sophomore at UMR has been named a Goldwater Scholar by the Barry M. Goldwater Scholarship and Excellence in Education Foundation.

Kylee is one of 320 undergraduates in the U.S. who learned in March that they had been selected as Goldwater Scholars for the 2005-2006 academic year. A UMR sophomore in chemistry from Joliet, Ill., Kylee will receive up to \$7500 annually to help cover tuition, fees, books, and room and board costs during the next two years.

"I am thrilled to have won this scholarship." Kylee says. "Not only will it help offset the cost of my education, but it is truly a great honor."

According to the foundation, the scholarship program honoring Goldwater was established in 1986 to encourage undergraduate students to pursue careers in the fields of mathematics, natural sciences and engineering. Winners are selected on academic merit.

Kylee says she plans to go to graduate school and eventually hopes to earn a Ph.D. in chemistry. For the past two summers, she has worked as an intern at Argonne National Laboratory, a U.S. Department of Energy laboratory operated by the University of Chicago.

At UMR, Kylee is participating in research to turn soybean oil into an environmentally friendly, renewable paint for striping roads.

UMR students tout new future for soybeans

If two University of Missouri-Rolla chemistry students have their way, soybeans will one day line Missouri's highways -- literally.

Kylee Hyzer, a sophomore from Joliet, Ill., and Kyle Anderson, a senior from California, Mo., are using what they call "green chemistry" to turn soybean oil into an environmentally friendly, renewable paint for trafficways.

Unlike current acrylic paints, the soybean paint is produced without any waste in a one-step, one-pot process.

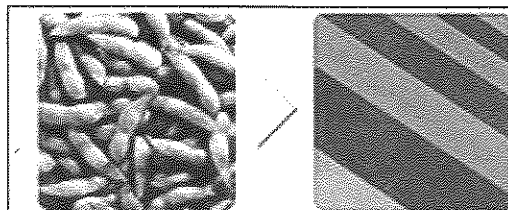
"Basically what goes into the pot comes out as the useable final product. There are no hazardous by-products that must be disposed of properly," says Anderson, who spends his summers working as a chemical intern for the Missouri Department of Transportation in Jefferson City. "Also, our emulsion releases less ammonia vapor, which causes problems for factory workers who process the emulsions into the final traffic coating."

The new coating system design is based on a water-based acrylic polymer prepared from the soybean oil product that serves as a major component of a traffic paint formulation. The paint would be applied about the same way as traffic paints currently are.

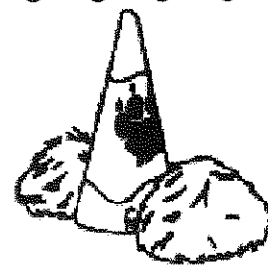
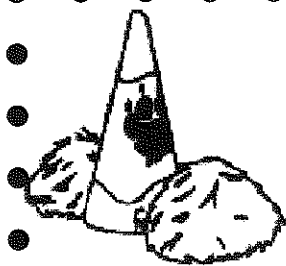
Under the direction of Dr. Harvest Collier, vice provost for graduate and undergraduate studies and professor of chemistry at UMR, the students are trying to remove the saturated components that currently makes the paint waxy.

"The salad oil industry already does this using expensive equipment," Hyzer explains. "They slowly freeze a mixture so that the fatty parts can be separated out. We also need to be able to slowly freeze the paint so we can remove the saturated components."

Their work is funded by UMR's Opportunities for Undergraduate Research Experience Program, which allows undergraduate students to work with faculty on joint research projects.



Chemistry Major has Spirit and gets Award for it



The Corporate Development Council (CDC) at the University of Missouri-Rolla presented six campus leadership awards during its annual leadership banquet and awards ceremony April 21 in the Havener Center on the UMR campus.

Seven awards were presented to individual students and three awards were presented to student groups. In addition, the CDC presented an award to an outstanding UMR staff member. Faculty, staff and students could nominate other UMR students, faculty and staff members for the awards.

Emily M. Hackworth, a junior in chemistry from Rolla, Mo., received the Most Spirited Missouri Miner Award. This award is presented to a student whose show of campus spirit is truly stellar. The award is judged on the student's ability to spread spirit throughout the campus with his or her actions and words.

The Corporate Development Council is composed of MSM-UMR alumni and others who work together to strengthen the university through their participation in campus activities and events.

The banquet was sponsored by the UMR chapter of the Blue Key National Honor Fraternity, National Residence Hall Honorary, Omicron Delta Kappa (a national leadership honor society), Order of Omega (a national Greek honor society), and the UMR Student Council.

UMR Chemistry Undergraduates Place in Research Day Competitions

Vice Provost Harvest L. Collier announced that April 13, 2005 was the first annual "Undergraduate Research Day." Students from various majors on our campus came to the Havener Center to present their research through oral and poster presentations. The conference was co-sponsored by Brewer Science Inc. of Rolla and the UMR office of Undergraduate and Graduate Studies. \$12,000 in cash awards was presented to the winners of the competitions.

The competitions were divided into four categories: engineering, humanities and social sciences, natural sciences, and management and information systems. Seventy UMR students entered the competitions; 26 competed in oral presentations and 44 competed in the poster competitions.

Keith Strassner, Assistant Director-Alliances and Planning, at Brewer Science, Inc. was the keynote speaker for the event.

Norman Horn from the UMR Chemistry Department participated in the oral presentations and placed third in the Humanities/Social Science category.

Kyle Anderson and Kylee Hyzer from the UMR Chemistry Department brought home second place in the poster contest in the category Natural Sciences.

Congratulations to all of the Undergraduates

Nineteen UMR faculty members receive tenure, promotions

Nineteen faculty members at the University of Missouri-Rolla will receive promotions or tenure effective September 1. Four of those faculty members were Chemistry. Faculty members are:

Dr. Nuran Ercal, promoted to professor of chemistry.

Dr. Yinfa Ma, promoted to professor of chemistry.

Dr. Thomas Schuman, promoted to associate professor of chemistry with tenure.

Dr. Chariklia Sotiriou-Leventis, promoted to professor of chemistry.

Far out: UMR scientist's views on solar system gain credibility

For decades, Dr. Oliver Manuel, a professor of nuclear chemistry at the University of Missouri-Rolla, has been telling anyone who will listen that the accepted theory on the sun's origin – that it was created slowly along with the planets in a huge collapsing cloud of hydrogen and helium – is seriously flawed.

“That story about the solar system's creation certainly doesn't match my findings,” says Manuel, who, back in the 1970s, uncovered evidence supporting a different theory: that a supernova explosion created the sun and planets.

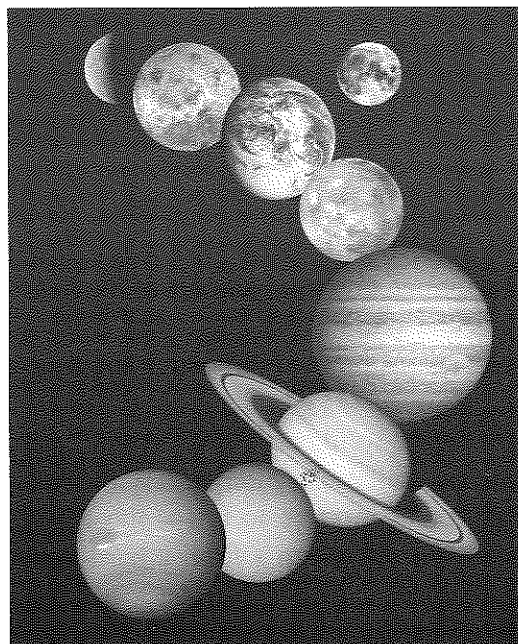
Lately, it appears Manuel's ideas aren't quite as far-fetched as they used to seem.

New findings at Arizona State University convinced a Chinese-American team of scientists that the origins of the solar system, indeed, were hotter and more violent than previously thought. After detecting clear evidence in meteorites for the past presence of chlorine-36, they concluded a nearby supernova must have injected radioactive isotopes into the interstellar cloud of light elements that was forming our sun and planets. The conclusions are reported in the Feb. 1 issue of the Proceedings of the National Academy of Sciences.

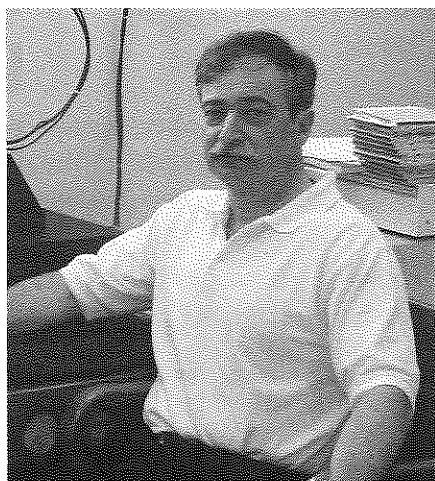
“Atoms in the solar wind showed us the seven most abundant elements in the sun are iron, oxygen, silicon, nickel, sulfur, magnesium and calcium,” says Manuel. “The most abundant elements inside the sun turned out to be the same elements that are most abundant in ordinary

meteorites. The likelihood of this spectacular agreement being a meaningless coincidence is less than one in a billion.”

As part of a continuing effort to prove he's been right all along, Manuel's latest publication shows that an additional 72 types of atoms in the outer layer of the sun or photosphere are sorted by weight. Those results, and additional evidence suggesting that iron is the most abundant element in the sun, will be published with co-authors in the next issue of the Journal of Fusion Energy.



UMR Chemist Awarded for Work with Latex Paint



University of Missouri-Rolla chemist Dr. Michael Van De Mark, director of the UMR Coatings Institute, received a Presidential Green Chemistry Award from the U.S. Environmental Protection Agency for his invention of an environmentally

friendly latex paint additive that reduces volatile organic compound (VOC) emissions.

The additive is marketed under the trademark Archer RC by Archer Daniels Midland (ADM). The award was presented today (Monday, June 20) at the National Academy of Sciences in Washington, D.C.

Latex paint makes up approximately 65 percent of all paint used in the U.S., and it contains two sources of volatile organic components. One component is a glycol that is used as an antifreeze agent and for wet edge retention; the other is a coalescing agent.

Van De Mark's invention, a vegetable-oil derivative, replaces the volatile coalescent with one that doesn't leave the film. "It doesn't continuously plasticize the paint forever," Van De Mark explains. "It air oxydizes and oligomerizes the additive, linking several coalescent aid molecules together to form a low-molecular weight polymer, and you get part of the hardness back. It softens the paint right away, but over a period of weeks, it regains most of its hardness."

Latex resins are solid particles of plastic approximately one-tenth of a micron in diameter. Without a coalescent aid in the paint mixture to allow the drying particles to flow together to form a film, a hard-type resin will crack as it dries.

"With the coalescent aid, those little hard particles are softened and flow together, forming a film," Van De Mark explains. "Without the coalescent aid, you can't form a film."

Traditional coalescing agents soften the paint, then evaporate away to return the paint's hardness, releasing the solvent into the air, which adds to air pollution.

To create the derivative, Van De Mark took a simple glycol and reacted it with the unsaturated fat, the vegetable oil, which then formed a new coalescent aid. Unlike traditional chemicals like IBT filmer (a trade name of Dow), Texanol (a trade name of Eastman) and butoxy ethanol, Van De Mark's product stays in the paint.

Van De Mark's invention was licensed by ADM and is currently marketed under the trademark Archer RC. The process works with any unsaturated oil derivative, but ADM chose to use sunflower oil.

Van De Mark first invented the additive 10 years ago while trying to find a use for Missouri plant-based oils, originally studying soybean oil derivatives with funding from the Missouri Soybean Merchandising Council.

The Presidential Green Chemistry Challenge was established in 1995 as part of the Reinventing Environmental Regulations Initiative to promote pollution prevention and industrial ecology through a new EPA Design for the Environment partnership with the chemical industry. EPA's Office of Pollution Prevention and Toxics leads this voluntary partnership program.

In addition to Van De Mark, the award is shared by Dr. Paul Bloom and Dr. George Poppe from ADM; and Jeff Nelson of Stepan Co., who were responsible for implementing the UMR technology.



Carolyn (Jones) Otten

(B.S. 1997) has accepted a position of Senior Analytical Chemist at Chemir Analytical Services in Maryland Heights, Missouri.

Don R. Strehlau

(M.S. 1942) Received Ph.D. in Chemistry from Northwestern University in 1950 and retired from DuPont in 1981.

Alumni Updates

Doug Papenmeier

(Ph.D.2005) Has accepted a position as lecturer at the University of Maryland Baltimore County.

Scott Hayes

(Ph.D.2005) Has accepted a position at CrossLink in St. Louis, MO.

Dr. James R Knox, Jr

(B.S. 1963) Retired as Emeritus Professor in 2002, but he is still writing and working on Editorial Board of the Journal of Biological Chemistry.

Bob Gambogi

(M.S. & Ph.D. 1990) Has accepted a position with Johnson and Johnson.

New Chair as of September 1, 2005



Dr. Phil Whitefield, professor of chemistry at the University of Missouri-Rolla and director of the UMR Center of Excellence for Aerospace Particulate Research, has been named chair of the chemistry department. The appointment took effect Sept. 1.

Whitefield, who also serves on the research faculty of UMR's Cloud and Aerosol Sciences Laboratory, replaces Dr. Ekk Sinn, who will remain in the department in a teaching and research capacity.

"Dr. Whitefield brings excellent credentials to the job," says Dr. Paula Lutz, dean of the UMR College of Arts and Sciences. "He is an internationally known research scientist, an effective teacher, and an outstanding leader. I look forward to working with him to enhance this already productive department."

Whitefield joined UMR in 1990 as a research associate professor. He was named associate professor in 2001 and promoted to professor in 2004. Prior to joining UMR, Whitefield was a scientist in the radiation sciences department of McDonnell Douglas Research Laboratories in St. Louis.

Whitefield earned a Ph.D. in physical chemistry and a bachelor of science degree in chemistry from Queen Mary College, University of London in 1979 and 1975, respectively.

Since joining UMR, Whitefield has worked with the UMR Cloud and Aerosol Sciences Laboratory studying particulate emissions produced by aerospace activities, such as aircraft operations and rocket launches. His current work, through the UMR Center of Excellence for Aerospace Particulate Research has led to the development of an internationally accepted approach to characterize the nature of particulate matter, or soot, in jet engine and rocket exhaust.

Late Breaking News

Johnathan Harper received an Outstanding Graduate Student Award and Amala Antony Samy received an Outstanding Graduate Student Teaching Assistant Award from the new Chancellor John F. Carney III at the graduate student banquet on Tuesday September 6, 2005. It was held in the St. Pat's Ballroom of the Havener Center.

**Congratulations
Johnathan and Amala**

Let us hear from you

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Name _____ Year attending UMR _____

Current activities/interests _____

Family _____

News/Plans _____

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