



## Celebrating 125 Years of Great Chemistry — Historical Perspectives (PART 3)

BY MARK A. GRIEP, MARCH 2009



"Beets from Sugar" cartoon showing Nicholson and Lloyd leaning against lab bench, two boys converting beets into sugar, and a student photographs dancing glassware while the lab goes up in flames, from 1892 Student Yearbook

Between 1887 and 1892, the University of Nebraska's chemistry department rose to prominence as one of the Top Chemical Research programs in the United States. The department's first two professors achieved this feat by focusing on beet sugar agriculture, industry, and instruction. Before 1887, Nicholson obtained funding and supervised the construction of a new building called the Chemical Laboratory by saying he would develop beet sugar agriculture. He argued that

this would be good for Nebraska's farmers and for the future analytical chemists he would train to analyze beets in the factories.

During the 1887 and 1888 seasons, Nicholson and Lloyd's studies were funded by the State of Nebraska. After that, they were funded through the Hatch Act, which passed in 1887. This Act funded agricultural experiment stations and land-grant colleges. It also specified that the results of such work had to be reported in bulletins at least once every three months so that farmers could reap benefits immediately. In all, there were 11 bulletins published describing the University's sugar beet work.

In other developments, German immigrant farmers in Grand Island had already proven their soil was quite suitable for sugar beets and had even made one attempt to raise funds to build a factory. In Spring 1888, Nicholson sent 100 pounds of USDA sugar beet seeds to Grand Island where they were distributed to 70 or 80 farmers in the surrounding area. The beets grew well and were sent for analysis to Dr. Rachel Lloyd at the University, the USDA, and three labs in Germany. All of them reported that the beets contained a promising amount of sucrose. Lloyd presented a summary of her results to the Nebraska Board of Agriculture on September 14, 1888.

Lloyd measured the sugar content as follows: she ground up a portion of the sugar beet, added basic lead acetate to precipitate the acids, filtered to remove the solids, used a saccharimeter to determine the sucrose content, and then used Fehling's reagent to determine the glucose content. Each sugar beet was assayed for sucrose content as a percent of total weight, clarified solution, and solids. The amount of sucrose per total solids

demonstrated purity because the water content was variable while the solid content was less so. At minimum, a sugar beet had to contain over 12% sucrose per total weight to have the potential to be profitable. The results from the first year showed that 31% of the beets contained over 12% sucrose per total weight.

To demonstrate that the first season was not a fluke and to test more parts of the State, the 1889 season involved about 500 farmers along the new railroad lines that paralleled the Platte River. That summer, Nicholson and senior undergraduate Thomas Herbert Marsland (B.Sc. 1890) took the train to central Nebraska where they collected soil samples from many of the fields in which the sugar beets were being grown. The Union Pacific participated by allowing Nicholson and Marsland to travel without charge. Once again, the beets grew well and, in August, Dr. Lloyd taught Marsland how to analyze for sugar content. Beets were again also sent for analysis to the USDA labs in Washington, DC and the three German sugar labs. With better attention to growth conditions, 72% of the beets contained more than 12% sucrose with good yields and reasonable costs per acre. These results exceeded those in either France or Germany. They also found that the beets grow best in light, sandy, loamy slightly alkaline soil and worst in strong clay soil. After the Experiment Station Bulletin describing this work was published, farmers across the State began clamoring for beet sugar factories to be built in their communities. By December 1889, the citizens of Grand Island had collected almost \$100,000 and made several commitments to induce to the Oxnard Beet Sugar Company

*History continued on page 10*

# MESSAGE FROM THE CHAIR



James M. Takacs  
Chair of the Department of Chemistry

Dear Chemistry Department  
Alumni and Friends,

It seems to me that chemistry as a modern scientific discipline is the study of science centered at the molecular level. As other traditional scientific disciplines seek molecular-level solutions to their most important problems, the relevancy of chemistry to topics often associated with the traditional life sciences (for example, biology, medicine, plant and animal science, etc.) and those associated within the domains of physics or engineering (for example, materials science, energy science, environmental science, etc.) only increases. Perhaps this, in part, explains why enrollments in basic chemistry courses at UNL continue to rise.

The department is committed to *excellence* and to improving its national and international research rankings

and its stature within the scientific community. A series of discussions and faculty retreats over the past 18 months led to formulating the following three initiative statements for the department.

- **Nanomaterials for Mesoscale Devices.** *An interdisciplinary initiative focusing on the theory, synthesis and application of nanomaterials toward the engineered multi-dimensional assembly of materials into controllable machines and sensors.*
- **Carbon Neutral Energy Science.** *An interdisciplinary initiative focusing on carbon neutral energy cycles using non-traditional materials, catalysts and biorenewable fuel sources for energy production and storage beyond ethanol.*
- **Macromolecular Assembly.** *An interdisciplinary initiative focusing on fundamental properties defining and modulating macromolecular interactions, assembly, and function.*

The three initiative statements describe research focus areas addressing timely and important problems in which the department has a presence and a competitive advantage. Each affords an opportunity to use additional resources to take a leadership role on campus to develop signature programs of national and international prominence. They form the core of the department's *Strategic Plan for Chemistry Excellence*, maintaining strength in basic research while encouraging and enabling contributions to the interdisciplinary fields and to important applied problems.

Jim Takacs  
Bessey Professor and Chair of Chemistry

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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 [develeth2@unl.edu](mailto:develeth2@unl.edu). Receipt does not guarantee publication and the editor reserves the right to edit for space, clarity, grammar and style.

**Editor and Writer** Terese Janovec and Dodie Eveleth  
**Contributing Writers** Professor Mark Griep, Jeff Bunker, and University of Nebraska Foundation  
**Designer** Stephanie Severin

## Editorial Correspondence email:

[develeth2@unl.edu](mailto:develeth2@unl.edu)  
or write Dodie Eveleth  
University of Nebraska—Lincoln  
545 Hamilton Hall  
Lincoln, NE 68588-0304  
Phone: (402) 472.5312

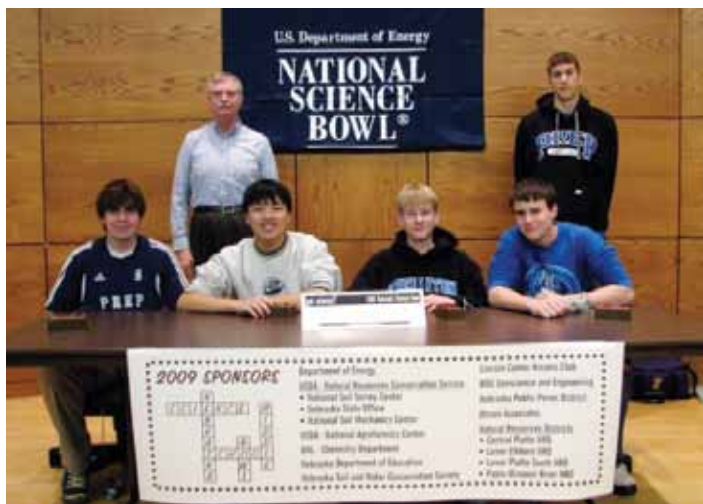
## Updates:

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

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# OUTREACH

## DEPARTMENT HELPS HOST HIGH SCHOOL SCIENCE BOWL



Every year, the USDA Natural Resources Conservation Service (NRCS) coordinates the Nebraska High School Science Bowl in conjunction with the University of Nebraska–Lincoln chemistry department. Over 75 volunteers were recruited by NRCS to help run the Nebraska High School Science Bowl.

This year, Creighton Preparatory School was the winner of the 15th annual Nebraska High School Science Bowl held Saturday, Feb. 7, 2009, at the University of Nebraska–Lincoln. The Science Bowl is a fun, fast-paced academic competition that tests students' knowledge in math and science. A total of 39 teams from across the state participated. The U.S. Department of Energy will provide an expense-paid trip for the team where they will represent Nebraska in the National Science Bowl competition in Chevy Chase, Maryland.

Participants from Creighton Preparatory School won the annual Nebraska High School Science Bowl in February.

## CHEMISTRY DEPARTMENT PARTICIPATES IN WOMEN IN SCIENCE CONFERENCE



High school women from all around Nebraska come to Lincoln for the Women in Science Conference. Photo Courtesy of KOLN/KGIN.

The chemistry department participated in the 11th Annual Women in Science Conference, February 20-21, held in Lincoln. The purpose of the conference was to provide career information and role models to Nebraska high school sophomore and junior women who want to:

- Explore their interest in science careers
- Interact with career and academic professional women in science
- Meet current women science students
- Meet other high school women from across Nebraska and the region who are interested in science
- Discover countless professions as diverse as biologists, geologists, engineers, food scientists, computer scientists, and those in the medical fields

Dr. Robert Powers' research group provided information about chemistry and were part of some of the following activities offered to participants:

- Panel discussions with professional women who are working in various science careers
- Hands-on chemistry demonstrations
- Lunch with current women students to learn of their experiences and expectations
- Tour of a local hospital to observe people at work
- Workshops focusing on career opportunities

High school participants were selected by their teachers based on interest and aptitude.

# FACULTY AND STAFF CHANGES

## FACULTY PROMOTION

BY JEFF BUNKER

### Pleased to Announce



Dr. Robert Powers

We at the chemistry department are pleased to announce the tenure of Dr. Robert Powers and his promotion to associate professor. Dr. Powers received his B.A. in chemistry from Rutgers University in 1984 and completed his Ph.D. at Purdue University in 1989. After completing a post-doctoral fellowship at the National Institutes of Health from 1990-1993, he worked in the pharmaceutical industry for ten years. Dr. Powers was an associate director at Wyeth Research before arriving

at UNL in 2003. Dr. Powers holds seven patents, has published over 70 journal articles, and has benefitted from research support from the American Heart Association and the National Institutes of Health. His research specializes in the development of techniques using nuclear magnetic resonance (NMR) to screen for new drug leads, to monitor *in cell* drug and protein activity, to assign protein functions and to rapidly generate protein-ligand structures. These methodologies are enabling the next generation of drug discovery and are addressing the diminishing innovation-productivity of the pharmaceutical industry.

Dr. Powers has taught several undergraduate and graduate courses in analytical chemistry since coming to UNL in 2003, and he has served on or chaired numerous department committees. Dr. Powers is truly an asset to the chemistry department, and we congratulate him on his tenure and promotion.



Dr. Robert Powers and his research group focus on the application of NMR to understand the function of proteins and design in structure-based drugs.

### Proud to Announce



Dr. Jody Redepenning

The department is proud to announce the recent promotion of Dr. Jody Redepenning to full professor. Dr. Redepenning received his B.A. from Concordia College in Moorhead, Minnesota in 1980. After receiving a Ph.D. from Colorado State University in 1985, he did postdoctoral work at the California Institute of Technology. Dr. Redepenning served as an assistant professor at Rensselaer Polytechnic Institute and joined the faculty at the University of Nebraska in 1990.

Dr. Redepenning holds 10 patents, has published over 40 journal articles, and has benefited from the research support of the National Science Foundation, the National Research Initiative, and the Defense Advanced Research Projects Agency.

Dr. Redepenning's group is presently focused on two research areas that rely heavily on the synthesis of new materials. One involves the use of electrochemistry to construct magnetic tunneling junctions. The other is focused on the preparation of composite biomaterials. Dr. Redepenning and his graduate students have discovered a simple, inexpensive process of making a biocomposite material that is as strong and flexible as bone. It easily molds to make hard-tissue replacements such as implants and screws and requires no toxic materials.



Dr. Jody Redepenning and his graduate students have discovered a simple, inexpensive process for making a biocomposite material that is as strong and flexible as bone.

## STAFF CHANGES

BY JEFF BUNKER

### A Fond Farewell



Terese Janovec

for Transcript International, an engineering company in Lincoln. While at UNL, Terese has been responsible for recruiting graduate students, coordinating the department Web site, and providing support for marketing projects in the department.

Over the last 3 and 1/2 years, Terese helped in implementing many positive improvements to the chemistry department. These include the "GAMES" enrollment management

This spring we said goodbye to Terese Janovec, recruiting and admissions coordinator and editor of this newsletter. Terese came to UNL in October 2005, after working as a recruiter

system for graduate students, marketing initiatives such as the alumni newsletter and department postcards regularly sent to hundreds of universities throughout the U.S., new undergraduate and graduate marketing materials, and a revamped department Web site. Terese cited deadlines and adapting to an ever-changing environment as day-to-day challenges.

Terese and her husband have three children and she enjoys home decorating, walking, and being outside. Terese will be taking up a new position at UNL titled assistant director of education and outreach for the Nebraska Center of Materials and Nanoscience. "My fondest memories will be those of working with the students. It's been really rewarding to bring students in from all over the world and see them succeed."

We wish her well in her future endeavors, and thank her for her great service to the chemistry department.



The Department bids a fond farewell to Terese Janovec.

### A New Face in the Chair's Office



Lorrie Adams

The chemistry department is proud to welcome Lorrie Adams, who recently began duties as staff assistant for the chair and vice chair. Lorrie is excited and enthusiastic about the

position, which includes maintaining faculty records, assisting with the search for and hiring of new faculty, and scheduling and managing access to the chair.

Prior to coming to the chemistry department, Lorrie also spent six years working at the Southeast Research and Extension Center on East Campus, and spent several years working for the Lincoln Public Schools. It is this love of working with students that inspired her to pursue the new position here at the chemistry department:

"I love the atmosphere around the university. I like education, and I like working with students."

Outside of work, Lorrie has four boys who are all currently attending college. Her husband works on East Campus, and together they own a Christmas tree farm, which keeps them busy year round. Lorrie enjoys gardening and spending time outdoors. Join us in welcoming Lorrie to the chemistry department here at the University of Nebraska-Lincoln.

## BEHIND THE SCENES

### Darrel Kinnan



Darrel Kinnan

Many important people work “behind the scenes” providing support of UNL chemistry’s research and teaching. Darrel Kinnan, undergraduate lab manager, is one of those people who plays a crucial role in the function of the labs for all 100-level chemistry classes. After graduating from UNL in 1976 with a B.S. in zoology, Darrel began working at the chemistry department lab stockroom. In 1984, Darrel took over the lab manager position he still holds today.

“In my job, I really try to make chemistry a successful endeavor for students. There are a lot of students that struggle with chemistry. It is a difficult subject, but my mission is to make their endeavors in chemistry as successful as possible.”

Darrel coordinates the ordering of chemicals and equipment for general chemistry labs, writes all lab quizzes, and sets up in-class demos. He also must make sure that all teaching assistants show up on time and that all schedules and chemicals are ready. Lab management also faces additional challenges in terms of proper collection and bookkeeping of chemicals in an environmentally conscious fashion. In his 33 years at UNL, Darrel has coordinated the labs of over 66,000 students!

Naturally, in managing chemicals and demonstrations, some disasters are bound to happen. Darrel fondly remembers a professor who once was performing an in-class demonstration using liquid oxygen. The professor would pour the oxygen through a magnet to show it was diamagnetic and it would then trickle down into an evaporating dish with a candle, producing a flame. Somehow, on this occasion, when the professor poured the oxygen, a giant explosion occurred, just feet from students in the front row! Remarkably no one was hurt, but Darrel did remark that “The student evaluations for that semester all requested more liquid oxygen demonstrations.”

Darrel has received several notable awards for his dedicated service, including the Board of Regents Kudo and APPLAUSE awards. He also helped participants in the Lincoln Public Schools Science Olympiads for 12 years and has been active in the chemistry department’s recruiting efforts, by participating in the Big Red Road Shows across the state. Truly, Darrel is one of the chemistry department’s most invaluable employees.

“What I’ve really enjoyed about my time here are all the people I’ve gotten to work with. I’ve truly enjoyed the faculty, staff, graduate, and undergraduate students. It’s been nothing but a pleasure for me.”

## IN REMEMBRANCE

### Professor Desmond M. S. Wheeler Memorial



Professor Desmond Wheeler

Professor Desmond M. S. Wheeler passed away March 8, 2009 in Dublin, Ireland where he had lived since his retirement from the University in 1993.

Desmond grew up in Dublin where he received his Ph.D. degree from the National University of Ireland (NUI) in 1955. He then spent two years at Harvard University doing postdoctoral work with Nobel Laureate R.B. Woodward in the chemistry department. He first came to the University of Nebraska in 1958. He then joined the

faculty at the University of South Carolina before returning permanently to Nebraska in 1961. In 1977, he was awarded the D.Sc. degree by NUI in recognition of his international reputation as a chemist.

His research interests involved the isolation and synthesis of biologically active natural products, especially those with carcinogenic potential, an area which has developed significantly in recent years. In later years, he and his wife Maureen were pursuing improved routes to powerful anticancer drugs. During his career at UNL, Des had 23 Ph.D. students, all of whom were nurtured with great affection. Des also taught extensively in organic chemistry, educating several generations of students who went on to study chemistry, medicine and other areas of the health professions. He received the UNL Distinguished Teaching Award in 1980. Following his retirement, Des, ever the scholar, undertook legal study at NUI-Dublin completing the equivalent of the J.D. degree in 1999.

When the Regents Bylaws were revised in the mid 70’s the major contributor from the faculty was Law Professor Jim Lake, with Des playing a formative role in that process. Des’ sense of academic freedom and justice made him a strong voice in the subsequent creation of the rules relating to academic freedom, tenure, promotion and the grievance process. His attention to these matters was so honored that his colleagues bestowed on him the Lake Academic Freedom Award, the first faculty member after Professor Lake to be so honored. In 1993, UNL honored him with the George Howard-Louise Pound Distinguished Career Award, “for exceptional contribution to the University Community through teaching, research, service, administration or a combination of these activities.”

Des continued his attention to governance and justice issues as long as he worked at UNL. In 1986, he was president of the Faculty Senate. He had a remarkable capacity to work smoothly and effectively both with aggrieved faculty and with University administrators. He had a burning sense of justice. But he also had a canny sense of how to work with those he was trying to influence. While his grievance reports might challenge administrators, his manner maintained their respect,

## DR. RIEKE LOOKS BACK ON 27 YEARS AT THE UNIVERSITY OF NEBRASKA-LINCOLN

*Dr. Reuben Rieke retired from the UNL chemistry department in May of 2004, after teaching and researching at UNL since 1977. We are happy to have him share his memories in the following article.*



Dr. Reuben Rieke

After graduating with my Ph.D. from the University of Wisconsin and completing a postdoctoral program, I started my first teaching job at the University of North Carolina-Chapel Hill. After teaching there for about ten years, I moved to Nebraska and took up a position at the University of Nebraska-Lincoln. Since I was from the Midwest originally, UNL was very appealing and it allowed me to teach and research at a top-notch university that was located in the Midwest.

Throughout my tenure at UNL, I taught hundreds if not thousands of students, supervised many Ph.D. and masters students, and worked with undergraduates on research.

*“Working with students was always a promising and pleasing experience, which I enjoyed greatly.”*

I served as chairman of the department from 1981 to 1984. It was a challenging time, but I did manage to accomplish some pretty significant things during my tenure as chairman. I set up a freshman scholarship program, celebrated our big 100th anniversary for alumni, coordinated an award ceremony for Norm Cromwell, and hired many prominent current faculty members.

The majority of my work at UNL dealt with the preparation of highly reactive metals. I really had wonderful times working with my graduate students developing metals. Eventually, I founded my own company, Rieke Metals, which sells pharmaceutical research reagents all across the world and has made some significant initial discoveries of conducting plastics. Throughout my career, I've also published over 200 works and hold over 20 patents. I was awarded the Midwest Chemist-of-the-Year award by the Midwest Regional ACS, which was a big event in my life.

Now that I am retired, I spend a lot of time fishing, gardening, attempting to learn and play golf, and managing my company. I also enjoy spending time with my wife, children, and grandchildren.

*“One thing I learned is that it is absolutely necessary to have a passion for chemistry if you wish to succeed in the field. If you have that burning passion for chemistry, the results will absolutely be rewarding.”*

*Reuben D. Rieke*

# AWARDS AND ACHIEVEMENTS

## FACULTY

### New Funding: December 2008 – June 2009

The following are newly funded grants received by the chemistry faculty. Congratulations!

**PI:** Dr. Wonyoung Choe  
**Funding Source:** UNL Research Council Faculty Seed Grant  
**Title:** Biomimetic Nanosheets for Heterogeneous Catalysis  
**Project Start Date:** January 2009

**PI:** Dr. Patrick Dussault  
**Co-PI:** Dr. Audrey Adkins (School of Biological Sciences,  
**Funding Source:** UNL Research Council Interdisciplinary Grant  
**Title:** Synthesis and Microbiology of PALO  
**Project Start Date:** January 2009

**PI:** Dr. Barry Cheung  
**Co-PIs:** Drs. Xiao Zeng (Chemistry), Wai-Ning Mei and Renat Sabirianov (UNO Department of Physics)  
**Funding Source:** Nebraska Research Initiative (NRI)  
**Title:** Design of Metallic Oxide and Nanotubes as Efficient Catalysts  
**Project Start Date:** February 15, 2009

**PI:** Dr. Patrick Dussault  
**Co-PI:** Dr. J. Vennerstrom (UNMC Pharmaceutical Sciences)  
**Funding Source:** Nebraska Research Initiative (NRI)  
**Title:** New Antimalarial Peroxides  
**Project Start Date:** February 15, 2009

**PI:** Dr. Andrzej Rajca  
**Co-PI:** Dr. M. Boska (UNMC Department of Radiology)  
**Funding Source:** Nebraska Research Initiative (NRI)  
**Title:** Nitroxide Dendrimers for Biomedical Magnetic Resonance Imaging  
**Project Start Date:** February 15, 2009

**PI:** Dr. Evgeny Tsybmal (Department of Physics and Astronomy)  
**Co-PIs:** Drs. J. Redepenning (Chemistry), A. Sokolov (Physics and Astronomy), and R. Sabirianov (UNO Department of Physics)  
**Funding Source:** Nebraska Research Initiative (NRI)  
**Title:** Quantum Microwave Generation Driven by Spin-Polarized Current  
**Project Start Date:** February 15, 2009

**PI:** Dr. Yongfeng Lu (Department of Electrical Engineering)  
**Co-PI:** Dr. Xiao Zeng  
**Funding Source:** Nebraska Research Initiative (NRI)  
**Title:** New Science and Engineering of Carbon-Based Low-Dimensional Nanoelectronics  
**Project Start Date:** February 15, 2009

**PI:** Dr. Patrick Dussault  
**Co-PIs:** Drs. Tim Carr and Ji-Young Lee (Department of Nutrition and Health Sciences)  
**Funding Source:** Office of Research  
**Title:** Pilot Work in Preparation for the R21 Grant Submission  
**Project Start Date:** February 20, 2009

**PI:** Dr. David Berkowitz  
**Funding Agency:** Mizutani Foundation of Glycoscience  
**Title:** Hexose Phosphate Mimics: New mRNA/Protein Dual Targeting  
**Project Start Date:** April 1, 2009

**PI:** Dr. David Berkowitz  
**Funding Agency:** American Chemical Society  
**Title:** Summer Undergraduate Research Fellowship for Ross Cheloha  
**Project Start Date:** April 20, 2009

**PI:** Dr. Barry Cheung  
**Funding Agency:** Lawrence Livermore National Laboratory  
**Title:** Boron Coatings for Scalable Solid-State Neuron Detectors  
**Project Start Date:** May 1, 2009

**PI:** Dr. Ron Cerny  
**Funding Agency:** Nebraska Center for Virology (NIH COBRE)  
**Title:** NIH Proteomics/Genomics Core Year 10  
**Project Start Date:** May 1, 2009

**PI:** Dr. Liangcheng Du  
**Funding Agency:** NIH  
**Title:** Biosynthesis of HSAF, an antifungal natural product with a novel mode of action  
**Project Start Date:** June 1, 2009

### Congratulations!

- **Dr. David Berkowitz** collaborates with Columbia University and Stockbridge Pharmaceuticals, Inc., for new cancer treatment
- **Dr. Stephen DiMagno** recognized by American Chemical Society for noteworthy contributions
- **Drs. Jason Kautz, Eric Malina and graduate student Leah Thompson** receive 2008-09 Parents Association Awards
- **Dr. Stephen DiMagno** elected the vice-chair/membership of the ACS Division of Fluorine Chemistry for 2009

*Congratulations continued on page 11*



## STUDENTS

### Student Awards

- **Paul Barron** (Choe Group) receives ACS Inorganic Chemistry Division Travel Grant
- Chemistry undergraduate students honored at February Forum: **Anna Jo Schreck, Sarah Kruse, and Crystal Fehr**
- PLU Honor Society awards travel grants to **Matt Shortridge and Adreienne Rohrich**
- **Ross Cheloha** (Berkowitz Group) receives ACS Organic Chemistry Summer Undergraduate Research Fellowship
- **Raychelle Burks** contributes article to ACS InChemistry magazine  
Link to <http://www.uniflip.com/catalogs2/8478/18410/pub/index.html>

### University Awards

- Folsom Masters Thesis Award: **Curtis Wray** (Choe Group)
- Folsom Doctoral Thesis Award: **Kelly Mercier** (Powers Group) received Honorable Mention
- Graduate Research Assistant: **Matt Shortridge** (Powers) awarded Honorable Mention
- UNL Sigma Xi's 2009 Outstanding Graduate Student: **John Schiel** (Hage Group) for creating new methods based on high-performance affinity chromatography for the analysis of free drug and hormone fraction in clinical and pharmaceutical samples and other applications of bioanalysis

### February Forum

Congratulations to the chemistry students who were honored at the February Forum, an annual recognition of women studying science-related fields, sponsored by UNL's Center for Science, Mathematics, and Computer Education. Students were selected by their department chairs for their outstanding achievements as junior or senior women studying in the science fields.



From Left to Right: Anna Jo Schreck, Professor Mark Griep, Sarah Kruse, and Crystal Fehr

### Ovation Award Recipient

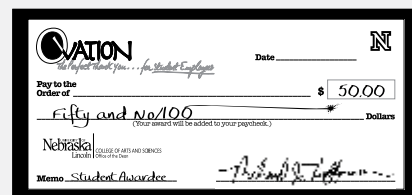
**Jacob Johnson**  
Recipient of the  
February 2009 Ovation Award



Jacob Johnson

Jacob Johnson, sophomore, biochemistry major and chemistry work-study student, received the February College of Arts and Sciences Ovation award

which recognizes undergraduate student employees in the areas of innovation, outstanding performance, and service above and beyond the call of duty. His nominators say, "Jacob has the ability to work positively with all types of people. He handles situations maturely and is able to do about anything you ask of him—from working with electronics, creating quality powerpoint presentations, or performing administrative duties. Jacob has done an excellent job and is a great asset to the chemistry department!"



# AWARDS & ACHIEVEMENTS

## CONGRATULATIONS TO GRADUATES

### December 2008 PhD Graduates

Name	Area	Adviser
Kelly Mercier	BioAnalytical	Powers
Rajesh Rajasekaran	Analytical	Redepenning
Shin Moteki	Organic	Takacs

### December 2008 Masters Graduates

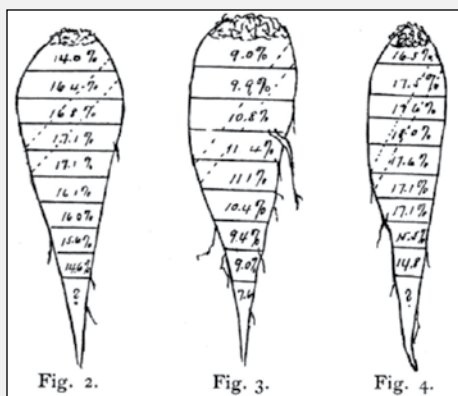
Name	Area	Adviser
Yoon Jeong Jang	Analytical	Hage
Ross Andrews	Organic	Takacs
Ryan Gerber	Organic	Du

### December 2008 Chemistry Major Graduates

Kari Ann Fiegen  
Andrew Raymond Lemke  
Jeremy Lynn Lohrman

*Congratulations to  
all 2008 Chemistry  
Department Graduates  
and Awardees!*

*History continued from page 1*



Beet sugar content showing that diagonally bored sample gives a suitable average content, from 1891 Experiment Station Bulletin published by Nicholson and Lloyd.

to build a factory there in 1890. This was the first of the ten sugar beet factories to be built by this company and only the third sugar factory to be built in the U.S.

The sugar beet studies continued for the next decade at the University. Lloyd trained the best of her graduate students and undergraduates in sugar beet analysis. Training so many inexperienced workers would require time, patience, and great organizational skills. All attributes Lloyd is said to have had. She combined her students' data with the

farmers' information about seed variety, acreage, climatic conditions, soil, agricultural procedures, costs, and yields per acre to provide an unbelievably complete analysis of Nebraska-grown sugar beets.

In Spring 1892, Professor Lloyd created a new course "Chem 19: Chemistry of Sugar" that she taught to 35 students. A formal report of the first year of the Sugar Beet School was published in *Science* magazine on June 10, 1892 under the title "Nebraska Sugar School" (*Science* vol. 19, p. 324). Lloyd did not teach the course its second year. Instead, students learned about sugar technology from Norfolk Beet Factory chemical engineer Emil Salich, analytical chemistry from NU assistant chemist Thomas Lyon, agriculture from NU agriculture professor Charles Ingersoll, boiler types and construction from NU mechanical engineering professor Owen, and optical instruments from NU physics professor DeWitt Brace. Upon completion of this course, graduates were given the option to attend the Experimental Station to learn sugar beet agriculture first hand. Besides encouraging the development of Nebraska's sugar beet industry, it pointed the way for experimental work across the nation.

During its first ten years, the department rose from a one-person show in the form of Hudson Nicholson to become a nationally recognized research program that was serving the needs of Nebraskans while training future chemists to become leaders in the academy, industry, and government.

# ESTATE GIFTS

## ESTATE GIFTS REMEMBER SISTERS' LEGACY OF TEACHING AND LEARNING



Lucile Hac

Marguerite and Lucile Hac grew up in Lincoln, Nebraska, and were very close sisters. Their shared love of teaching and lifetime learning led them to create special opportunities for students and teachers at the University of Nebraska. Marguerite was passionate about music and children. She graduated from the university in 1927 and taught piano in Lincoln for more than 50 years. She also started an avant-garde preschool music program and formed a children's rhythm and

melody band. Over the years, she provided the first introduction to music for hundreds of young people.

Lucile, the younger sister, had an aptitude for science. She studied chemistry at the university and earned bachelor's and master's degrees in the early 1930s. After obtaining a doctorate degree from the University of Minnesota, she established a notable career that included the University of Chicago, Northwestern University and the International Minerals and Chemical Corp. where she extracted amino acids from residue of sugar beets and other agricultural products and eventually became Director of Research. Throughout her career, she engaged in pioneering research activities and had scientific publications and patents in chemistry, microbiology antibiotics, plant physiology and genetics. Upon retirement, she stayed active and was inducted into the Senior Citizen Hall of Fame for the city of Chicago in 1985.

When Marguerite could no longer live on her own, Lucile returned to Nebraska to help her. Sadly, Marguerite died in 2003 with Lucile following in 2006. Neither will be soon forgotten, however. Both women established meaningful gifts to the University of Nebraska Foundation through their individual estate plans and trusts. Marguerite established the Marguerite A. Hac Scholarship for Excellence in Piano Studies, an endowed fund that provides annual tuition aid for piano students at UNL. Lucile's gift created the Lucile R. Hac Professorship Fund, also a permanently endowed fund, which will soon be awarded by the university to a faculty member engaged in teaching and research in the area of chemistry or life sciences.

## IN REMEMBRANCE

*Memorial continued from page 6*

admiration and good will.

Des and Maureen were very hospitable entertainers in their home, and were particularly adept at introducing new young faculty to those from other departments and the university hierarchy in the social life of the institution beyond lecture halls and labs. He loved to play bridge and golf with a variety of groups of university colleagues and was a regular squash player at the University Club, where town and gown regularly made their marks on one another.

Des will be missed by his many friends and colleagues in Ireland and Nebraska. He is survived by his wife, Dr. Maureen (McMahon) Wheeler, who resides in Blackrock Co. Dublin.

A memorial mass was held at Madonna Chapel, 5401 South Street, on Wednesday, March 25. A memorial in Desmond's name has been established with the Alzheimer's Association of the Great Plains (5601 South 27th Street, Lincoln, Nebraska 68512).

## CONGRATULATIONS

*Congratulations continued from page 8*

- **Professor Hage** to begin editorship for the *Journal of Chromatography B* in April
- **Professor Griep** has *ReAction!*, chemistry in the movies book published
- **Professor Kautz** received College of Arts and Sciences Distinguished Teaching Award
- **Professor Du** featured on JACS Web site
- **Professor George** received College of Arts and Sciences Hazel R. McClymont Teaching Fellow Award
- **Professor Zeng's** research featured in JACS Select virtual issues
- **Professors Harbison and Woodford** featured at press conference at the American Chemical Society meeting in Salt Lake City
- **Professor Takacs** reappointed to another term as a Charles E. Bessey Professor
- **Professor Hage** received 2009 College of Arts and Sciences Award for Outstanding Research and Creative Achievement in the Social Sciences

# ALUMNI FOCUS

## ONE AMONG MANY

BY JEFF BUNKER

### Dr. James Fletcher



Dr. James Fletcher

Among UNL's many distinguished alumni, certainly not the least of which is Dr. James Fletcher. Dr. Fletcher currently teaches and performs research at Creighton University in Omaha, sharing his knowledge of chemistry with many young aspiring students at the Nebraska school.

Before completing his doctoral work at the University of Pennsylvania and postdoctoral work at The Scripps Institute in San Diego, Dr. Fletcher attended the University of

Nebraska–Lincoln as an undergraduate chemistry major. It was at UNL, under the guidance of Dr. Steve DiMagno, that Dr. Fletcher first developed a passion for chemistry.

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*“My experiences at UNL were very important in developing who I have become today. Through my sophomore year, I still wasn't sure about chemistry as a career. Then I started doing research full-time in the summers and part-time during the school year in Dr. DiMagno's lab. That was when I really fell in love with chemistry. So much so that my eventual graduate work was very similar to the research I had previously worked on in Dr. DiMagno's laboratory. There are skills in the lab I still use today that I learned long ago in Steve's lab.”*

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Dr. Fletcher's accomplishments as a professional have been indeed quite notable. He administers a summer research program at Creighton University, which enables nearly a dozen students to perform full-time research in subjects such as chemistry, biology, and physics during the summers.

Dr. Fletcher's current research involves the utilization of 'click' chemistry for the development of molecules that interface inorganic metals with organic and biological molecules. Applications of such work include the development of new chelators for preparing organometallic complexes and also to serve as metalloenzyme inhibitors. He also is developing new biochemical sensors via the attachment of peptides with organic fluorophores. But he has never forgotten the value of the research experience he received working one-on-one with Dr. DiMagno.

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*“I really enjoy working side-by-side with undergrads—it reminds me of my own research experience. At Creighton, we don't have grad students, so I try to give my students the same experience I had as an undergrad.”*

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In his free time, Dr. Fletcher enjoys spending time with his wife Megan, also a UNL alum, and three kids, and enjoys gardening. We at UNL are certainly proud of Dr. Fletcher's accomplishments, and wish him and all other alumni nothing but the best.

**Support**  
the  
Chemistry Department

### Chemistry Alumni Graduate Fellowship Fund

Visit the chemistry Web site at [www.chem.unl.edu](http://www.chem.unl.edu), click on icon in lower left side of homepage, and join other alums in our effort to attract and support the best and brightest graduate students in our program.

## AN ALUMNI RETURNS HOME

### Dr. Jeff Woodford



*Dr. Jeff Woodford, currently a professor teaching at Eastern Oregon University and a former UNL graduate student, is back at UNL for a year long sabbatical, working with Dr. Gerry Harbison and Dr. Xiao Cheng Zeng.*

“It’s kind of like I’m a grad student again!” remarked Dr. Woodford, speaking of the time he has spent at UNL on sabbatical from Eastern Oregon University. Dr. Woodford specializes in physical chemistry, which he teaches

to undergraduates at Eastern Oregon. In 2000, Dr. Woodford graduated with a Ph.D. in physical chemistry from UNL and, after teaching for eight years, has been given the opportunity to return on an extended professional visit. Dr. Woodford will be at UNL until the end of this summer, mainly working on research projects with faculty hosts.

Since late July, Dr. Woodford has been collaborating with Dr. Harbison on a nationally recognized project dealing with the detection of explosives. Woodford specifically has lent his expertise on theoretical physical chemistry to the project, which aims to predict properties of explosives to design sensors. He and Dr. Harbison were recently interviewed about their research at a press conference held during the American Chemical Society national meeting in Salt Lake City and it can be viewed at [www.ustream.tv/recorded/1292597](http://www.ustream.tv/recorded/1292597).

The end of last year, Dr. Woodford joined award winning chemist Dr. Xiao Cheng Zeng on a project involving molecular dynamic simulation.

“We will be simulating carbon nanotubes through which water can flow. I’m really excited about the project—it’s a new field that holds a great deal of interest for me.”

Woodford had the opportunity to take several classes from Dr. Zeng during his time as a Ph.D. student at UNL, and has enjoyed working with him thus far. “I never did have a class with Dr. Harbison, though—let’s just say I was intimidated by his brilliance!”

Dr. Woodford fondly remembers his time spent at UNL.

“Being back on campus has brought back a lot of memories for me – time spent with friends, meeting great people, and learning a lot about this field that I really love. In some ways the department hasn’t changed, and in others it has changed a lot. I’ve become used to everything again and am really enjoying my return to UNL.”

## Updates:

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

## Undergraduate Lounge

Just one of Hamilton Hall’s many useful resources provided to undergraduates is the Undergraduate Chemistry Lounge, located on the fourth floor next to the Undergraduate Instrumentation Lab. The lounge is accessible to all undergraduate chemistry majors as a location in which they can study or work with other chemistry majors on class projects. The lounge contains couches, computers, tables, chalkboard, fridge, and a microwave that make it a great place for students to study without the distractions that may be present in other areas of the building. Sarah Kruse, an undergraduate chemistry major, says that “The lounge is really nice as an added resource center room. Often it is hard for me to study in the Undergraduate Resource Center since I’ve been a TA, and many students there recognize me and come ask me questions about their homework. In the Undergraduate Lounge, I have a quiet place where I can focus on my own work.”



Students take advantage of the Undergraduate Chemistry Lounge.

# PUBLICATIONS

## A SELECTION OF PUBLICATIONS FROM 2008

### A First-Principles Study of Carbon Nanobud.

Wu, X.; **Zeng, X. C.**; *ACS Nano* 2, 1459-1465 (2008).

### A Method For Detecting Water in Organic Solvents.

Sun, Haoran; Wang, Bijia; **DiMagno, Stephen G.**; *Organic Letters* (2008), 10(20), 4413-4416.

### Cation-Cation pi - pi Stacking in Small Ionic Clusters of 1,2,4-Triazolium.

**Li, Hui**; Boatz, Jerry A.; Gordon, Mark S.; *Journal of the American Chemical Society* (2008), 130(2), 392-393.

### Development of Immunoaffinity Restricted Access Media for Rapid Extractions of Low-Mass Analytes.

Wa, Chunling; Mallik, Rangan; **Hage, David S.**; *Analytical Chemistry* (2008), 80(22), 8751-8762.

### Efficient Amide-Directed Catalytic Asymmetric Hydroboration.

Smith, Sean M.; Thacker, Nathan C.; **Takacs, James M.**; *Journal of the American Chemical Society* (2008), 130(12), 3734-3735.

### Elastic Constants and Related Mechanical Properties of the Monoclinic Polymorph of the Carbamazepine Molecular Crystal.

Mohapatra, Himansu; **Eckhardt, Craig J.**; *Journal of Physical Chemistry B* (2008), 112(8), 2293-2298.

### Estimating Protein-Ligand Binding Affinity using High-throughput Screening by NMR.

Shortridge, Matthew D.; **Hage, David S.**; **Harbison, Gerard S.**; **Powers, R.**; *Journal of Combinatorial Chemistry* (2008), 10, 948-958.

### Hydrogen Storage in Pillared Li-Dispersed Boron Carbide Nanotubes.

Wu, Xiaojun; Gao, Yi; **Zeng, X. C.**; *Journal of Physical Chemistry C* (2008), 112(22), 8458-8463.

### Hyperthermophilic Aquifex Aeolicus Initiates Primer Synthesis on a Limited Set of Trinucleotides Comprised of Cytosines and Guanines.

Larson, Marilyn A.; Bressani, Rafael; Sayood, Khalid; Corn, Jacob E.; Berger, James M.; **Griep, Mark A.**; Hinrichs, Steven H.; *Nucleic Acids Research* (2008), 36(16), 5260-5269.

### Impact of Electron-Electron Spin Interaction on Electron Spin Relaxation of Nitroxide Diradicals and Tetraradical in Glassy Solvents Between 10 and 300 K.

Sato, Hideo; Kathirvelu, Velavan; Spagnol, Gaeelle; Rajca, Suchada; **Rajca, Andrzej**; Eaton, Sandra S.; Eaton, Gareth R.; *Journal of Physical Chemistry B* (2008), 112(10), 2818-2828.

### Mild and Efficient Re(VII)-Catalyzed Synthesis of 1,1-Dihydroperoxides.

Ghorai, Prasanta; **Dussault, Patrick H.**; *Organic Letters* (2008), 10(20), 4577-4579.

### Phosphorylation of MUC1 by Met Modulates Interaction with p53 and MMP1 Expression.

Singh, Pankaj K.; Behrens, Michelle E.; Eggers, John P.; **Cerny, Ronald L.**; Bailey, Jennifer M.; Shanmugam, Kandavel; Gendler, Sandra J.; Bennett, Eric P.; Hollingsworth, Michael A.; *Journal of Biological Chemistry* (2008), 283(40), 26985-26995.

### Synthesis, Structure, and Conformation of Aza[1n]metacyclophanes.

Vale, Matthew; Pink, Maren; Rajca, Suchada; **Rajca, Andrzej**; *Journal of Organic Chemistry* (2008), 73(1), 27-35 (FEATURED ARTICLE).

### TATA-Binding Protein Recognition and Bending of a Consensus Promoter Are Protein Species Dependent.

Whittington, J. E., Delgadillo, R. F., Attebury, T., Parkhurst, L. K., Daugherty, M. A. and **Parkhurst, L. J.**; *Biochemistry* (2008), 47(27), 7264-7273.

### The Application of FAST-NMR for the Identification of Novel Drug Discovery Targets.

**Powers, Robert**; Mercier, Kelly A.; Copeland, Jennifer C.; *Drug Discovery Today* (2008), 13(3/4), 172-179.

### Effective CO Oxidation on Endohedral Gold-Cage Nanoclusters.

Gao, Yi; Shao, Nan; Bulusu, Satya; **Zeng, X. C.**; *Journal of Physical Chemistry C* (2008), 112(22), 8234-8238.

### CO Oxidation Catalyzed by Single-Walled Helical Gold Nanotube.

An, Wei; Pei, Yong; **Zeng, X. C.**; *Nano Letters* (2008), 8(1), 195-202.

Names in *red* indicate UNL chemistry faculty.

# DEPARTMENT GOALS

## SITTING DOWN WITH THE DEAN OF THE COLLEGE OF ARTS AND SCIENCES



Dean David Manderscheid

The Department of Chemistry at the University of Nebraska–Lincoln is a member of the College of Arts and Sciences. In order to gain some perspective on where UNL chemistry fits in with the rest of the college, we sat down with Dean Manderscheid of the College.

“Our college’s main goals are twofold: Research, and Undergraduate Education. The chemistry department is integral to the mission of the college—you really can’t have a great university without a great chemistry department like we have here.”

UNL’s Department of Chemistry constantly drives the rest of the college to higher goals. Chemistry faculty bring in a large number of grants, have a large amount of interaction with other departments, and conduct productive interdisciplinary research. As numbers go, the department ranks 2nd in grant proposals submitted, 3rd in total research funding, and 2nd in research dollars per faculty member.

“The research quality in the Department of Chemistry is outstanding and we’ve really benefitted from the leadership of department chair Jim Takacs and the hard work of the chemistry faculty.”

The undergraduate chemistry program currently has 100 majors—a number that has doubled in the past ten years. It’s also one of the largest producers of semester credit hours in the college.

“Education in chemistry impacts a very large number of students on campus. If one thinks of the number of doctors, scientists, and engineers that have taken classes in chemistry, the numbers are astronomical. Our chemistry department here is truly integral to the mission of the College of Arts and Sciences.”



### Offering:

**Class Listings:** Current listings of Ph.D., masters, and B.S./B.A. graduates

**Connections:** Career Networking Services provide links to job listings, help with chemistry job searches, and opportunities to use Chemistry Facebook Group and LinkedIn for social and professional networking.

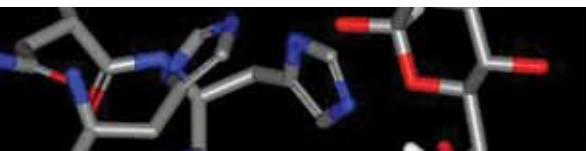
Update your contact information by sending to [alumni@huskeralum.org](mailto:alumni@huskeralum.org)

**Events/News:** Keep up with current events, past happenings, alumni newsletter, alumni stories

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Department of Chemistry  
552 Hamilton Hall  
P.O. Box 880304  
Lincoln, NE 68588-0304



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## IDA FREY SAMUELSON UNDERGRADUATE SCHOLARSHIP

The UNL Department of Chemistry wants to thank the family of Ida Samuelson for recently establishing a new scholarship fund in her memory for deserving chemistry undergraduate students. The Ida Samuelson Fund will be used annually to assist an undergraduate chemistry student with financial need, who shows high potential for success, to receive the best educational and research opportunities possible. Preference will be given to first generation college students.



WHAT'S HAPPENING IN  
**CHEMISTRY**