



UNIVERSITY OF NEBRASKA-LINCOLN



125TH ANNIVERSARY CELEBRATION



UNL Chemical Laboratory 1887

The UNL Chemistry Department is celebrating its Quasiquintennial (125th Anniversary - Since 1882). We will be presenting a short series of historical articles in our upcoming newsletters to commemorate this landmark event. The following is the first of the series by Dr. Mark Griep that we hope you enjoy!

The History of the University of Nebraska-Lincoln's Chemistry Department, Part 1

The University of Nebraska's Chemistry Department began in July 1882 when Hudson Henry Nicholson arrived to take his position as chair of the newly created Chemistry and Physics Department. Over the next 27 years, Nicholson would create one of the top Chemistry Departments in the US and transform the University while doing it. Part 1 introduces Nicholson, the first two undergraduates, and the first graduate student.

In July 1882, Hudson Henry Nicholson began his position as Chair of the University of

Nebraska Chemistry and Physics Department. Lucius A. Sherman, Professor of English, later described Nicholson as "an organizer, a man of ideas and ideals, of insistence and tact and courage" and that "by dint of his influence and vigilance and zeal...the balance of power went palpably over to the science side of the Colleges for some years to follow." Nicholson joined 11 other professors and their collections in a building called the U, the University, and later Old Main, which had been located one building away from where Hamilton Hall stands today.

Nicholson had grown up on a farm in Rushford, Wisconsin and then fought in the Civil War at age 14. In 1870, he earned a BA from Antioch College, Ohio, one of the first two coeducation colleges in the world. It must have left a strong impression since he later hired and trained women chemists when no other Chemistry Department was doing so. In 1874, he and his young wife moved to

Peru, Nebraska, where he became Professor of Natural Sciences at the Nebraska State Normal University in Peru (now Peru State) and where they stayed for eight years.

After his arrival on the University of Nebraska campus in 1882, Nicholson renovated the chemistry and physics classrooms so that he could install the apparatus and books he brought with him. In fact, several books with his signature are still in the Department. After the school year began, the student newspaper reported that a large ventilating hood had been installed above the door that "will do away with all unpleasant odors and greatly improve the sanitary condition of the laboratory."

In the summer of 1883 following his first year at Nebraska, Nicholson attended the Harvard Short Course in Chemistry taught by Charles F. Mabery from Case University. This was an important event for him for many reasons. He did enough organic chemistry work to publish a journal article, the first chemistry research published with a University of Nebraska byline. The citation is Mabery and Nicholson (1884) "XLII.—On β -Dibromdichlorpropionic and β -Bromdichloracrylic Acids" *American Chemical Journal* 6, 165-169. He also met the widow Rachel Lloyd, who was attending the summer course for her eighth year in a row. Four years later he would hire her as Nebraska's second chemistry professor. Amusingly, Nicholson's entry in the 1883 Student Bulletin now listed Harvard among his academic credentials.

In 1883 or 1884, the first two undergraduates must have begun working closely with Nicholson to earn the first two undergraduate chemistry degrees. George Bell Frankforter from Lincoln earned a BSc in Chemistry in 1886. When he earned his MA two years later,

Anniversary continued on page 15

INTRODUCING NEW CHAIR



James M. Takacs
Chair of the Department of Chemistry

7th & 8th floor building renovation and the fixes that followed and filled the role of Business Manager and HR expert due to an unexpected position vacancy. Under his leadership the department hired Drs. Robert Powers, Joe Dumais, Jason Kautz, Wonyoung Choe, Barry Cheung, Hui Li, Eric Malina, and Rebecca Lai.

Along with his administrative duties as Chair, Dr. Dussault continued his own research, successfully mentoring his students with several earning their doctorates exploring aspects of the synthesis of organic peroxides. Peroxide natural and unnatural products remain challenging (and often unexplored) synthetic targets because of the lack of suitable methodology for introduction or elaboration of the peroxide or hydroperoxide functional

groups. The Dussault group is a leader in the development of new methods for peroxide synthesis and the application of these methods to natural product synthesis.

To Dr. Dussault, "A job well done!" And to you alums, please join me in kicking off the celebration of 125 years of great chemistry from the first chemistry graduate program west of the Mississippi.

Dear Chemistry Department Alumni,

It is my pleasure and privilege to write to you. As the new Chair of the Department of Chemistry I want to announce the 125th Anniversary celebration of the Department. Please visit our Web site (chem.unl.edu) and view the many interesting artifacts there dating from 1882 when the department began. Along with my responsibilities as Chair, I will continue in my current research which is using chirality-directed metal complexation to define an exciting new strategy for preparing chiral self-assembled ligand (SAL) libraries and supramolecular catalyst systems.

A very special thanks goes out to Dr. Patrick Dussault for his leadership and hard work during his tenure as Chemistry Department Chair, from 2001 to 2007.

He guided the department through the

Highlights 2007

- Three new faculty: Drs. Hui Li (2006), Eric Malina, Rebecca Lai.
- 7 Ph.D's, 2 Master students graduated
- 17 students graduated with BS/BA degrees
- Faculty published over 150 publications, referred journals, and presented many lectures at national and international meetings at universities, government, and industrial laboratories.
- Dr. Du was promoted to the rank of Associate Professor.

In This Issue:

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Support the Chemistry Department:

If you would like more information about specific needs of the department, such as graduate and undergraduate fellowships/scholarships, award lectureships, or research instrumentation, please contact:

Amber Antholz (402) 458-1182 direct
Director of Development (800) 432-3216 toll free
aantholz@nufoundation.org

Story ideas, activities and achievements can be submitted by sending an email to tjanovec3@unl.edu. Receipt does not guarantee publication and the editor reserves the right to edit for space, clarity, grammar and style

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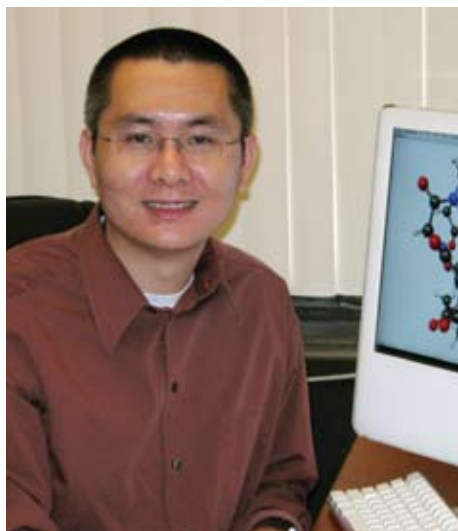
Alumni members, now you can update your contact information by visiting <http://chem.unl.edu/dept/alumnreg.shtm>

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FACULTY CHANGES

NEW FACULTY

Over the last year or so, the Chemistry Department, with great excitement, welcomed three new faculty members to the department. They were Dr. Hui Li, Dr. Rebecca Lai, and Dr. Eric Malina.



Dr. Hui Li

Dr. Li's academic background includes a BS, from Lanzhou University, China and Ph.D from the University of Iowa. He uses state-of-the-art computers to perform quantum mechanical (QM) calculations on the electronic structures of various molecular systems, including proteins and enzymes. The molecular structures and many other chemical properties such as pK_a values, reduction potentials, NMR chemical shifts, vibrational frequencies, binding energies, reaction paths and rates, can be predicted from QM calculations. Combined quantum mechanical, molecular mechanical and continuum methods are employed to investigate the structure-property relationships in biological macromolecules. New computational methodologies, strategies and algorithms are developed and computer codes are written in our research.

The reduction potentials (E^0) of transition metal ions (such as Fe^{3+} and Cu^{2+}) in metalloproteins are calculated using quantum methods, and the protein regulations on the E^0

are analyzed. Many enzymes utilize metal ions to catalyze biological reactions, and the atomic details of the catalytic mechanisms can be revealed by quantum calculations on the active sites. The change of oxidation status (electron transfer) of a metal ion often results in changes of the protonation statuses (proton transfer) of the ionizable residues (Asp, Glu, His, Tyr, Cys, Arg) in proximity. Coupled electron-proton transfer reactions in cytochrome c oxidase, a key enzyme that reduces O_2 to produce energy for many living organisms, are investigated with quantum chemical methods.

High-level quantum calculations are used to determine the intermolecular interactions and nanoscale structures of ionic liquids, atomic and molecular clusters and molecules on surfaces or in cages. Based on quantum calculations, efficient force field methods are developed and molecular dynamics and Monte Carlo simulations are performed. Dr. Li is in active collaborations with experimental and theoretical groups in chemistry and other disciplines.



Dr. Rebecca Y. Lai

Dr. Lai received her BS from California State University, Los Angeles and Ph.D from the University of Texas–Austin. Dr. Lai's research program is comprised of both fundamental and applicational aspects of biosensor research. The main objective of her research involves the design of folding-based electrochemical biosensors, with the goal of developing a portable real-time biosensor for point-of-care diagnosis. The sensing strategy is to link ligand-induced folding in biopolymers (e.g. peptides, nucleic acids) to a robust, electrochemical signaling mechanism. Unlike most optical-based biosensors, these sensors are reagentless, reusable, and insensitive to non-specific interactions of contaminants,

thus allowing them to be employed directly in realistically complex media such as blood serum and urine.

Her research also encompasses the engineering of new or improved protein scaffolds (e.g. periplasmic binding protein, calmodulin) for biosensor applications. Part of Dr. Lai's research effort is to further understand protein-electrode interactions, with the aim at improving sensor performance and stability. She is also interested in exploring various electrode materials (e.g. carbon, indium tin oxide), in particular, materials that are compatible with the fabrication of low-cost, high-quality sensor arrays.

Faculty Changes continued on page 4

FACULTY CHANGES

Faculty Changes continued from page 3

NEW FACULTY



Dr. Eric Malina

As a Professor of Practice, **Dr. Malina's** primary responsibility at UNL is teaching introductory-level chemistry; however, his scholarly interests and activities focus on better ways of teaching chemistry. He received his BS at Southwest Missouri State-Springfield and his Ph.D at Purdue. His research interests are in the area of learning in the laboratory, and specific focus has been on how instruments impact student understanding.

Dr. Malina's research typically uses the methodological framework of phenomenography (Marton, 1981) with the distributed cognition model (Salomon, 1993) in conjunction with Gibson's theory of affordances (Gibson, 1979,1982) to identify the affordances of scientific instruments

that impact students' understanding of chemistry concepts and interpretation of data. Affordances are what something provides, furnishes, or offers to someone and are fundamentally linked to the perceptions of a person in a given situation. This perspective has provided a useful framework for analyzing how people use the tools and artifacts in their environment to support their thinking and learning.

His current research is focusing on development of introductory-level chemistry laboratory activities and assessment of the impact on student understanding of concepts, learning of laboratory techniques and methods, and understanding of the nature and process of science inquiry.

DR. STEZOWSKI MEMORIAL

BY JAMIE KLEIN, DAILY NEBRASKAN



Professor John Stezowski

The University of Nebraska-Lincoln's Department of Chemistry lost a valued faculty member on December 1, 2007 when 65-year-old professor John Stezowski passed away from natural causes.

Stezowski came to the university as a chemistry professor in 1991. Before that, he was professor at the University of Stuttgart in Germany and Cornell University in Ithaca, N.Y. He received his degree in chemistry from what is now known as Case Western Reserve University in Cleveland and his doctorate in chemistry from Michigan State University.

Colleagues said Stezowski was a man of many talents who is already missed by students and faculty. Jim Takacs, the chairman of the Chemistry Department, said he will miss Stezowski's infectious smile.

A chemistry graduate student, Van Nguyen-Mai, said she was comfortable working with Stezowski, who was her adviser and mentor, from the moment they first met. She said he

made people feel comfortable and had a good sense of humor. "He gave you enough room to explore your own ideas but made sure he was close enough to give you ideas and advice if he thought you were going the wrong way," she said.

George Sturgeon, an emeritus chemistry professor and a longtime friend of Stezowski, said the late professor enjoyed European food and cooking - Stezowski was especially fond of the low-calorie apple pie he made often. Sturgeon said Stezowski encouraged people to go on social outings and participate in group events. "He was sort of an initiator of a lot of things," he said.

A Memorial Fund has been set up at the University of Nebraska Foundation in memory of Professor Stezowski. If sending a check, please make it payable to the University of Nebraska Foundation and mail to 1010 Lincoln Mall Ste 300, Lincoln, NE, 68508.

DR. CARR SAYS A RETIREMENT GOODBYE

Dr. James Carr recently retired after 41 years in the Chemistry Department. We were fortunate to have him share his memories in the following article.



Dr. Carr with Ice Sculpture of Hamilton Hall

In the fall of 1966 I arrived in Lincoln and joined the faculty of UNL Chemistry after completing my PhD at Purdue University and a post-doctoral stay at University of North Carolina. When I started, the Chemistry Department was still housed in Avery Lab but freshman chemistry labs were being held in the 501 Building. Hamilton Hall was in the early planning stages at that time. I actually served on and later chaired the building committee during Hamilton Hall construction. During my forty plus years in the chemistry department I supervised the study of 16 PhD and 22 MS graduates. My research focused on kinetics of exchange reactions of metal chelates of multidentate ligands, on the behavior of iron (VI) in aqueous solutions, and on measurements of herbicides in natural waters and their destruction through oxidation by chlorine and ozone.

For a time I served as vice-chairman of the chemistry department and for a longer time as coordinator of the general chemistry program. By my estimates I have taught around ten thousand students. Former students frequently introduce themselves when they spot me away from the university.

*They'll come up and say
"Weren't you my Chemistry teacher 20 years ago?"*

and we start a nice conversation about what they've done since then.

There is a number of awards I've received such as being a member of the UNL Academy of Distinguished Teachers, winner of the Outstanding Teaching and Instructional Creativity Award as well as the Nebraska Teaching Improvement Council's Distinguished Teacher of 2001. My textbook, "Chemistry: A World of Choices", which I co-authored has been used around the U.S. in freshman chemistry courses for liberal arts majors since 1999.

One of the many activities I enjoyed while at the University was performing exciting chemistry experiments during the department's annual Chemistry Day for high school students and on the road each year since 2001 for UNL's Big Red Road Show. The Road Show promoted the University in Omaha, Scottsbluff, and Sioux City where I would get to show high school students how interesting and fun chemistry can be.

Alan Cerveny, Dean of Admissions, has said, "Jim and his colleagues have played an instrumental role in the event's growing stature and popularity. Thank you for your wonderful support Jim."

You and your famous multicolored lab coat belong in the Big Red Road Show Hall of Fame!

Scientifically, I am now working on a quantitative analysis textbook with another professor in the Chemistry Department. I'm also working on the chemical analysis of corrosion products on sunken ships, including the USS Arizona, the Monitor, and possibly the Bon Homme Richard.

My wife Rosalind and I have begun and plan to continue more travel to various places around the world in the near future as part of my retirement. I'm looking forward to this new season of life but will miss the many relationships and conversations with students I've had the opportunity to enjoy.

James D. Carr

RESEARCH, COLLABORATIONS AND UPDATES

SCIENTISTS REPORT BREAKTHROUGH IN SPIN ELECTRONICS

BY KELLY BARTLING, UNIVERSITY COMMUNICATIONS

A UNL research group has broken ground in spin electronics by proving a magnetoresistance phenomenon on the nanoscale.

In the March issue of Nature Nanotechnology, Andrei Sokolov, Chunjuan Zhang, Evgeny Tsymbal, and Jody Redepenning, all from UNL, and Bernard Doudin, a former UNL colleague now of the Institut de Physique et de Chimie des Matériaux de Strasbourg in France, reported quantized magnetoresistance in atomic-size contacts. The UNL researchers are with the Nebraska Center for Materials and Nanoscience and the departments of physics and astronomy (Sokolov, Tsymbal) and chemistry (Zhang, Redepenning).

The researchers said the work demonstrated

that a new physical phenomenon exists and proved an early theory on quantized magnetoresistance made by a group that also included Tsymbal.

"As a theorist, I am proud that our theoretical prediction of ballistic anisotropic magnetoresistance published earlier in Physical Review Letters was confirmed experimentally by our colleagues—researchers from UNL," Tsymbal said. "We consider our achievement as the demonstration of a new quantum effect at the atomic scale."

Using an electroplating technique, the team measured the conductance of magnetic metals by examining the electrons moving across tiny constrictions in wires, under the influence of a magnetic field. This is all on the scale less than

one nanometer, or less than one 50,000th the diameter of a human hair.

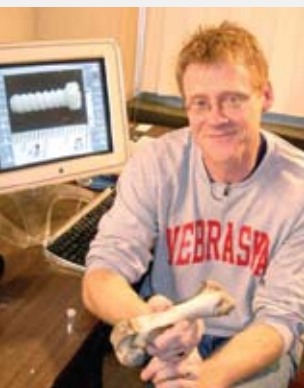
It is difficult to predict what will be the consequences of this discovery for technology, the researchers said.

A key step is to improve the reproducibility of the effect, which requires controllable fabrication of structures consisting of a few atoms. Potentially, the quantized magnetoresistance may be appealing for the future generation of ultra-small electronic devices, such as ultra small magnetic read heads, quantum switches and logic circuits, the researchers said.

The National Science Foundation and the Materials Research Science and Engineering Center supported the collaborative effort.

CHEMIST CREATES SYNTHETIC BONE

AS REPORTED IN THE SCARLET



Professor Jody Redepenning

Jody Redepenning, a chemistry professor at UNL, has discovered a one-step process that creates synthetic bone.

Redepenning has discovered a monomer that, when heated, becomes as hard as bone. That finding can lead to a biocomposite that can be used as a bone replacement, a screw, or other orthopedic

appliances or hard-tissue replacements.

The monomer, L-lactide, is made in Nebraska from the ethanol refining process.

The process has a patent pending. It was one of several technologies featured at an international BIO biotechnology conference in Chicago.

CHEMISTS PROBE INTERACTION PROCESSES

AS REPORTED IN CHEMICAL & ENGINEERING NEWS, DECEMBER 11, 2006
VOLUME 84, NUMBER 50, P. 14-19

Dr. Hage's group is using an emerging area in separations science to probe interaction processes.

An emerging area in separations science known as affinity monolith chromatography relies on immobilizing selective affinity ligands in monolithic supports and using those agents to retain analytes via specific, reversible biological interactions. Such interactions include binding between an enzyme and a substrate or an antibody and an antigen. As David S. Hage, a chemistry professor at the University of Nebraska–Lincoln, explains, the ligands can be attached to monoliths through covalent immobilization, formation of coordination complexes, or other ways.

Hage's group uses the technique to study processes that cannot be probed via conventional chromatographic methods. For example, by carrying out separations in just seconds (or faster), the team can probe equilibrium phenomena such as binding interactions between drugs and serum proteins.

Hage recently reviewed the technology and its use in bioaffinity and immunoaffinity chromatography, chiral separations, and other applications (J. Sep. Sci. 2006, 29, 1686).



Professor David Hage

PROJECT UNCOVERS DNA-LIKE ICE STRUCTURES

BY TOM SIMONS, UNIVERSITY COMMUNICATIONS

Working the frontier between chemistry and physics, Xiao Cheng Zeng has grown accustomed to discovering the unexpected through computer modeling.

Regularly, Zeng and his colleagues find new—often unanticipated—behaviors of matter in extreme environments. Their discoveries have been published several times in international scientific journals. However, those findings have been ahead of existing technology and immediate practical impact was essentially nil—until now.

Zeng and two members of his team have discovered double helices of ice molecules. Resembling the structure of DNA, the molecules self-assemble under high pressure in carbon nanotubes.

The discovery could have major implications for scientists in other fields that study protein structures that cause diseases such as Alzheimer's and mad cow. It may also help guide those searching for ways to target or direct self-assembly in nanomaterials and predict the kind of ice that may be found on Mars and moons in the solar system.

Zeng, post-doctoral student Jaeil Bai and doctoral candidate Jun Wang reported the findings in the Dec. 11-15 online edition of the Proceedings of the National Academy of Sciences.

This research was funded by the Department of Energy, the National Science Foundation, the Nebraska Research Initiative and the John Simon Guggenheim Foundation.



RESEARCH GROUP - Members of the UNL research group that discovered the nano-ice double helix are (from left) doctoral candidate Juan Wang, chemistry professor Xiao Zeng and post-doctoral student Jaeil Bai. Photo by Troy Fedderson/University Communications.

UNL CHEMISTS RESEARCH BOMB DETECTION OPTIONS

BY TOM SIMONS,
UNIVERSITY COMMUNICATIONS



In the fight against terrorism, one of the main goals of law-enforcement and security agencies is to stop terrorist attacks before they strike.

Early detection is essential, and work being done by UNL chemists could give those agencies the tools they need to detect the easy-to-make and highly explosive bombs that can be made from peroxide compounds sold at virtually any hardware store.

Gerry Harbison and Jody Redepenning are among a group of six UNL scientists involved in the research. Harbison is researching the

ability of nuclear magnetic resonance machines to target the substances. Redepenning is exploring chemical "sniffers" that would sense their presence.

Harbison and Redepenning said early research in both detection areas has shown enough promise that UNL has submitted a proposal to the Department of Homeland Security to build experimental models of each.

Other UNL chemists working on similar projects include Patrick Dussault, David Hage, Stephen DiMugno and Ronald Cerny.

CHEMICAL DETECTIVE - Chemist Gerry Harbison holds pieces of an NMR detection device. A capsule at the top end of the tube contains a small amount of the peroxide. Photo by Troy Fedderson/University Communications.

AWARDS & ACHIEVEMENTS

FACULTY & STAFF

Professor Mark Griep Griep Project Wins \$45,000 Award



Dr. Mark Griep

Dr. Mark Griep, Associate Professor of chemistry at the University of Nebraska–Lincoln, and artist Marjorie Mikasen of Lincoln, received a \$45,000 Officer Grant in August from the Alfred P. Sloan Foundation to research and develop a book and companion website to be published by Oxford University Press USA. Their project will examine the relationship between movie narratives featuring chemical themes and the real world of chemistry and explore this intersection of art and science with the goal of furthering the public understanding of science.



The New York City-based Alfred P. Sloan Foundation was founded in 1934 and makes Trustee Grants and Officer Grants in the areas of science, technology, and economic performance. Trustee Grants require approval of the board and are awarded to very few programs. Typical Officer Grants range from \$500 to \$45,000 (the maximum allowed), with very few toward the upper end of the range.

The goal of the Sloan Foundation's Public Understanding of Science program, directed by Doron Weber, is to enhance people's lives by providing a better understanding of the increasingly scientific and technological environment in which we live. In 2004, the Foundation received the National Science Board's Public Service Award citing Mr. Weber's program "for its innovative use of traditional media—books, radio, public television—and its pioneering efforts in theater and commercial television and films to advance public understanding of science and technology."



Mark Griep, assistant professor of chemistry, has studied the role chemistry has played in movies, from "It's a Wonderful Life" to more recent releases such as "Hollow Man." "You can follow chemical ideas through the history of film," he says.

Professor David Hage Top Cited Review Author 2002–2007



Dr. David Hage

Dr. David Hage has been informed that one of his papers (below) is in the "Top 20 most cited review articles" published in the *Journal of Chromatography B* from 2002 to 2007.

High-performance affinity chromatography: A powerful tool for studying serum protein binding, *Journal of Chromatography B: Analytical Technologies in the Biomedical and Life Sciences*, Volume 768, Issue 1 (2002), Pages 3-30.

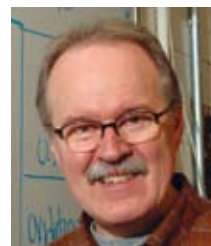
The *Journal of Chromatography B* is widely accessible by institutes worldwide. More than 800,000 full-text articles were downloaded from these journals between November 2006 and October 2007: that is more than one per minute.

We want to recognize and congratulate Dr. Hage for this noteworthy achievement!

Dr. Jason Kautz, Dr. William McLaughlin and Dr. Andrzej Rajca Certificate of Recognition for Contributions to Students



Dr. Jason Kautz



Dr. William McLaughlin



Dr. Andrzej Rajca

The UNL Teaching Council and Parents Association held an awards ceremony on February 2, 2007 recognizing faculty and staff members who had been nominated by parents of students. They choose individuals "who had made a significant contribution to their student's lives while at UNL". Honored at this ceremony were Dr. Andrzej Rajca, Dr. Jason Kautz, and Dr. William McLaughlin. They received a "Certificate of Recognition for Contributions to Students". The ceremony was followed by a reception.

In a letter to the honorees, it stated "Congratulations and thank you for your efforts to make UNL a special place for our sons and daughters to develop into well-educated young people. Your work is greatly appreciated!"

FACULTY & STAFF

Professor Xiao Cheng Zeng Elected AAAS Fellow

AS REPORTED IN THE SCARLET



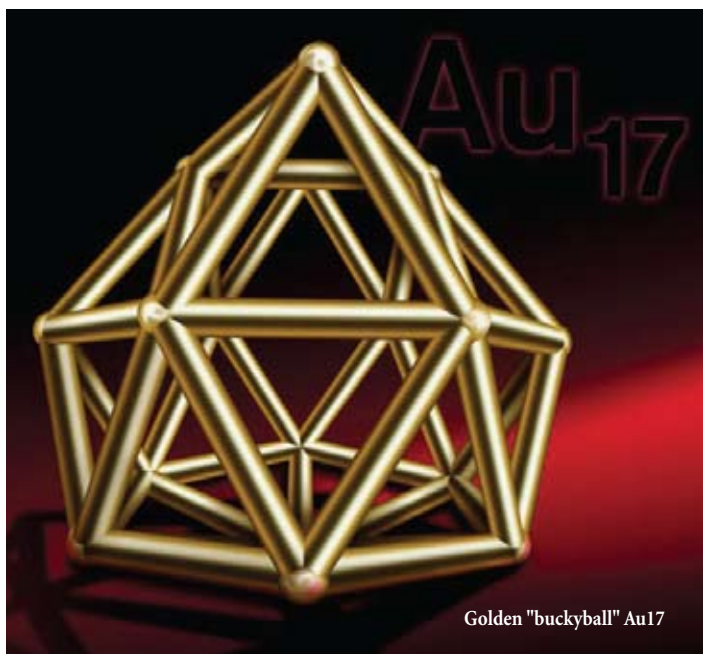
Professor
Xiao Cheng Zeng

Xiao Cheng Zeng, university professor of chemistry, has been elected a fellow of the American Association for the Advancement of Science. Election as a fellow is an honor bestowed upon AAAS members by their peers.

This year, 471 members have been awarded this honor by AAAS because of their scientifically or socially distinguished efforts to advance science or its applications. New fellows will be presented with an official certificate and a gold and blue (representing science and engineering, respectively) rosette pin Feb. 16 at the Fellows Forum during the AAAS annual meeting in Boston.

Zeng, a member of the UNL faculty since 1993, was elected in the Section on Chemistry for distinguished contributions to the field of computational and theoretical chemistry, particularly for predictions of novel structures of nano-ice, silicon nanotubes and clusters, and gold clusters. He is one of 18 UNL scientists who are AAAS fellows.

The American Association for the Advancement of Science is the world's largest general scientific society and publisher of the journal *Science* (www.sciencemag.org). AAAS was founded in 1848.



Golden "buckyball" Au₁₇

Jane Langan, DeAnna Larson, and Jonathan Skean Recipients of the APPLAUSE Award



Jane Langan



DeAnna Larson



Jonathan Skean

The APPLAUSE Program is the perfect thank you for Managerial/Professional (B-line) and Clerical/Tech/Service (C-line) staff in the College of Arts & Sciences to recognize their innovative ideas, their consistently outstanding performance, or their service above and beyond the call of duty. As in any endeavor, APPLAUSE is given for a valiant effort in a failed attempt, as well as for a brilliant achievement.

Chemistry Department recipients in the last year were:

- Jane Langan, Accounting Clerk, Purchasing Department
- DeAnna Larson, Staff Secretary III in the Recruiting Office
- Jonathan Skean, Electronic Technician with Chemistry's Electronics Shop

DeAnna Larson and Jonathan Skean have also been nominated for the Regents KUDOS award. An individual receiving a KUDOS award receives a monetary stipend, recognition at a Board of Regents meeting and an article in the SCARLET.

Applause <i>The Perfect Thank You</i>		Date _____	N
Pay to the Order of _____	\$ 200.00		
Two Hundred and ^{no} /100 _____		Dollars	
<small>(Your monetary award will be added to your next paycheck.)</small>			
Nebraska Lincoln COLLEGE OF ARTS AND SCIENCES Office of the Dean			
Memo <u>Staff Awardee</u>			

AWARDS & ACHIEVEMENTS

Ovation Award Recipients

Ashley Knott

Recipient of the
March 2007 Ovation Award



Ashley Knott

Ashley Knott, sophomore Art History and Criticism major and Chemistry work-study student, received the March College of Arts & Sciences Ovation award which

recognizes undergraduate student employees in the areas of innovation, outstanding performance, and service above and beyond the call of duty.

Jodie Schreurs

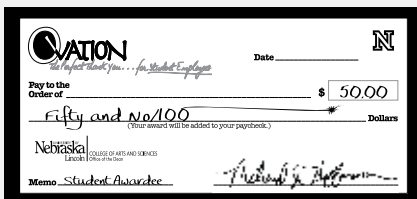
Recipient of the
April 2007 Ovation Award



Jodie Schreurs

The Ovation Award for April went to Jodie Schreurs, senior Biological Sciences major. She has been in charge of the Chemistry Department's Rec'i on Line

Quizzes "ROQ" for the past three years. Her work has had a major impact on several thousand students taking Chemistry 109, 110, 111, 113, 114, 253, and 254.



STUDENTS

Graduate

John Schiel

Congratulations to John Schiel, a third year Ph.D student (Hage Research Group) awarded 2007-08 American Chemical Society Summer Analytical Division Fellowship.

Raychelle Burks

Congratulations! Raychelle Burks, Ph.D student (Hage Research Group) authors gold catalysis article for Chemical & Engineering News (September 24, 2007, Volume 85, Number 39, pp. 87-91).

<http://pubs.acs.org/isubscribe/journals/cen/85/i39/html/8539sci1.html>

University Awards

Satya Bulusu (Zeng)

2007 UNL Outstanding Graduate Research Assistant Award

Arts & Sciences College Awards

Satya Bulusu (Zeng)

2007 College Graduate Research Assistant

Chemistry Department Awards, 2006-07

Chunling Wa (Hage)

Korean Alumni Research Assistant Awardee

Kausik Das (Rajca) and Rangan Mallik (Hage)

Research Assistant Awardees

Ross Andrews (Takacs), Efthimia Papastavros (Hage), Adrienne Roehrich (Harbison), Chris Schwartz (Dussault), and Jun Wang (Zeng)

Teaching Assistant Awardees

Shin A. Moteki (Takacs) and Weijun Shen (Berkowitz)

Cromwell Research Assistant Awardees

Chris Schwartz (Dussault)

Fuerniss Fellowship Awardees

Congratulations to all 2007 Chemistry Department Graduate Student Awardees!

CONGRATULATIONS TO GRADUATES

2007 PHD Graduates

Name	Area	Advisor	Initial Placement
Kausik Das	Organic	Rajca	Research & Development Scientist, Streck Laboratories, Omaha, NE
Christine Devries	Physical	Eckhardt	Faculty, Wartburg College, Waverly, Iowa
Sangeeta Dey	Organic	Berkowitz	Postdoctoral fellow, University of Pennsylvania-Philadelphia
Rangan Mallik	Analytical	Hage	Senior Scientist, Schering-Plough Corp., Union, New Jersey
Weijun Shen	Organic	Berkowitz	Postdoctoral fellow, Scripps Laboratory, San Diego, California
Chunjuan Zhang	Analytical	Redepenning	Postdoctoral fellow, University of Pennsylvania-Philadelphia
Xiangcheng Zhu	Organic	Du	Director of Microbiology Lab, Changsha Charisma Bioscience Co., Ltd

2007 Masters Graduates

Name	Area	Advisor	Initial Placement
Sike Chen	Analytical	Hage	Avena Pharmaceutical Company
Evans Hurley	Inorganic	Choe	SSCI Company, Lafayette, Indiana

Undergraduate

Meghan Sedlacek

Congratulations to Meghan Sedlacek, senior Chemistry major chosen for Phi Beta Kappa honor society. Phi Beta Kappa is the oldest and most respected honorary society in the United States with chapters at 270 of

the foremost institutions of higher education across the country. The organization recognizes and encourages a commitment to excellence in the liberal arts.

2007 Chemistry Major Graduates

Joanne Antoine, BS	Brandon Michael Johnson, BA
Prashant Bajaj, BS	Nancy Anh Nguyen, BS
John William Bowman, BA	Jeremy Jae Obermeier, BS
Tori Lynn Cunningham, BA	Ngoc-Thao Thi Phan, BS
Sara Duhachek, BA	Meghan Ann Sedlacek, BS (with high distinction)
Pok Lun Fu, BS	Christopher Aaron Stevens, BA
Toan Ngoc Ha, BS	Courtney Beth Story, BS
Christine Ella Hay, BS (with distinction)	Tuan Tran, BS
Elliot Hohn, BA	

ALUMNI FOCUS

REMEMBERING OUR OUTSTANDING ALUMS

The UNL Chemistry Department has had its share of quality alums, starting with Dr. Rachel A. Lloyd who was a woman of many firsts being the first woman to publish a research article in Organic Chemistry, the first woman to earn a Ph.D. in Chemistry (University of Zurich, 1886), and the first woman in the world to become a chemistry professor—at the University of Nebraska.

Dr. Clifford S. Hamilton was the department's first research star. He was a faculty member during the late 1920's through the 1960's and trained over 120 graduate students. He studied organic arsenic compounds and later antimalarials. One of the drugs he created, Arsphenamine, until very recently, provided the best cure for syphilis.

One of our most famous graduate students is Dr. Donald J. Cram. He shared the Nobel Prize in 1987 with two others for their creative approaches to organic synthesis.



Dr. Kerry A. Clark

In an effort to continue honoring noteworthy alums we are featuring Dr. Kerry A. Clark in this newsletter. She received her B.S. in Chemistry from the University of Wisconsin–Madison in 1996 and her Ph.D in 2001 from the University of Nebraska–Lincoln under advisor Professor Adrian George, current Vice Chair of the Chemistry Department. She worked in Dr. George's lab, as a synthetic inorganic chemist, putting organic ligands around metal centers of iron, tin and

ruthenium. Her thesis was titled: "Synthesis and Characterization of Stable Fe(IV), Sn(IV) and Ru(IV) Thiatriane Complexes".

There are lots of places and events Dr. Clark remembers about graduate life, Lincoln, and UNL.

"I do miss the football games and the sea of red and white, the beer at Lazlos, the cheap wings at the N-Zone, no traffic, small town-feel, Midwest folks and their slower pace of life. And oh...the good, inexpensive beef!"

"I made really close friends there at UNL with people I still keep in touch with very frequently."

"When you're in grad school you spend a lot of time with classmates that become good friends. Lots of coffee, pizza and homework assignments. Those friends get you through the ups and downs of grad school...when you fail a cume, bomb an exam, ARE SICK AND TIRED OF GRADING CHEM 109 EXAMS INTO THE WEE HOURS OF THE MORNING, when the research just isn't working or when you just need a break. The

ups and downs of getting through the OPO were best shared over a pint at Crane River."

"And of course I can't forget the "Whoo-hoo" bell in Dr. George's lab."

As Dr. George explains it was a variety of cowbells strung together that would ceremoniously be rung in celebration anytime there was a success in the lab!

Her time at UNL prepared her well for her job now as a rocket scientist. She currently works for the US Navy at the Naval Surface Warfare Center–Indian Head Division, just South of Washington D.C. Her first job on this operational Navy base was to design synthetic pathways to new primary explosives. The second position she held was as a manager of the Applied Analytical Laboratory on base. She managed a group of 15 chemists that did routine analytical characterization of explosives manufactured. Now, Dr. Clark is a program manager assessing the safety, reliability and performance of Navy fleet weapons.

"The navy is unique in that we are the only branch of the armed forces that sleeps with their ordnance. No mishaps on my watch!"

Dr. Clark says, "Grad school was great in preparing me to communicate my scientific thoughts in any forum with colleagues and peers."

"I learned to be innovative with creative research ideas and forward-thinking with possible research applications."

The base she was assigned to in 2002 received the Meritorious Unit Commendation for the work she and others did on "Bunker Buster" bombs used in the caves in Afghanistan. Dr. Clark is also a co-applicant on a patent.

Her two girls, Sarah, 10 months, and Mia 3 years old, also keep her busy. She is an active triathlete and soccer fanatic.

We are very proud of this past UNL Chemistry Alum and congratulate her on the successes she has had since graduating from the department.



GRADUATE STUDENT FOCUS

IT'S HAPPENING IN CHEMISTRY AT NEBRASKA

When you mix an outstanding mentor and an outstanding student, the results are award-winning research and personal success. Fourth year Ph.D student John Schiel, 2007-2008 ACS national graduate fellow, with his mentor, analytical chemistry professor David Hage, 2005 UNL Excellence in Graduate Education Awardee, have invented new techniques to study binding interactions in biological processes that cannot be probed via conventional chromatographic methods. (See Hage Research article (p. 6) for more information)

John has been in the Hage research group since 2001 when he started as an undergraduate and later participated in the UCARE program. In 2004 he graduated with his BS in chemistry from UNL

"Chemistry 109/110, taught by Dr. McLaughlin, changed my mind from pursuing a biology degree. I realized that chemistry was the way to go," says John.

"Dr. Hage's research fit with my interests by coupling analytical chemistry, biochemistry, and immunology so I continued on as a PhD student in the Hage group after graduation. I've come to learn and really appreciate the medical bearing that advances in these fields have on human life."

"My collaborations with multiple UNL professors, other U.S. Institutions, and professionals in industry, many of whom possess different scientific backgrounds, have proven very rewarding."

"These experiences have brought to light the significant advances that can be made through collaborative efforts, and serve as the model for my future. My ambition is to continue analytical research into biochemical problems such as the HIV epidemic, Alzheimer's disease, and Multiple Sclerosis."

John has received numerous awards, scholarships, fellowships, and travel grants as a graduate student as well as having co-authored seven publications. His thesis is titled "Clinical and Pharmaceutical Applications of High Performance Affinity Chromatography"

John Schiel and Dr. David Hage are award-winning examples of first rate science and outstanding graduate training in chemistry at UNL.

MENTORING



Award winners Dr. David Hage, professor and mentor, and John Schiel, third year PhD student.

INVITED LECTURESHIPS, TALKS AND PUBLICATIONS

LECTURESHIPS & TALKS

Robert Powers

- 49th Experimental Nuclear Magnetic Resonance Conference, Pacific Grove, CA, March 9-14, 2007 "Protein Functional Annotation using NMR Ligand Affinity Screens."
- 23rd International Conference on Magnetic Resonance in Biological Systems, San Diego, CA, Aug. 24-29, 2008, "Protein Functional Annotation using NMR Ligand Affinity Screens."

Gerard Harbison

- American Crystallographic Association Annual Meeting in June 2008.
- Experimental NMR conference in 2007
- Rocky Mountain Conference on Analytical Chemistry in 2007

Hideaki Moriyama

- Nakachi M, Terry PM, Schirber B, Matsumoto M, Moriyama H. 2007. Proteomics on sperm for understanding sperm activation in the sea star. Society for Molecular Biology and Evolution, June 24-28, Annual Meeting at Dalhousie University, Halifax, Nova Scotia, Canada.

David S. Hage

- David S. Hage, "Analysis of Environmental Contaminants by Rapid Chromatographic Immunoassays and On-Line Immunoextraction", 2006 Fall National Meeting of the American Chemical Society, San Francisco, CA, September 2006.
- Presentation manuscript included in the following book:
Annette Moser, Mary Anne Nelson and **David S. Hage***, Environmental Applications of Immunoaffinity Chromatography, in: *Immunoassay and Other Bioanalytical Techniques*, J. Van Emon (Ed.), Marcel Dekker: New York, 2007.

Marjorie A. Langell

- Marjorie Langell (Charles Bessey Professor of Chemistry) was invited to speak at the San Luis IV International Symposium and Summer School on Surfaces, Interfaces and Catalysis, in Cuernavaca, Mexico from April 14-23, 2007 at the CIICAP (Centro de investigaciones en Ingenieria y Ciencias Aplicadas) of the UAEM (Universidad Autonoma del Estado de Morelos). She presented an invited talk in the symposium, lectured in the summer school, part of the organizing committee, and a guest editor for the conference proceedings due out in December. This conference was aimed at bringing together theorists and experimentalists working in the area of surface chemistry, primarily in connection with catalysis, to facilitate international communication particularly among scientists working in North and South America, and to expose students from these areas to leading international scientists.

Stephen G. DiMagno

- Fluorine Division Award symposium at the 2008 Spring ACS meeting in New Orleans.
- "Reagents and Techniques for Rapid Nucleophilic Fluorination" *NIH/NIDDK Laboratory of Bioorganic Chemistry, Bethesda MD*, September 28, 2007.
- "Recent Advances in Nucleophilic Fluorination" plenary lecture given at the 8th *Winter Conference in Medicinal & Bioorganic Chemistry, Steamboat Springs, CO*, January 22, 2007.
- "Fluoride Relay: a new concept for rapid preparation for fluorinated aromatic compounds from KF" *Eighteenth Winter Fluorine Conference held by the Division of Fluorine Chemistry, St. Petersburg, Florida*, January 13, 2007.

Barry Cheung

- 63rd American Chemical Society Southwest Regional Meeting, Lubbock TX, November 2007. "Wettability of structurally stabilized zirconia" *Cheung, C.L., Wang, G., Zeng, X.C., Sabirianov, R.F., Mei, W.N., Varma, S. & Namavar, F. (Invited oral)

Jim Carr

- Division of Environmental Chemistry at the 232nd ACS National meeting in San Francisco in September 2006, "Kinetics and Product Identification of Oxidation by Ferrate(VI) of Water and Aqueous Nitrogen-Containing Solutes."

Mark A. Griep

- "DNA Replication Proteins as Antibiotic Drug Targets" by Mark Griep, invited lecture at the Chemistry and Biochemistry Regional Conference, University of Nottingham, UK, on March 11, 2008.
- "How to Use Movies in the Chemistry Classroom" by Mark Griep, invited lecture in the Teaching Chemistry Using Popular Media Symposium of the 20th Biennial Conference on Chemical Education at Indiana University, Bloomington, Indiana, on July 27-31, 2008.

A SELECTION OF PUBLICATIONS FROM 2007

A type III effector ADP-ribosylates RNA-binding proteins and quells plant immunity

Zheng Qing Fu, Ming Guo, Byeong-ryool Jeong, Fang Tian, Thomas E. Elthon, **Ronald L. Cerny**, Dorothee Staiger, and James R. Alfano *Nature*, 2007, 447(7142), 284-288.

Atomic motion in ferromagnetic break junctions - Response

A. Sokolov, C. Zhang, E. Y. Tsymbal, **J. Redepinning**, and B. Doudin, *Nature Nanotechnology*, 2007, 2, 522.

Single-Walled MoTe₂ Nanotubes

Xiaojun Wu, Zhanping Xu, and **X. C. Zeng**, *Nano Letters*, 2007, 7(10), 2987-2992.

Production of Dihydroisocoumarins in *Fusarium verticillioides* by Swapping Ketosynthase Domain of the Fungal Iterative Polyketide Synthase Fum1p with that of Lovastatin Diketide Synthase

Xiangcheng Zhu, Fengan Yu, Xing-Cong Li, and **Liangcheng Du**, *Journal of the American Chemical Society*, 2007, 129(1), 36-37.

"Cassette" In Situ Enzymatic Screening Identifies Complementary Chiral Scaffolds for Hydrolytic Kinetic Resolution Across a Range of Epoxides

Sangeeta Dey, Douglas R. Powell, Chunhua Hu, and **David B. Berkowitz**, *Angewandte Chemie International Edition*, 2007, 46(37), 7010-7014.

Developing web-based, pedagogical content coursework for high school chemistry teachers

David W. Brooks, John P. Markwell, **Marjorie A. Langell**, Randy Emry, Kent J. Crippen, Helen B. Brooks, Amjad Abuloum, and Karen C. Cohen, *Journal of Chemical Education*, 2007, 84(11), 1861-1865.

PDB2PQR: Expanding and upgrading automated preparation of biomolecular structures for molecular simulations

Todd J. Dolinsky, Paul Czodrowski, **Hui Li**, Jens E. Nielsen, Jan H. Jensen, Gerhard Klebe, and Nathan A. Baker, *Nucleic Acids Research*, 2007, 1-4.

Use of NMR Metabolomics to Analyze the Targets of D-cycloserine in *Mycobacteria*: Role of D-Alanine Racemase

S. Halouska, O. Chacon, R. Fenton, D. Zinniel, R. Barletta, and **Robert Powers**, *Journal of Proteome Research*, 2007, 6(12), 4608-4614.

Triplet (S = 1) Ground State Aminyl Diradical

Andrzej Rajca, Kouichi Shiraishi, Maren Pink, and Suchada Rajca, *Journal of the American Chemical Society*, 2007, 129(23), 7232-7233.

Thermal stability of nanostructurally stabilized zirconium oxide

F. Namavar, G. Wang, **C.L. Cheung**, R.F. Sabirianov, X.C. Zeng, W. Mei, J. Bai, J.R. Brewer, H. Haider, and K.L. Garvin, *Nanotechnology*, 2007, 18, 415702-415707.

Effect of Molecular Crowding on the Response of an Electrochemical DNA Sensor

Francesco Ricci, **Rebecca Y. Lai**, Alan J. Heeger, Kevin W. Plaxco, and James J. Sumner, *Langmuir*, 2007, 23(12), 6827-6834.

Fluoride relay: A new concept for the rapid preparation of anhydrous nucleophilic fluoride salts from KF

Haoran Sun and **Steven G. DiMagno**, *Chemical Communications*, 2007, 528-529.

Computer Simulations and Analysis of Structural and Energetic Features of Some Crystalline Energetic Materials

Craig J. Eckhardt and Angelo Gavezzotti, *Journal of Physical Chemistry B*, 2007, 111(13), 3430-3437.

Environmental applications of immunoaffinity chromatography

Annette Moser, Mary Anne Nelson, and **David S. Hage**, *Immunoassay and Other Bioanalytical Techniques*, 2007, 337-356.

Myricetin inhibits *Escherichia coli* DNA B helicase but not primase

Mark A. Griep, Sheldon Blood, Marilyn A. Larson, Scott A. Koepsell, and Steven H. Hinrichs, *Bioorganic & Medicinal Chemistry*, 2007, 15(22), 7203-7208.

Anniversary continued from page 1

I believe he became the first chemistry graduate west of the Mississippi River. His handwritten Master's thesis titled "The economic value of limestones of southeastern Nebraska" is the earliest thesis in the University's archives. This topic was probably chosen because so



H.H. Nicholson
in 1895 Student Yearbook

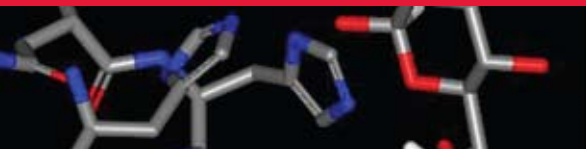
many of Lincoln's earliest buildings, including its first Capitol, had been constructed using substandard limestone. After Frankforter graduated, he took a position as Professor and then Dean of

The University of Minnesota's new School of Chemistry. His cousin or nephew C. J. Frankforter earned his chemistry degrees at Nebraska a few years later and became a faculty member here, working in the area of industrial chemistry.

H. Elton Fulmer earned his Chemistry BA in 1887 and became a technician in the Experiment Station Laboratory. Nicholson relied upon him to analyze the samples sent by Nebraska citizens, to teach the odd course, and to work the sugar beet fields. In 1894, he joined the Chemistry faculty at Washington State College, ultimately becoming its Head, and later the Washington state chemist. His brother C. A. Fulmer served as Chancellor of Wesleyan University in Lincoln.

In summary, Nicholson came to the University with his chemistry books, apparatus, and a vision. During his first two years, he appears to have taught all of the classes in chemistry and physics during the academic year and spent his summers improving his chemical knowledge and credentials. In part 2, we'll see that his fourth and fifth years in the Department were filled with the planning and construction of the second building on campus and hiring of the University's second chemistry professor so that he could begin the University's first non-service research program.

WHAT'S HAPPENING IN **CHEMISTRY**



WWW.CHEM.UNL.EDU

IT'S CHEMISTRY'S GREAT CHILI COOK OFF!

What started as a good idea a few years ago has evolved into a favorite tradition by staff and faculty of the Chemistry Department. Each year competition for the best chili is held in the fall. Judges this year were from KFOR radio station, Lincoln Journal Star, the UNL Athletic Department, and the Dean's office. The coveted wooden spoon awards were given to winners in 6 categories including the "Most Unique" and "Spiciest". Of course chili recipes were swapped except those secret ones which will continue to win the big prizes in the years ahead!



UNL OFFICE DISPLAY WINNER

Congratulations go to the Chemistry Department's Resource Center for being this year's winner of UNL's 2007 Homecoming Office Display Contest. The theme was Big Red Studios: A Tribute to Johnny Carson.



CHEMISTRY HELPS OUT WITH HOMECOMING PARADE

UNL's Homecoming Parade Committee requested volunteers from Chemistry to help provide judges and drivers for candidates in the 2007 Homecoming Royalty Court. This is the second year that Chemistry faculty and staff have participated since the Parade was reinstated two years ago after a 20 year absence.



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