



UNIVERSITY OF MISSOURI-ROLLA

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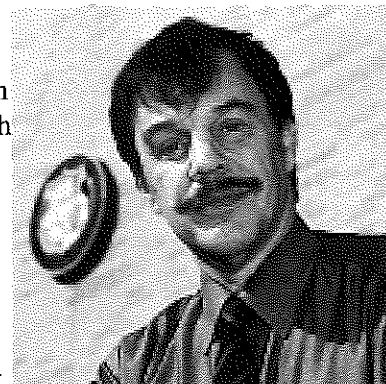
Chemistry Department Newsletter
2005 Spring Semester

www.chem.UMR.edu
chem@UMR.edu

Greetings:

This has been a good year for Chemistry despite the infamous budget cuts that come up in many conversations about UMR. Our faculty continues to achieve: Jay Switzer's research is featured on the NSF & NIH web pages, and in this issue some recent highlights on Drs. Yinfa Ma, James Stoffer, Nuran Ercal, Charles Chusuei, Phil Whitefield, and their students are featured in these pages.

The dean who hired me at UMR agreed to increase the Graduate Teaching Assistant budget to enable us to run the courses. That was before the budget cuts. In fact the GTA budget has suffered a shrinkage of 18% in the last four years despite a large rise in undergraduate enrollment. We are always under pressure to give up far more of the TA budget. We hold the line to provide the best lab teaching for undergraduates and to bring grad students into our research program. What keeps us going is a strong research program and Graduate scholarships for some of the students.



Please Contact

To keep our records up to date please send in your most recent e-mail and other contact information. If you know any Alumni whose e-mail and/or address has changed, please ask them to get in touch with us.

Phonathon

Last year's phonathon was held on April 21-27, 2004, and was a success. The UMR Chemistry Department received pledges totaling \$12,550. Thank you for your generosity.

Undergraduate Research Feature

Our undergraduates continue to do great research, and we value their enthusiasm and commitment. We plan to hold another undergraduate research meeting (students present their work) at the end of this summer, all welcome, pizza & drinks provided. In addition, the campus will hold an Undergraduate Research Conference on April 13, 2005, at the UMR Havener Center.

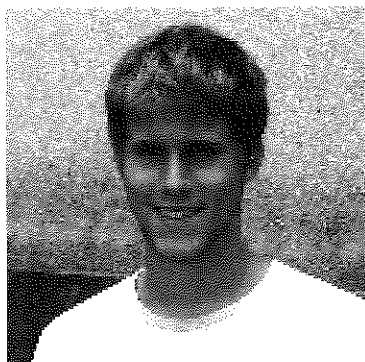
Graduate Program

As usual we have about as many graduate students as undergraduate majors or slightly more (60). There isn't space here to describe all the great research, this time we just feature Dr. Chusuei's group. Meanwhile, some of our measures of success have been research funding (a rise to \$3,468,148.00) and publications (106 in the journals of our fields).

With best regards,

Ekkehard Sinn

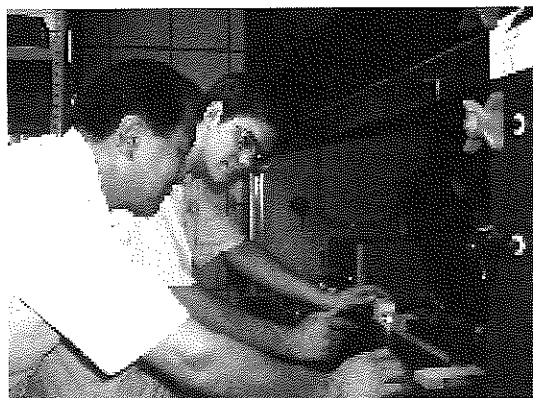
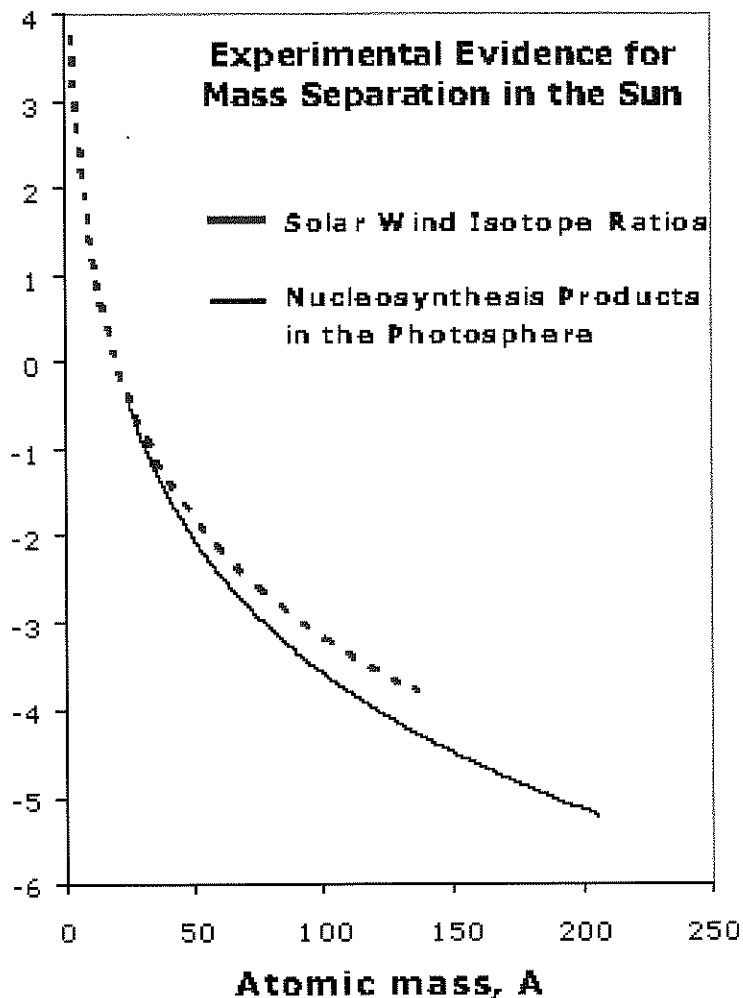
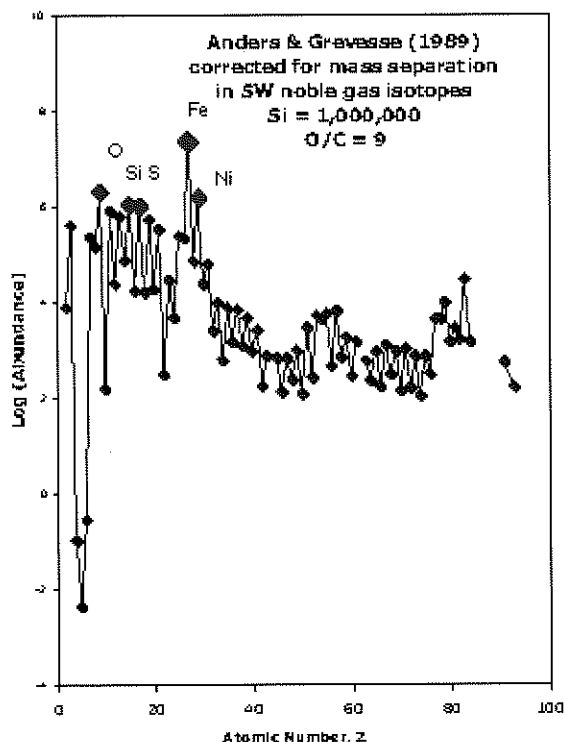
Undergraduate Research



Marcel Pleess, pictured on the left, a recent graduate of the Kepler-Gymnasium in Tuebingen, Dettenhausen, Germany, worked with Dr. Manuel this summer to solve a serious difficulty that has plagued nuclear astrophysics for decades:

"Why is the Oxygen to Carbon ratio only $O/C = 2$, when burning Helium-4 is expected to produce a much higher O/C ratio?"

Answer : "The Oxygen to Carbon ratio is $O/C = 9$ in the bulk Sun. In the Sun's photosphere $O/C = 2$ because mass separation enriches lighter elements at the Sun's surface." The composition of the bulk Sun, with $O/C = 9$, is shown on the bottom right: The mass separation they identified is shown in the figure on the bottom left:



Pictured above is Professor Yinfa Ma and his student Thomas Fennwald conducting Biosensor Research in Ma's Lab. Thomas also presented an abstract at Argonne Undergraduate Research Symposium.

Other Undergraduate Researchers

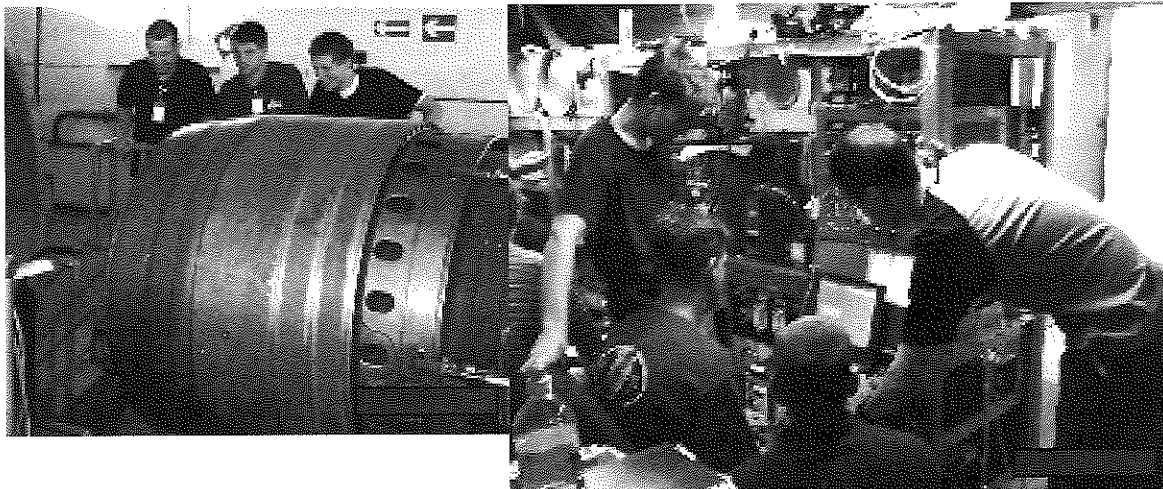
(Also see Dr. Phil Whitefield's page)

Joe Bindbeutel and Libby Cooley with Dr. Ekk Sinn
 Kyle Anderson, Kylee Hyzer, and Eric Wiedner with
 Dr. Harvest Collier
 Emma Schmitzche, Wesley Trueblood, and Michael Webb
 with Dr. Nuran Ercal
 Elizabeth Garvin and Kathryn Sandefur with Dr. Michael Van
 De Mark

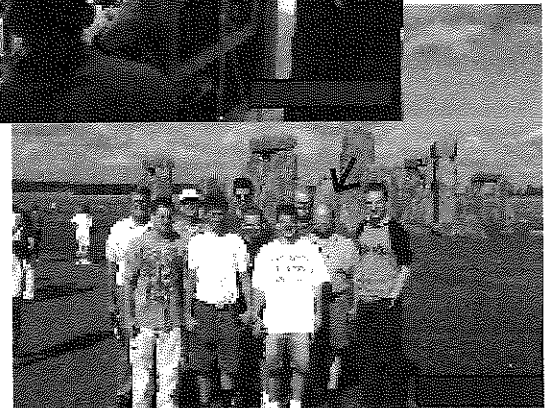
Undergraduate Research (continued)

Center of Excellence for Aerospace Particulate Reduction Research
Dr. Philip Whitefield, Director

NASA-UK MOD Collaboration Particulate Fate
through the "hot section" of a Gas Turbine Jet Aircraft Engine

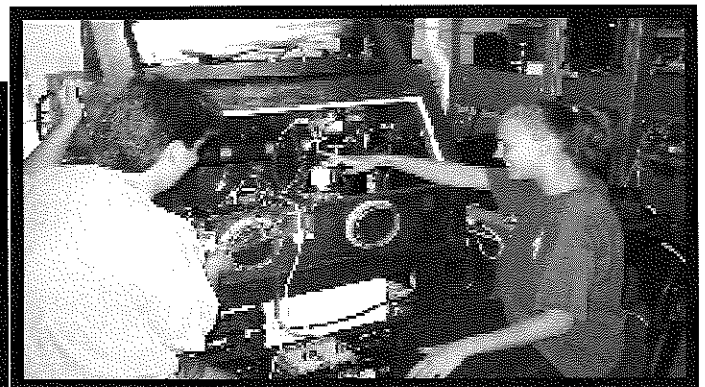
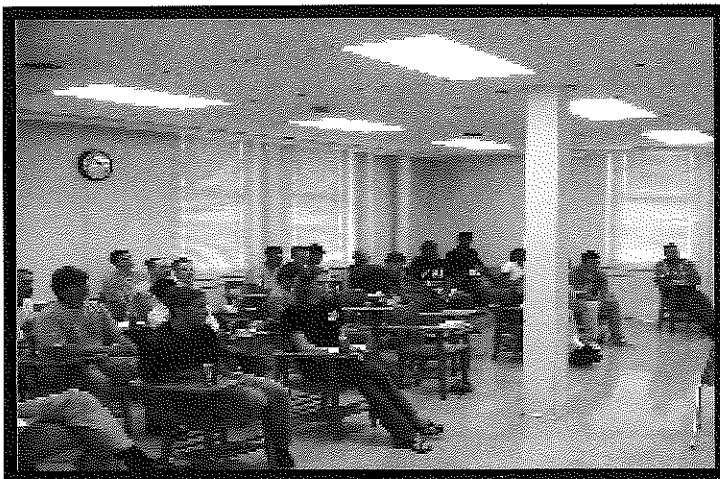


**UMR STUDENTS
IN THE FIELD
UK - Farnborough**



*Second from the right is Prof. Philip Whitefield.
Background shows the British version of Stonehenge*

COE Summer Intern Program



Chusuei Group

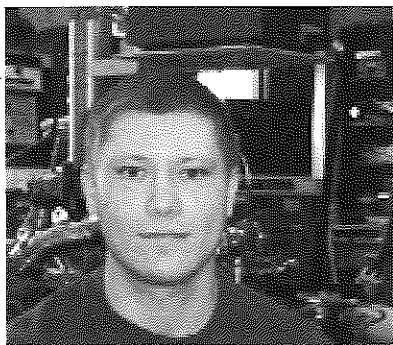
Pictured on the right is Dr. Chusuei conducting experiments at the National Synchrotron Light Source at Brookhaven National Laboratory in Upton, NY.

In 2004, Dr. Chusuei was awarded 6 cycles of beamtime (2004–2006) at the National Synchrotron Light Source at Brookhaven National Laboratory to conduct studies on “Oxianion contaminant redox and sorption reactions on Fe oxide nanoparticles.” The award was provided to help him further his Petroleum Research Fund grant and the work sponsored by the American Chemical Society.

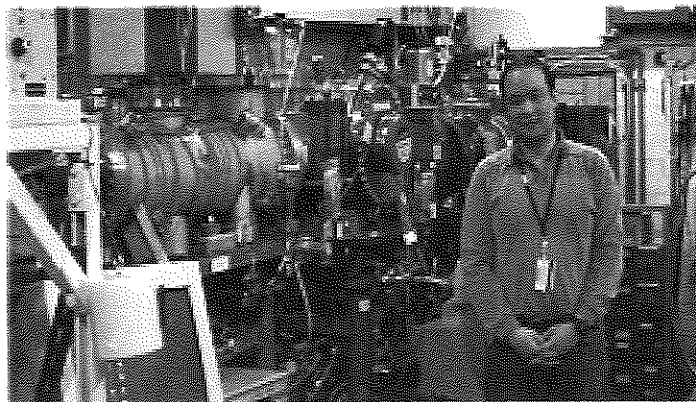
Pictured on the bottom right is Jake Armstrong, a senior, who won OURE and Sigma Xi research awards totaling \$700 in cash prizes for his work on “Reaction of Mg on a Silicate Crucible Surface,” in which he performed XPS analysis to characterize the surface species in the lab. His work will soon appear in the NSF-sponsored Journal of Young Investigators.

This fall 2004, the Chusuei group welcomes first year graduate student, Robert Hull, and Dr. Chintalapalle Ramana, Postdoctoral Fellow, to the lab. Robert received his B.S. in chemistry from the University of South Alabama and worked at Neurocrine Biosciences in La Jolla, CA prior to enrolling at UMR. Dr. Ramana completed his Ph.D. in physics from Sri Krishandevaraya University (India). Just prior to his arrival at UMR, he completed a postdoctoral appointment in the physics department with Prof. Richard Smith at Montana State University at Bozeman. He brings a wealth of expertise in the area of oxide thin-film synthesis and ion beam scattering techniques to the group.

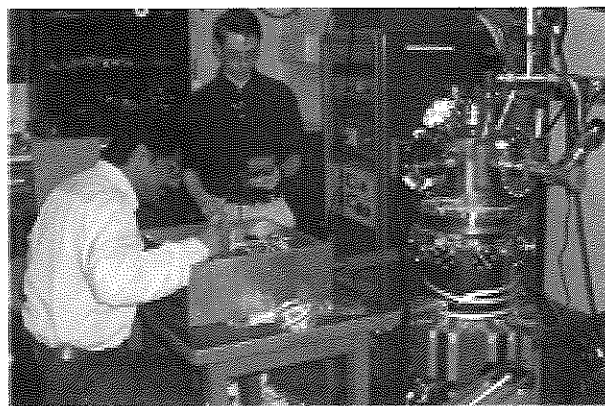
For more information on Dr. Chuseui please visit his website at: <http://web.umn.edu/~chusuei/>



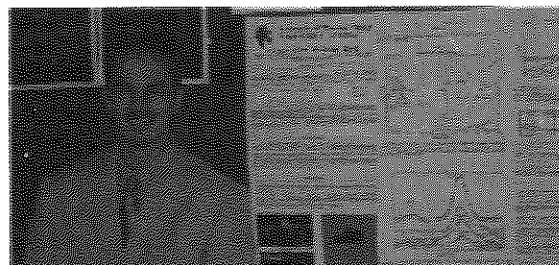
Robert Hull in front of the XPS Chamber



Dr. Chusuei at the National Synchrotron Light Source



Dr. Ramana (seated) troubleshooting the LEED with Colin Stagner (freshman) assisting.



Jake Armstrong (senior) who won OURE and Sigma Xi research awards.

Dr. Charles Chusuei's Undergraduates (OURE Program)

Vaishalee Naruka - Analysis of Mercury and Brain Tissue

Jacob A. Armstrong - Reaction of Mg on a Silicate Crucible Surface

Jake Naeger - Currently working on the Characterization of Antioxidant Lead Complexes

New teaching methods improve student grades

We are using PRS (Personal Response System) technology which consists of infrared transmitters (response cards) that are issued to the students, a receiver(s), and PowerPoint software plug-in. The instructor poses a question to the students via PowerPoint and the students respond using the transmitters. The responses are collected and assimilated instantly into graphical data, such as a pie chart, which is displayed back to the students. The result is greater student engagement and the instant assessment of student learning.

Also:

- Homework assigned is daily, collected 7 days later, graded quickly
- Reading assigned is daily, student reading notes required, collected and "graded"
- Reading questions asked at start of class and answered electronically as part of grade, serves as a method of assessing attendance ("Are you present, are you awake")
- Questions asked at intervals during class and answered electronically as part of grade, takes into account the expected audience attention span of 10-15 min.
- A weekly recitation session to revise class material, and take a short quiz which counts toward the final grade.

Involved in this effort are 5 Professors (Dr. Collier, Dr. Ma, Dr. Sotiriou-Leventis, Dr. Sinn, and Dr. Woelk, the recitation TA's, LEAD Peer Instructors, LEAD Peer Tutors, and graders.

Dr. Klaus Woelk will give a presentation on the new technology at the New Faculty Teaching Scholars (NFTS) meeting on February 20, 2005.

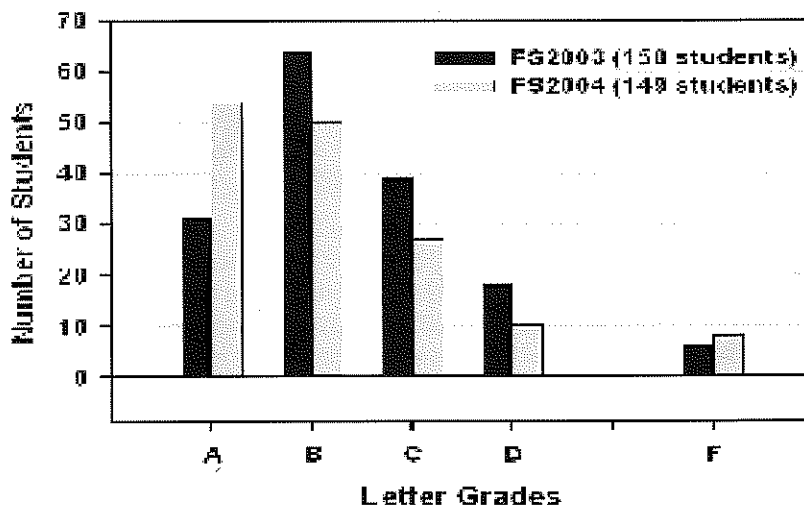
Overall, faculty and students are excited about the possibilities this technology brings to the classroom. Properly employed, PRS technology encourages student engagement, increases course material retention, and provides a timely assessment of student learning. It's no longer a guessing game when it comes to student comprehension of the content. Other department are studying our results. Plans are currently being formulated to make this product more broadly available in fall 2005.

The electronic collection of student response data is based on new software ("Turning Point") and hardware, which we extensively tested during a summer course and during self-training sessions in the classroom where it was to go live. There were expected and unexpected glitches, and these were dealt with more easily because we had prepared for them. The questions and answers display on the screen at the front of the room and are easily integrated into a power point presentation.

Faculty began with a healthy amount of skepticism about the new method, and I believe have been pleasantly surprised. It does take a large amount of man-hours to make it work.

- 1st measure of improvement: So far so good, average grade up *ca* 10% near the end of the exams ,even though course content is up *ca* 25%. Particularly, the number of very low grades (0-50%) is reduced significantly, which we attribute to having better engaged the students with the class materials
- 2nd measure of improvement: Final grades are up *ca* 20% (no curving). E.g. see graph, below. This shows data from Dr. Woelk's class, to be used in his upcoming presentation.

Comparison: Final Grades FS2003 & FS2004

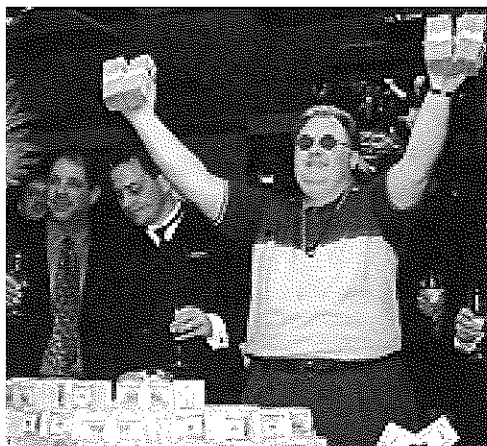


Alumni Updates

Deanne Warner Hamilton

(B.S. '90, MS '92) has accepted a Chemistry Professor position at Okaloosa - Walton College in Fort Walton Beach, Florida.

Annie Hall Milne (B.S. '76) - is involved with current activities including recording texts for an organization called Recording for The Blind & Dyslexic.

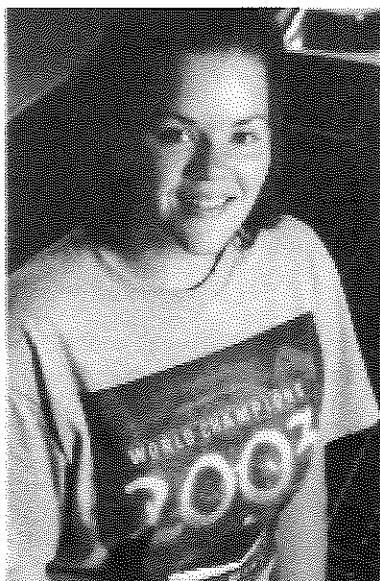


Greg Raymer's picture taken from Pokerstars.com

Frank Zvanut (Ph.D. '37) - Charter Member of Alpha Chi Sigma, passed away May 2, 2004. He received a Ph.D. in Ceramic Engineering in 1937. He wrote an award winning essay in 1927 on "Chemistry and the National Defense".

Greg Raymer (B.S. '85) - Won the first place in Las Vegas at the World Series of Poker. He lives in Stonington, CT where he is a patent lawyer at Pfizer.

Chemistry Major is President of the Solar Car Team



The UMR Chemistry Department is proud to announce that Chemistry major Stephanie Maiden is the President of the Solar Car Team. She is pictured on the left with the Solar Car. The team won World Champions in 2003 with the Solar Miner IV car. The 2003 route followed Route 66 from Chicago to Los Angeles. The team is currently in the process of building a new car, named Solar Miner V. With all of the building going on for the new car, the team is in need of sponsors and donations. You can donate online by going to the web site listed below. The next American Solar Challenge in 2005 will start in Houston, TX, and end in Calgary, Canada. Go UMR!

To find out more information on the Solar Car Team visit the web site at: <http://campus.umar.edu/solar1/index.html>



Chemistry Phonathon

April 19-21 & 24-25

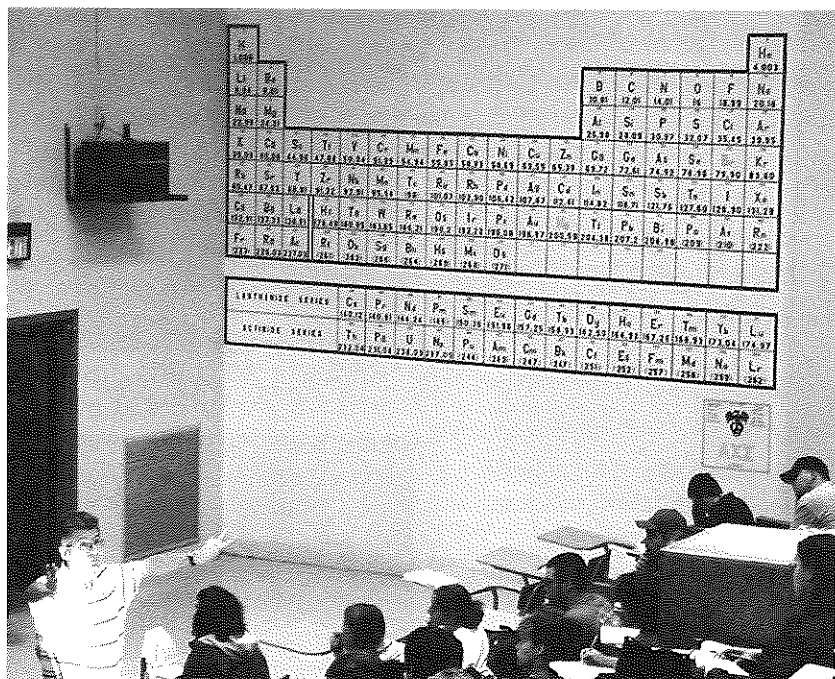


Last year's phonathon was held on April 21-27, 2004, and was a success. The UMR Chemistry Department received pledges totaling \$12,550. Thank you for your generosity.

We will begin calling our alumni on April 19, 2005. When the phone rings, please take a moment to share some of your Rolla experiences with a current student, and say "Yes," when asked to make a pledge. Taxpayer support accounts for 40% of the university's revenue, making your contribution a vital ingredient in the revenue pie. Any amount you give will be appreciated.

Make your contribution today to help our students.

Alpha Chi Sigma Paints G-3 Schrenk Hall



Alpha Chi Sigma, the professional chemistry fraternity, undertook the project of painting a periodic table on what used to be a large blank wall in G-3 Schrenk Hall. It was inspired by a large periodic table that students had painted on a wall at the University of Hull in England. In both places the result was more artistic and more practical than a large blank wall. The project spanned nine days and took over 300 man-hours to complete. Painting on the wall began on Friday, April 23. Throughout the week and especially over the weekends there were many early mornings and late nights for the AXE volunteers. At times there were workers in G-3 for more than twelve hours at a time. To claim credit for their hard work AXE painted their logo on the bottom right-hand corner of the wall. The Chemistry Department thanks the many hard-working AXE volunteers for their outstanding effort.

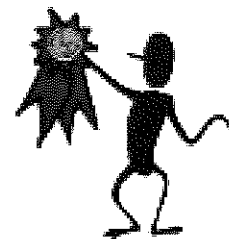
FCR Grant for Research Award Winners

Dr. Ma's Grant Proposal Awarded in 2003

"Early Cancer Screenings by Using Pteridines as Fingerprints"

Dr. Charles Chusuei's Grant Proposal Awarded in 2004

"Designing Mixed Metal Oxide Architectures for Mitigating Biofilm Surface Adhesion"



Dr. Nuran Ercal's Grant Proposal Awarded in 2002

"A New Treatment for An Old Problem: Lead Poisoning"

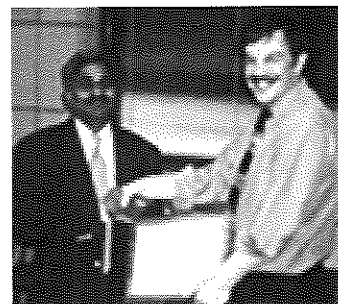
Spring Awards Banquet

April 23, 2004

The Spring Awards Banquet was held on April 23, 2004, at Zeno's. Many of the faculty and students in our department received awards. Dale Sivils was the speaker at the awards banquet that night. Dr. Nuran Ercal, pictured 3rd from the top, received the Outstanding Teaching Award for upper-level undergraduate teaching. The recipient of the Wilbur Tappmeyer Excellence in Teaching Undergraduate Award was Dr. Harvest Collier who is pictured on the top right. Pictured on right is Dr. Prakash Reddy receiving the Outstanding Teaching Award for graduate level teaching.



Dr. Collier, Dr. Sinn, & Dr. Tappmeyer



Dr. Reddy & Dr. Sinn

The recipients of the Outstanding Senior Awards were: Ramin Herati, Eric Wiedner, Wesley Trueblood, and Tonya Trudgeon. The winners of the Outstanding Junior Award were Julie Breckenridge, Stephanie Maiden, and Thomas Fennewald, who are all pictured below. The Outstanding Sophomore Award went to Madeleine Philpot. Tracie Kost and Elyse Hendrickson won the Outstanding Freshman Students award. John Simpson received the American Institute of Chemists Foundation student award. Receiving the Pietsch Distinguished Scholar Award was Ashley Bruns. On behalf of CRC Press, the winner of the 2003 Freshman Chemistry Achievement Award was Matthew Stevens. Pictured on the bottom right is Dr. Kapila presenting the Distinguished Alumnus Award to Dale Sivils.



Dr. Ercal & Dr. Sinn

The Outstanding Graduate Teaching Assistant Awards were presented to Lynell Gilbert, Zahra Afrasiabi Navan, Lijun Fan and Johnathan Harper. Congratulations to all of our winners who received awards!



Julie Breckenridge, Stephanie Maiden, Dr. Sinn, Thomas Fennewald



Dr. Kapila & Dr. Sivils

Dr. James O. Stoffer

Receives Coatings Institute Award

Dr. James O. Stoffer, a UMR Curators' professor emeritus of chemistry whose research includes finding a more environmentally friendly replacement for chrome in aircraft coatings, recently received the UMR Coatings Institute Distinguished Scientist Award for his contributions to advance research and education in the coatings field.

Stoffer received the award during the UMR chemistry department's awards banquet April 23. He is the third person to receive the award in its 12-year existence. "Dr. Stoffer has

served the coatings industry in an exemplary way through his educational efforts, high standards in research and extensive service," says Dr. Michael R. Van De Mark, director of the UMR Coatings Institute and an



Dr. Stoffer receiving the Coatings Institute Award from Dr. Van De Mark

associate professor of chemistry. "He is nationally known for his work in polymer and coatings chemistry."

He also directed the UMR Paint Short Course Program from 1985 to 1987. He also has served as a lecturer in the Coatings Short Courses at UMR for 30 years.

While at UMR, Stoffer has received five Outstanding Teaching Awards and three Faculty Excellence Awards. Also active in the community, he served for 12 years on the Rolla Planning and Zoning Commission and 24 years on the Rolla Municipal Utilities Board of Directors.

Homecoming October 15-16, 2004

The homecoming events were held this year on Friday, October 15 and Saturday, October 16, 2004. On Friday the luncheon meeting was held at Zeno's. Terry Brewer introduced the guests, Charles Chusuei, Nuran Ercal, Yinfa Ma, and Paul Nam. Terry also announced this year's FCR Award winner, Charles Chusuei. Oliver Manuel conducted an election of officers, President, Vice President, Secretary, Treasurer, and Assistant Treasurer to the FCR Board of Directors. Dr. Jay Switzer, Castleman/FCR Professor of Chemistry, reviewed the accomplishments of his research group this past year. Kay Thornton reported on plans for the Advisory Board Meetings. Ekk Sinn presented information on the Chemistry Department. Following the luncheon, the Advisory Board elected a Secretary and renewed William Shermer's membership. Listed below are the current officers and the expiration of their



Pictured from left to right are: Barbara & Phil Whitefield, Dr. Ma, Fikret & Nuran Ercal, Barbara Switzer, Arlene & Bill James, Wilbur & Marian Tappmeyer, Ruby Webb, Caroline & Oliver Manuel and Keesoo Lee at the Tenth Street Dinner House

terms of office:

Chairman, 2004, William Shermer; First Vice Chairman, 2005, Karen Beckmann; Second Vice Chairman, 2005, Kay Thornton; Secretary, 2006, Richard Matthews. Refreshments and social time with faculty and students were held prior to the Homecoming Seminar on Friday afternoon. Professor Paul Nam presented the seminar "Roller-Coaster Ride in Supercritical Fluids - More Excitement Ahead?" The dinner was held on Friday evening at the Tenth Street Dinner House with around 35 guests attending. On Saturday, Dr. Yinfa Ma and his wife, Honglan Shi, held a brunch at their home in Rolla.

For more information about the FCR, please visit their webpage at <http://www.fcr-umr.org/>.

FCR Member Thom Dunning to Lead NCSA

CHAMPAIGN, IL – The University of Illinois at Urbana-Champaign announced that Thom Dunning Jr. will be the new director of the National Center for Super computing Applications (NCSA), pending the approval of the University of Illinois Board of Trustees.

Dunning officially assumed his new position shortly after January 1, 2005. He also has been recommended for an endowed position as Distinguished Chair for Research Excellence in Chemistry and professor in the Department of Chemistry.

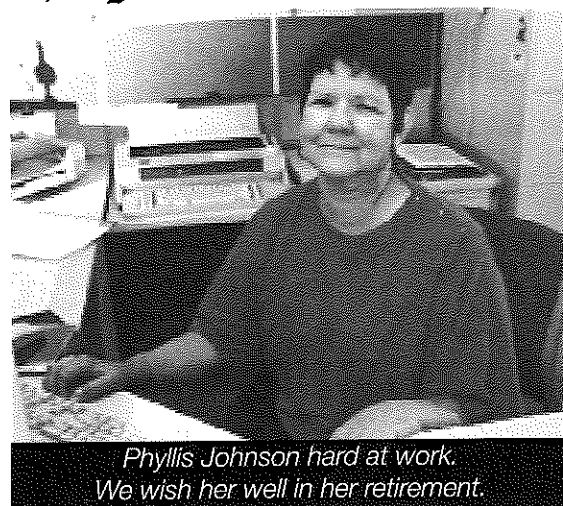
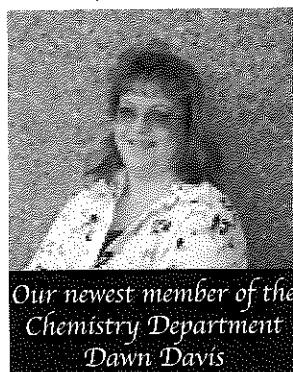
“As an accomplished, respected discipline scientist, Thom Dunning has developed research and leadership skills that are well-suited to achieving NCSA’s mission of enabling scientific discovery,” said Charles Zukoski, vice chancellor for research at the University’s Urbana-Champaign campus, home to NCSA. “Thom is a great addition to the university’s research leadership.”

Dunning comes to NCSA from Tennessee, where he was the director of the Joint Institute for Computational Sciences in Oak Ridge, a distinguished professor of chemistry and chemical engineering at the University of Tennessee in Knoxville, and a distinguished scientist in computing and computational sciences at Oak Ridge National Laboratory. Before that, Dunning was responsible for super computing and networking for the University of North Carolina System and was a professor of chemistry at the University of North Carolina at Chapel Hill.

Before going to North Carolina, Dunning was assistant director for scientific simulation in the Office of Science at the U.S. Department of Energy, on leave from Pacific Northwest National Laboratory. In that position, he was instrumental in creating DOE’s new scientific computing program, Scientific Discovery through Advanced Computing (SciDAC). SciDAC is the federal government’s first comprehensive program aimed at developing the software infrastructure needed for scientific computing.

Chemistry Department Secretarial Changes

Phyllis Johnson, longtime employee, retired in January 2004 as Senior Secretary. Phyllis worked in the Chemistry Department 36 years starting in August 1966. Peggy Tennyson started as Secretary in the Chemistry Department in October 2000. She resigned in July 2004. The Secretary position was filled temporarily by several people until Dawn Davis began in the Chemistry Department on January 3, 2005.



Dr. Ma Receives Deans Teaching Scholar Award

UMR established a new award this fall to recognize faculty who consistently demonstrate quality instruction in the classroom.

Dr. Yinfa Ma, associate professor of chemistry, College of Arts and Sciences was one of the 6 chosen for the award.

The Deans Teaching Scholar program was developed to honor faculty members for their ability to create and maintain an outstanding learning environment for students. "The award is designed to promote and encourage excellence across campus," says Dr. Harvest Collier, professor of chemistry and vice provost for graduate and undergraduate studies at UMR.

Award winners are selected by the dean of each school or college based on student course evaluations, department chair recommendations, and evidence of good teaching practices. The recipients are appointed to a three-year term and receive \$2,000 per year. The award is open to all UMR faculty members except Distinguished Teaching Professors and will be awarded annually.

Congratulations Dr. Ma!!!

Let us hear from you

mail to
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University of Missouri-Rolla
142 Schrenk Hall
Rolla MO 65409

or

fax to (573) 341-6033
or
e-mail to
<chem@umr.edu>

Name _____ Year attending UMR _____

Current activities/interests _____

Family _____

News/Plans _____

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