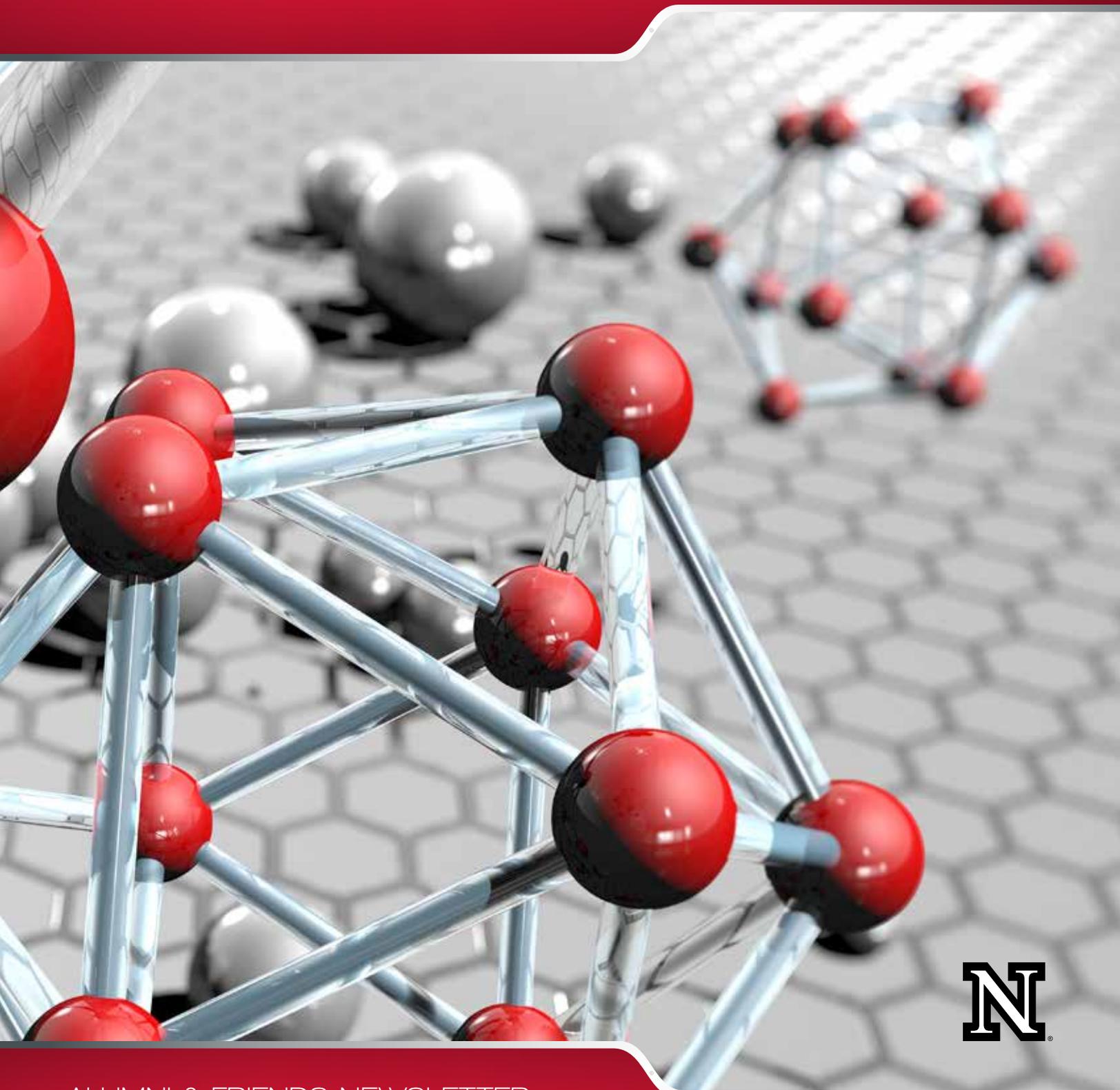


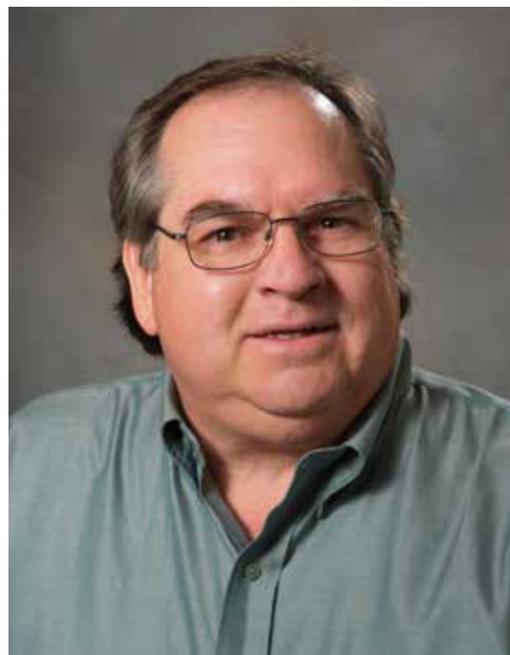
# DEPARTMENT OF **CHEMISTRY**

UNIVERSITY OF NEBRASKA-LINCOLN



ALUMNI & FRIENDS NEWSLETTER  
Winter 2013

## Letter from the Chair



Dear Alumni and Friends,

The holidays are long since past, but I would like to take a moment to look back on two of my favorite annual events. I am sure that many of you will remember fondly Mike Cook's Annual Holiday Potluck celebration. It again packed the 4th floor of Hamilton Hall with people and a smorgasbord of aromas that captivate chemists and kept them guessing as to the constituent molecules and the nature of their structures. Mike has been a mainstay in the department as its chief buyer in purchasing for more than 27 years. The annual potluck he organizes is just one of the many ways Mike has endeared himself to faculty, staff and students alike. Another great event this year; thanks Mike!

The Board of Regents recognizes full-time employees from each of the four campuses for outstanding service to the University of Nebraska. Mike will receive the BOR Kudos Award in March. Congratulations, Mike!

The second event was the annual PLU Holiday Party. This year's PLU officers did an outstanding job and interest in PLU is growing steadily. Now a UNL Recognized Student Organization with Bob Powers as its faculty adviser, PLU began issuing a newsletter, co-sponsored the

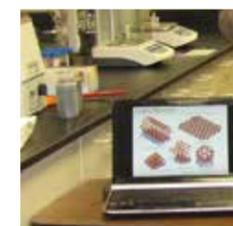
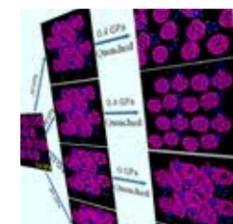
very successful "After Graduation ACS Workshop" for graduate students, gave out a record number of travel grants to its members, gave the first ever PLU Graduate Student Research Award in conjunction with the annual departmental research poster session, and participated in planning and carrying out Chemistry Day activities. PLU named Venkata Kolli, a graduate student under the direction of Eric Dodds, as the PLU Student of the Year. The PLU Holiday Party was a fitting capstone, attracting a record crowd of nearly 170 faculty, staff, students and their families. The momentum is continuing into 2013; Dr. Mark Meyerhoff (Michigan) and Dr. Emily Balskus (Harvard) are already scheduled as PLU-invited colloquium speakers.

This past year we saw the retirements of our two longtime Electronics Shop staff. Dr. Walt Hancock worked as chemistry's electronics shop manager for the past 34 years. He is a UNL alumnus having graduated with a doctorate in physics in 1976. In addition to supporting departmental research projects, over the years Walt worked on several NSF and NASA funded projects designing, building, and in some cases operating instrumentation for ice core drilling projects in Greenland and Antarctica. Jonathan Skean, an electronics technician in the department, retired after 32 years assisting chemistry researchers, and others across campus, with building, maintaining and repairing a wide variety of research instrumentation as well as serving the IT needs of the department. When it came to electronics, between them, Walt and Jonathan could pretty much build or fix anything you brought them. They are already missed.

Best wishes for the New Year,

Jim Takacs  
Charles J. Mach University Professor and Chair of Chemistry

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# DEPARTMENT OF CHEMISTRY

Story ideas, activities and achievements can be submitted by sending an email to [kerry.vondrak@unl.edu](mailto:kerry.vondrak@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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### Updates

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

## 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:

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## UNL Researchers Create New Form of Matter That Can Dent Diamonds

What do you get when you take buckyballs, soak them in a particular solvent and crush them under the pressure of more than 300,000 atmospheres?

The obvious answer is a bunch of crushed buckyballs. But a team of scientists that included UNL chemist Xiao Cheng Zeng has found that by using the right solvent at the right pressure, they created a new form of matter that they termed an "ordered amorphous carbon cluster." It's so hard it can dent diamonds, the hardest known substance.

Like diamonds, buckyballs (technically buckminsterfullerenes) are made of carbon. They're well-ordered, cage-like structures of 60 carbon atoms that look remarkably like soccer balls. When the scientists smashed them, they lost their cage-like structure, as expected. What wasn't expected was what they turned into.

"It's a new form of matter not seen before," said Zeng, Ameritas University Professor of Chemistry at UNL. "The buckyballs originally are ordered, but if we crush them, it's an ordered amorphous carbon cluster. They become a mess, but they are still in a long-range order."

"And it turns out this new form of matter is super hard. It can indent diamonds."

The discovery was announced in a paper published in the Aug. 16 issue of the international journal *Science*.

The scientists infused the buckyballs with a solvent with the chemical designation of C<sub>8</sub>H<sub>10</sub> (eight carbon atoms and 10 hydrogen atoms), an aromatic hydrocarbon based on benzene ("aromatic" meaning the atoms can share electrons).

Using a device called a diamond anvil cell, lead author Lin Wang of the Carnegie Institution of Washington in Argonne, IL, subjected the buckyballs to steadily increasing pressures. Below approximately 30 gigapascals (nearly 300,000 atmospheres), the buckyballs bounced back to their normal shape after decompression. Above 32 gigapascals, however, the cages completely collapsed and transformed into amorphous clusters, but remarkably maintained their long-range order after decompression.

Subsequent X-ray tests by Wang, using the Advanced Photon Source at Argonne, and by Bingbin Liu, using the National Synchrotron Light Source at Brookhaven National Laboratory in Upton, NY, measured and confirmed the structure.

The new material's hardness was confirmed when the experimental team found indentations on the diamond anvils used in their experiments.

"The unique aspect of this experiment is the solvent the team used with the buckyballs before they crushed them, it was the crucial trick in making this new form of matter," Zeng said. "When they added the high pressure, the solvent molecules were still intact and separated the buckyballs, preventing them from forming polymers. The balls were highly damaged, but the entire system was still in ordered structure."

**'New Form of Matter' continued on page 14**

Below: Xiao Cheng Zeng (right) and postdoctoral researcher Hui Li with their computer-generated images of what happens to buckyballs (pink) when they're infused with molecules of the C<sub>8</sub>H<sub>10</sub> solvent (blue), then crushed by intense pressure and released.

Photo courtesy University Communications

## Chemistry Department Explores New Possibilities with Center for Nanohybrid Functional Materials (CNFM)

Scientists are always seeking better ways to find and quantify minute things, such as toxins in the air or cancer particles in blood. UNL researchers lead a collaboration to create more powerful detection devices by combining manmade nanoparticles with nature's inherent recognition capabilities.

Creating these "nanohybrids" requires the diverse expertise of researchers in biology, chemistry, and nanomaterials engineering. A Nebraska team recently launched the UNL-based Center for Nanohybrid Functional Materials, which brings together 14 researchers from UNL, the University of Nebraska Medical Center, the University of Nebraska at Kearney, Creighton University, and Doane College. With nanohybrids, "you get the best of both worlds," said UNL chemist Patrick Dussault, a Charles Bessey Professor, who co-leads the center with Mathias Schubert, associate professor of electrical engineering.

Nanohybrids combine nanostructures—which can be engineered to behave uniquely under certain conditions, such as when subjected to a beam of light or radio energy—with chemical or biochemical agents, such as RNA or antibodies that can bind a specific substance. This new nanomaterial can both find and reveal its target.

Materials often behave differently at nanoscales, Dussault said. Understanding the basic sensing principles of nanohybrids is a major goal of the new group. With this knowledge, researchers hope to develop tools with enhanced detection capabilities.

Potential applications include devices that more selectively or sensitively diagnose diseases or find environmental contaminants. The ability to better detect toxins in air or water also could benefit national security.

The center builds on UNL's strength in nanomaterials. With about \$7.5 million in funding from the National Science Foundation through Nebraska EPSCoR, the center is poised to develop many partnerships in Nebraska and beyond.

Currently, the center is located in the Scott Engineering Center on the UNL campus. Among those CNFM researchers include UNL Department of Chemistry's Dr. Patrick Dussault, Dr. David Hage, Dr. Alexander Sinitskii, and Dr. Rebecca Lai. Their research focus includes the following:

### Dr. David Hage's Research:

Hage's research in this area involves the production of hybrid separation media or new separation media that use nanomaterials, the evaluation of nanomaterials by separation-based methods, and the creation of flow-based bioassays based on nanomaterials and miniaturized separation devices.

### Dr. Patrick Dussault's Research:

Dussault's research in this area focuses on methods for synthesis of functionalized nanomaterials.

Additionally, Dussault's group has been collaborating with several groups, including Prof. Rebecca Lai (UNL Chemistry), and Prof. Craig Eckhardt/Prof. Christine Ericsson (UNL Chemistry/Wartburg College, IA), investigating the synthesis of functionalized amphiphiles with unique chemical or physical properties.

### Dr. Rebecca Lai's Research:

Lai's center-related research includes a collaborative project with the Schubert group on the development of an "in-situ" combined electrochemical and quartz crystal microbalance with dissipation and spectroscopic ellipsometry instrumentation for chemical and biosensing. Specifically, they have demonstrated the use of this combined approach to characterize an aptamer-based cocaine sensor. This "tribrid" characterization technique provides additional information on the sensor system otherwise not accessible. Future work includes the implementation of the same folding-based sensing platform on 3-D ordered nanostructures fabricated via glancing angle deposition. Additionally, they recently initiated a collaborative project with Dr(s) Weeks and Oylar from the Nebraska Center for Algal Biology and Biotechnology on the design and fabrication of electrochemical protein-based sensor using camelid single-domain antibodies as bio-recognition elements.

### Dr. Alexander Sinitskii's Research:

Sinitskii's lab collaborates with CNFM PIs on several projects related to nanohybrid materials. In collaboration with Dr. Tino Hofmann (Department of Electrical Engineering) they are trying to fabricate a new class of chiral nanostructures based on metal nanospirals covered with graphene. Sinitskii's group works on several projects related to graphene, a recently discovered two-dimensional carbon allotrope



Dr. David Hage



Dr. Patrick Dussault



Dr. Rebecca Lai



Dr. Alexander Sinitskii

**'CNFM' continued on page 14**

## UNL Professors Now Textbook Authors

Several of our professors are in the process of or just finished writing their own chemistry textbooks. Dr. Gerard Harbison just finished writing a comprehensive biophysical chemistry textbook for chemistry and biochemistry undergraduates. Dr. Harbison signed with Pearson Education, Inc. and his textbook hit the presses this past November just in time for the spring semester.

Pearson approached Dr. Harbison to be the lead author of the 5th edition of the bestselling *Physical Chemistry: Principles and Applications in Biological Sciences with Mastering Chemistry*. The publisher explains the content is presented with clear writing and the ideal level of mathematics which combines for an engaging overview of the principles and applications of contemporary physical chemistry as used to solve problems in biology, biochemistry, and medicine.

Dr. Harbison collaborated with Ignacio Tinoco Jr., Kenneth Sauer, James C. Wang, Joseph D. Puglisi, and David Rovnyak for this best selling textbook.

Dr. Mark Griep is also in the process of writing a chemistry textbook but his book will not be published until 2015. Griep has signed with Oxford University Press to write a textbook for introductory chemistry courses taken by non-science majors. The title will be *Chemistry Matters*.

Paraphrasing the words of his publisher, "*Griep's background as a biochemist, his popularity as an instructor, and the prominence he's gained as a recognized communicator of chemistry for the lay audience (ReAction!, Oxford University Press, 2009), makes him uniquely situated to write a best-selling text that meets the needs of students and instructors in the liberal arts chemistry course.*"



Dr. Gerard Harbison



Dr. Mark Griep

Griep has been writing his textbook for almost two years. He believes the most effective way to communicate chemistry to non-science majors is to begin with a thumbnail sketch of either an important issue or a story about the wonders of the natural world. As in his classroom, he then spends most of the chapter explaining how chemists understand that chapter's issue or object of wonder. This approach stimulates students' curiosity so they will want to learn more about the chemistry behind the story. He has found students want to learn things that are useful to their everyday lives.

These books are sure to be the next "go to" chemistry textbooks on the market!

### Physical Chemistry: Principles and Applications in Biological Sciences with Mastering Chemistry, 5th edition

— Dr. Gerard Harbison, along with Ignacio Tinoco Jr., Kenneth Sauer, James C. Wang, Joseph D. Puglisi, and David Rovnyak

### Chemistry Matters

— Dr. Mark Griep

## Two Longtime Staff Retire this Year

The UNL Department of Chemistry had two longtime staff members from the electronics shop retire this year. Walt Hancock, the Electronics Shop manager retired after 34 years with the chemistry department and Jonathan Skean, our electronics technician, retired after 32 years. Together they kept the Department of Chemistry running like a well-oiled machine.

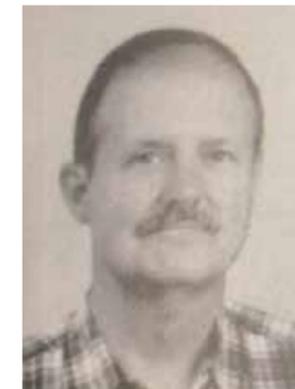
Before coming to the Department of Chemistry, Walt Hancock was a UNL Physics Ph.D. student. He graduated in 1976 and that same year was hired by the Department of Physics as a postdoc. In 1978, Walt took a position with the chemistry department as its Electronics Shop manager and served this position and the department faithfully until his retirement.

Throughout Walt's tenure at UNL, he was published in several scientific journals including an article titled the "Instrumentation for the PICO Deep Ice Coring Drill." Furthermore, Walt worked on several NSF research endeavors designing, building, and operating ice core drilling instrumentation for the GISPII project in Greenland, and the Siple Dome and McMurdo Dome/Taylor Dome projects in Antarctica.

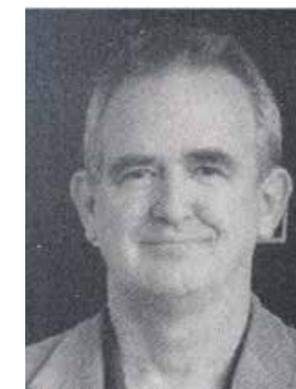
Walt also worked on several NASA projects where he designed, built, and operated equipment that included thermal probes at GRIP in Greenland and hot water drilling at Crary Ice Rise in Antarctica. Additionally, Walt operated and maintained instrumentation for the NSF AMANDA project at the South Pole Station in Antarctica.

Jonathan Skean, before joining UNL, worked for the United States Navy as an aviation fire control technician working on highly technical, radar systems for fighter aircraft both ashore and at sea aboard U.S. aircraft carriers in combat zones. After retiring from the military, Jonathan worked with the Department of Chemistry for over three decades assisting with the maintenance, repair, and creation of numerous scientific instruments.

Jonathan's responsibilities evolved alongside the emergence of the personal computer, personal printers, servers, the Internet, email,



Walt Hancock



Jonathan Skean

Skype, and the list goes on. He was responsible for all computer-related installation, repair, and maintenance as well, quickly becoming the jack of all trades. As such, on a daily basis he came into contact with faculty, graduate students, undergraduates, and staff, going out of his way to create a relationship with each and every one of them.

Our department chair also had a few parting words for both Walt and Jonathan.

"Dr. Walt Hancock, shop manager, and Jonathan Skean, electronics technician, have capably staffed the department's Chemistry Electronics Shop for the past 34 and 32 years, respectively. When it came to electronics, Walt and Jonathan could pretty much build or fix anything you brought them. Few students, postdocs or faculty will have passed through the department without a story or two on how Walt or Jonathan saved the day by building or repairing some key piece of instrumentation," commented Dr. James Takacs, department chair. "And speaking of stories, each could sure tell some great ones. I miss that already."

As you can see, both of these men have created footprints in this department that will not soon be forgotten! They will be greatly missed by all of us here at the Department of Chemistry. If you have any memories of Walt or Jonathan, we'd love to hear them. Thank you Walt and Jonathan for all your years of dedicated service!

## Faculty Receive Notoriety in the Following Publications:

Dr. Griep and his lab were recently published in ACS's *Journal of Chemical Education*.  
<http://pubs.acs.org/doi/abs/10.1021/ed300092t>

A paper from Dr. Xiao Zeng's research group made the cover of *Journal of Chemical Theory and Computation*.

[http://pubs.acs.org/subscribe/covers/jctc/jctc\\_v008i009.jpg?0.13276423804018544](http://pubs.acs.org/subscribe/covers/jctc/jctc_v008i009.jpg?0.13276423804018544)

Dr. Marilyne Stains is featured as the evaluator of the Cottrell Scholars Collaborative New Faculty Workshop in *Chemical & Engineering News*.

<http://cen.acs.org/articles/90/i36/Boot-Camp-Professors.html>

## Junior Faculty Adding Strength to Research



Dr. Marilyne Stains

Some of our junior faculty members have been very busy securing numerous grants for the department. These are just a few of the awards:

Dr. Marilyne Stains was awarded a National Science Foundation grant. The EAGER which was submitted to the WIDER program is titled Evidence-Based Instructional Practices in Action: Enhancing Exemplary Teaching at the University of Nebraska-Lincoln. One of the primary goals of this grant is to develop and implement a professional development program designed to train chemistry, biology and physics faculty in the implementation of evidence-based instructional practices.



Dr. Clifford Stains

Dr. Clifford Stains has also been awarded several grants including an Eppley Cancer Center Pilot Project titled "High-Throughput Screening of Kinase Inhibitors Using a Real-Time Activity Assay." Its goal is to adapt a fluorescence-based kinase activity assay to high-throughput screening for inhibitors of kinases involved in cell migration. Plus, an Elsa U. Pardee Foundation grant titled "Direct Protein Kinase Activity Sensors for Interrogating Clinically Relevant Signaling Pathways." Its goal is the development of direct activity sensors for protein kinases involved in metastatic signaling.

## Regional ACS Meetings Represented Well by Faculty, Students, and Alumni

This year's regional fall American Chemical Society (ACS) event took place in Omaha, NE, practically our backyard. UNL's Department of Chemistry participated in a variety of ways. Staff set up an exhibit booth and had a great time talking to prospective graduate students and undergraduate students looking for summer research opportunities. Plus, we had the pleasure of talking to numerous alumni from the region, catching up on old times—definitely some interesting stories for sure!

We are proud to say several of our grad students presented some excellent posters at the conference's poster sessions, and we had several of our professors present their research during various sessions.

One of Dr. Rebecca Lai's postdocs, Seyed Ehsan Salamifar, presented two talks. The first one was about the "Application of Scanning Electrochemical Microscopy in the Characterization of Folding-based Electrochemical DNA Sensors" and the second one focused on the "Real Time/In-Situ Studies of Oxidative Stress in Cancer Cells Using Scanning Electrochemical Microscopy and Fluorescence Microscopy."

All in all, it was another great ACS event, and we hope to see you at the next one.

## Norton Peet, Director of Chemistry at Microbiotix Shares His Alumni Story

It is humorous to imagine the director of chemistry at a biopharmaceutical company brewing his own liquor as a grad student for a UNL football game—one they watched from the roof top of Avery Hall. Sound like any former colleague you know? Let's hope that student's brews have improved as he has gotten older. That is one of the many memories Ph.D. alum, Norton Peet, recalled as a grad student here at UNL.

Peet attended UNL from 1966 to 1970 completing his doctorate in an unheard of 3.5 years thanks to a NIH pre-doctoral research grant.

In those 3.5 years, Peet created some wonderful memories. He speaks very fondly of his professors and especially his advisor Dr. James H. Looker.

"My colleagues and I were lucky to be a part of the Department of Chemistry at UNL during this era when we had a group of outstanding organic professors who taught, mentored, and advised us," commented Peet. Among his favorite professors he recalls were: James Looker, Norman Cromwell, Henry Baumgarten, Desmond Wheeler, Charles Kingsbury and Chris Michjeda. "This was the Camelot Era at UNL."

Peet recalls being enthralled with this innovative learning environment and absorbing it all along with the numerous opportunities it presented.

"My fondest memories really revolve around being a part of a dynamic chemistry department where I could learn new things, conduct independent basic laboratory research, synthesize new compounds that had never before been reported, and prepare myself for a career in the chemical/pharmaceutical industry where I could apply my knowledge to real-life challenges."

Peet credits that environment for producing some outstanding chemists who thrived as students and in their careers as well. Peet admits he can't recall all the names of his colleagues who have done exceptionally well, but did remember a few who he thought were worth mentioning: Robert Cregge, Claire Olander, Robert Auerbach, Richard Rodebaugh, Barry Gold, Earl Doomes, Karlheinz Kronberger, and George Glaros.

Peet's time with the UNL Department of Chemistry wasn't all work. He did find time to relax with his friends, which is often a precious resource in grad school.

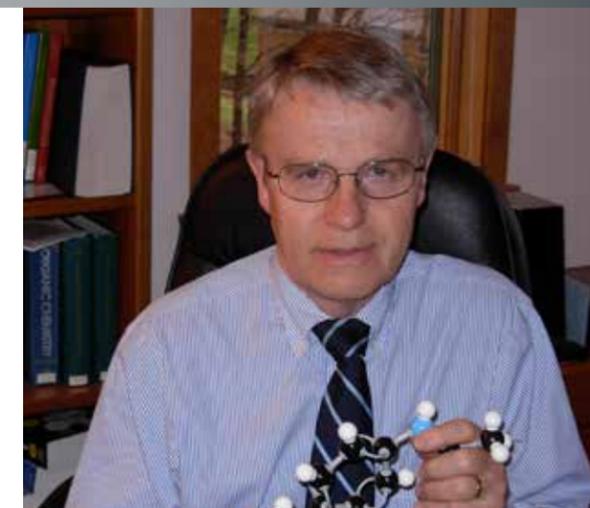
"I will always remember the radiator that the graduate students mounted in the big lab in Avery Laboratory, which served as a heater in the winter (with steam) and an air-conditioner (with cold water) in the summer. I also remember attending a football game with wineskins containing grape juice and lab ethanol (guaranteed to be benzene-free by hplc by Don Olander) with colleagues. It was more usual for us to take a break from lab work on a Saturday afternoon and watch the game from the top floor of Avery Laboratory."

When Peet had the time, he and his wife Pat would often spend their leisure time ice skating, playing bridge, putting together jigsaw puzzles, and seeing an occasional movie when the budget would allow.

However, during his grad school years there were some challenges. Peet recalls that he and his wife had to live on a tight budget while both were attending UNL. (Sound familiar?) To give an idea of how prices have changed, Peet noted that his apartment on 16th and G streets was \$73 a month back in the late 1960s. What our current grad students wouldn't give to be paying \$73 a month in rent.

With his UNL education, Peet was able to build a long and successful career.

"UNL equipped me with strong skills in synthetic organic chemistry and a good work ethic, which placed me in a good position for selling myself to industry." His



Dr. Norton Peet

first job with Dow Chemical led to a progression of assignments with increasing responsibility with a company that was about to embark on a series of mergers and acquisitions. He stayed with this progression until the company name was Aventis, where he was head of Medicinal Chemistry and a Distinguished Scientist. Peet realized that his major responsibility had evolved into the management of mergers rather than science, so he left big pharma in 2000 to become a VP at ArQule, where he built an integrated Drug Discovery Group for the company. In 2002, he became the first CEO of Aurigene Discovery Technologies. He built and staffed a small laboratory in Boston and a large laboratory in Bangalore, India. In 2005, Peet became an international consultant to the pharmaceutical industry and shortly after became the director of chemistry at Microbiotix in Worcester, MA, where he is presently one of the executives that manages an anti-infective company.

Peet is also very active in the scientific community with several professional affiliations including the American Chemical Society and the Industrial Advisory Board for the Department of Chemistry at UNL. In addition, he also has worked with several scientific journals, spoke at numerous universities on drug discovery, and chaired several international symposia. His publications include 150 research articles, several book chapters, and inventorship on 65 U.S. patents.

In his spare time, Peet enjoys woodworking, playing the piano, and volunteering with various organizations, which include their local church, Merrimack Valley Habitat for Humanity, the United Way, and Cor Unum.

Peet and his wife Pat, who also graduate from UNL, have three wonderful children (Dustin, Dulcie and Andrea) and have nine grandchildren, including recently born twins.

*If you enjoyed reminiscing with Peet please consider sending us your alumni updates.*

## Alum, Paul Ries, Offers Words of Advice for Graduate Students

You would think working in the Air Force on top secret projects would be an alluring career for a young man. However, UNL chemistry alum recalls more than once getting arrested for security clearance issues. Surprisingly (sarcasm) he got tired of calling his superiors and asking them to tell authorities that he was in fact working on a top secret project. Spending several nights in jail has a way of forcing you to re-evaluate your career choices. So Paul Ries decided to go back to school to get his Ph.D. in chemistry. "I always knew I wanted to become a scientist, even when I was little," commented Paul Ries, UNL chemistry 1988 alum.

However, Ries recalls the journey to become a scientist/chemist was a rough row to hoe and has some advice for current graduate students.

"Although course work (e.g. quantum chemistry, classical electrodynamics, etc.) was demanding, the main challenge was making the transition from being a consumer to a producer of knowledge," Ries explains. "Once, while reviewing lab data with my advisor (Dr. Craig Eckhardt) I asked if I had gotten the 'right' answer. He responded, 'I don't know. You tell me. No one has ever run that experiment before.'"

Ries also faced the challenge that many chemistry graduate students encounter and that was the unshakable feeling that graduate school would never end. Was there a light at the end of the tunnel? He wondered if all that hard work was worth it. Would he ever graduate? All those thoughts ran through his head. It all seemed so daunting.

"Two challenging aspects of graduate school were learning to deal with delayed gratification and ambiguity. Unlike undergraduate or other professional education programs, there was no set curriculum, no specific end-date, and no guarantee of success. There were times when it was not clear progress was being made. I hit the wall about four years into the program and seriously considered quitting the program."

At the same time, he recalls being offered a job again with the Air Force. It was a hard decision Ries recalls. He spoke with Dr. Eckhardt at great length about his dilemma, but finally came to the conclusion that he could stick it out.

"Although course work (e.g. quantum chemistry, classical electrodynamics, etc.) was demanding, the main challenge was making the transition from being a consumer to a producer of knowledge," Ries explains. "Once, while reviewing lab data with my advisor (Dr. Craig Eckhardt) I asked if I had gotten the 'right' answer. He responded, 'I don't know. You tell me. No one has ever run that experiment before.'"

The life skills Dr. Eckhardt and other advisors taught Ries made a lasting impact on his career.

"The professors were very helpful. For example, once while struggling to develop a theoretical framework, professors Eckhardt and Gallup both made themselves available for numerous discussions and were very encouraging. Professor Apple told me 'If one person knew all the answers, there would be no need for the rest of us. We would simply go and ask them.'"

Likewise, Dr. Eckhardt had some sage words of advice.

"UNL prepared me by providing a solid technical foundation while honing my critical thinking skills. I was encouraged to step back and look at the big picture. Dr. Eckhardt used to say 'solve the specific problem and you have an answer, solve the general problem and you have a solution.' This advice has served me well over the years."

Currently, as The Dow Chemical Company's Associate Commercial Director, Ries evaluates a wide range of technologies such as biotechnology, material science, catalysis, and polymers. Those responsibilities coincide with his advisement work in research and development. Ries facilitates the department with project analysis and critical thinking, thus shaping the direction of its research program. Additionally, Ries is also responsible for negotiating deals with other companies and recommends venture capital investments for Dows' Venture Capital Fund.

In Ries' spare time, along with his wife, he mentors 40 young adults at their church. He also enjoys cycling, running, flying, and flight instruction. Where does he find the time?

If you would like to share your story, email us at [kerry.vondrak@unl.edu](mailto:kerry.vondrak@unl.edu) or fill out an update on-line at <http://www.chem.unl.edu/dept/alumnreg.shtml>.

## UNL Alum Spends Internship in Cape Town, South Africa



Michele Kalal a former undergraduate researcher in Dr. James Takacs' lab shares her most recent trek of her career path with us in a letter to Dr. James Takacs.

*Dear Dr. Takacs,*

*I hope you are having a great year so far. It is a weird feeling not to be back at UNL this fall, but it is also a very good thing as I am at a great stage in my life. My original plan was to start earning my masters degree in public health this fall, but I decided to postpone that when I got offered two very good internships.*

*For my first internship, I spent February through April in Ho Chi Minh City, Vietnam where I worked for the East Meets West Foundation. It is an American nonprofit that works to improve healthcare, infrastructure, education, and clean water in developing nations.*

*I am currently in my second internship for the Paediatric AIDS Treatment for Africa (PATA). I started in June and will be working here in Cape Town, South Africa until mid-December when we hold our annual summit. PATA is a network of over 200 clinics through more than 25 sub-Saharan African nations. We work hard to provide resources and up-to-date training to our clinic teams through our local forums and annual summit as well as the Expert Patient program. This year's summit will focus on the continuum of care, managing co-infections, and disclosure. Our clinics reach over 50% of children on ARVs in the world.*

*I have learned so much this past year, and am very grateful that I had the opportunity to take off around the world for 2012. My future plans still include earning my masters degree, hopefully starting this spring.*

*Sincerely,  
Michele Kalal*

A little update on Michele, she has just recently been accepted into Boston University's School of Public Health's masters program.

Michele, thank you for sharing your stories with us, and we hope to hear more wonderful success stories from you as you grow in your career!

## UNL Alum Finds Rewarding Work at LI-COR

Undergraduate research helped springboard UNL alum Bambi Reynold's love of chemistry research and set the path for a successful industry career at LI-COR in Lincoln, NE.

It turns out, securing a position in Dr. Hage's research lab proved to be a pivotal experience.

"The training I received at UNL was beneficial because the lab work gave a very nice insight to what a typical lab might do."

Reynolds explains she was able to learn more about instrumentation and methodologies in only a way that hands-on undergraduate research could do. For many, undergraduate research is a deciding factor whether they really want to go into research and chemistry lab work or something different altogether. For Reynolds, her undergraduate research only strengthened her resolve to go into chemistry.

When Reynolds graduated in 1999, she was hired at LI-COR as a chemist synthesizing dyes.

"I really enjoyed performing small scale synthesis with nucleotides. Working at LI-COR gave me a great insight in combining chemistry, microbiology, and engineering for the purposes of creating products which I found very interesting and rewarding."

Reynolds is currently a Licensing and Intellectual Property Manager at LI-COR Biosciences. LI-COR Biosciences is a scientific instrumentation company with two divisions. She works in the biotechnology division. Her position is responsible for reviewing invention disclosures, patents, and bringing in other technologies which require a very broad knowledge base.

Outside of work, Reynolds loves spending time working out, watching movies, going to sporting events, and watching her two boys enjoy their favorite activities.



## Chemistry Day Hits Record Enrollment

This October, we had our annual Chemistry Day event for high school students. We are happy to announce we had a wonderful student and teacher turnout this year. In fact, we reached capacity with record enrollment!

The purpose of this event is to introduce high school students to the UNL Department of Chemistry undergraduate programs including clubs, award winning instructors, and scholarship information. Plus, this event serves as a perfect catalyst to get students thinking about the relationship between a chemistry degree and their future career.

This year, teachers and students enjoyed a variety of actives and took part in fun, hands-on chemistry demonstrations. The feedback from the attendees was resoundingly positive and enthusiastic. This truly is a "don't miss event" for any chemistry enthusiast! If you know of a high school student who's interested in chemistry, encourage them to attend this annual event. For more information, check out: <http://www.chem.unl.edu/chemday/index.shtml>.



Dr. Sinitskii shows Chemistry Day participants his latest research.

## Newly Renovated Undergraduate and Research Labs

The north wing renovation on 2nd floor of Hamilton Hall is now complete. Soon all the CHEM 100-level laboratory classes will be held in completely redesigned, remodeled laboratories. These labs are designed to not only accommodate all students currently taking 100-level labs, but they also have the capacity to accommodate a 30% enrollment increase above current levels. In addition, the 2nd floor plan houses newly configured, combined prep labs for both 100- and 200-level lab courses.

Additionally, we are continuing to renovate research labs. Dr. Clifford Stains and Dr. Marilyn Stains both received newly renovated labs with the most up-to-date equipment.

Dr. Cliff Stains' lab space was designed around interdisciplinary science, specifically the interface of chemistry and biology. It allows for solution-phase organic synthesis as well as molecular biology experiments to take place in the same setting. This laboratory space will give them access to modern fume hoods and cell culture equipment, which were not available to them before.

Upgrades for Dr. Marilyn Stains' lab area include its own interview room for chemical education research. Plus, the room also allows them to confidentially conduct audio and video interviews and observations with our research participants.



Dr. Clifford Stains' newly renovated research lab.

## Chemistry Department Student Workers Receive Two Ovation Awards

The College of Arts and Sciences Ovation Award for September goes out to **Adam McQuistan**, student worker in the Department of Chemistry! *As his nominators say:*

"Adam has been a life saver for the Chemistry Resource Center and the Department of Chemistry. Adam has worked as a student worker in the chemistry department since the Fall of 2010. He has been a student worker in the Resource Center office, worked with the lab renovation, and has been in an undergrad lab, and a reci and Instrumentation Center teaching assistant. He is a major reason the renovation of the chemistry labs has run so smoothly. He worked tirelessly removing glassware and other items from the labs then turned around and replaced it all again once the rooms were finished. He has organized, typed, copied, tutored, and then turned around and did it all again. We realize that most of these tasks are very monotonous but need to be done, and he has worked independently and has taken ownership of many projects. We will have to replace him in the spring and this will be almost impossible. THANK YOU ADAM for all your hard work and dedication to the Department of Chemistry!"

"I have worked with Adam for two years in the UIC. Adam is a top notch student worker. He is very easygoing and flexible and is always willing to help out. Since the UIC sees a variety of undergraduate students, he is always answering questions from different chemistry courses. Last fall, Adam did a FANTASTIC job covering a majority of the classes that came through while I was on maternity leave. Adam made sure that all the instruments were ready for the classes and that everything ran in an orderly fashion. Adam will graduate soon, and he will be very difficult for me to replace!"

"Adam has been a great student worker. Adam has been outstanding in helping with renovation of our chemistry labs."

"Adam comes up with good ideas to make the job go faster or easier. You can tell Adam what needs to be done and he gets it done with very little supervision. Things would not run as smoothly for the chemistry resource center without Adam's help. Adam is very deserving of the ovation award."

"Adam has become an important part of the Department of Chemistry. Whatever he is asked to do for the department, he will accomplish. From cleaning out and organizing labs, and assisting with the lab renovation, to organizational tasks he is the "go to" man. He always has a great attitude and a smile. We will be very sorry to see him graduate and move on, but appreciate his contributions immensely."

Plus, the November Ovation went out to **Carolyn Clark**, another Department of Chemistry student worker! *As her nominators say:*

"Carolyn is a fantastic student worker. She takes on any tasks that you give her and completes them with little or no supervision. She arrives with a smile on her face and is ready to tackle whatever tasks she is assigned. We are very fortunate to have her working with us. I would like to nominate her for the OVATION AWARD to show my appreciation for her continued hard work and dedication in the Department of Chemistry!"

"Carolyn is: wonderful, efficient, cheerful, always up for a challenge, a superior shredder, a photo shop wiz and tons more. You name it, she can do it! Carolyn is very deserving of the Ovation Award for all her great work in the Department of Chemistry!"

"Carolyn is a huge asset to the chemistry department. She has been with us since she was a freshman, and it has been fun to see her grow and mature. She is a very quick learner, and doesn't let any grass grow under her feet. She is always hustling



Adam McQuistan



Carolyn Clark

around, keeping busy and cheerful in whatever task she has been given. She is a very good communicator, and always looking to take on a new project. She juggles her busy school schedule with her work schedule, and is highly reliable. She is very good at multi-tasking. Carolyn is very deserving of this award. I would trust her to do anything, and to do it well!"

"Carolyn Clark is exactly the type of student worker that every department needs. She comes in, gets her job done quickly and efficiently, and always, always has a smile on her face. Another great reason to show someone like Carolyn how much they mean to us is it helps us build team morale and continuity. When you have someone who knows what they are doing and what needs to be done it just makes it easier for everyone involved. Carolyn is deserving of an Ovation award!"

The Ovation award is staff and faculty's way to say thank you to our student employees recognizing their innovative ideas, their consistently outstanding performance, or their service above and beyond the call of duty. Again, congratulations to Adam and Carolyn for their very deserving awards! Read about more awardees at <http://cas.unl.edu/ovation.aspx>.

### Congratulations to Our Summer/Fall Graduates:

#### SUMMER 2012

Monica Kinde, Ph.D.  
John Persons, Ph.D.  
Sean Smith, Ph.D.  
Nandun Thellamurege, Ph.D.  
Justin Huffman, Ph.D.

#### FALL 2012

Lili Lou, Ph.D.  
Tom Fisher, Ph.D.  
Jacob Friest, Ph.D.  
Michael Richardson, M.S.  
Ben Puffer, M.S.

## Donors and Board Members Help with Recruitment

Recruiting top notch graduate students can be very challenging with today's competitive environment. Sometimes the right offer can make all the difference in swaying a potential candidate. A little extra financial incentive can often level the playing field. However, the Department of Chemistry didn't have these extra discretionary funds at least not at the level necessary to make a real difference in our recruitment efforts. So at one of the Department of Chemistry's Industrial Advisory Board (IAB) meetings, it became apparent to the membership that some external help was in order.

The IAB board members concentrated their efforts in establishing and promoting the Chemistry Excellence Fund. Seed money for this fund was borrowed from another fund already started by Jim McClurg, former chair of the IAB. Jim agreed to transfer his fund to the Chemistry Excellence Fund. After that, other board members followed suit with donations and countless other donors became involved.

From the revenue this fund has generated, the Department of Chemistry was able to award its first Chemistry Excellence Fellowship to Alissa Horn. Ms. Horn was highly recommended to us by faculty from her undergraduate institution.

Currently, Horn is working in Dr. Rajca's lab. Their research is in the area of organic chemistry with an emphasis on the design, synthesis, and study of molecules with novel molecular structure and chemical properties.

As the fund matures, its capacity will increase and fund more promising new grad students just like Ms. Horn.

## Chemistry Faculty Remembrance Fund

The UNL Chemistry Faculty Remembrance Fund was created to establish an endowed fund for those wanting to honor professors who impacted their lives.

Each year, an award will be made in honor of a former faculty member to a deserving undergraduate or graduate student with the spendable income generated by this fund.

If you would like to give to this fund, the Chemistry Excellence Fund, or establish a fund in someone's memory or honor please call 1-800-432-3216 or visit <https://nufoundation.org/SSLPage.aspx?pid=2078&chid=25> for more information.

### 'New Form of Matter' continued from page 4

Zeng also said the specific solvent used was crucial. He said a team of scientists in Sweden tried a similar experiment several years ago, but used C<sub>8</sub>H<sub>8</sub> as the solvent and didn't get the super-hard ordered amorphous carbon cluster.

The laboratory experiments and tests were further confirmed after Zeng and his postdoctoral researcher, Hui Li, the lead author in the computational study, used some 1.4 million computer hours performing large-scale quantum molecular dynamics simulations—900,000 hours at the Oak Ridge Leadership Computing Facility at Oak Ridge National Laboratory in Tennessee, and another 500,000 hours at UNL's Holland Computing Center. As a point of comparison, that's the rough equivalent of one top-of-the-line desktop computer running calculations continuously 24 hours a day for 160 years.

"The simulation gave us some important insight to this material, atomic insight, because in the experiment, it's very hard to see how the matter collapses," Zeng said. "With the super computers, we can monitor the pressure and then monitor the matter under high pressure at atomic scale under different pressures."

Zeng said there were several scientific motivations for the work, especially the never-ending search by materials scientists for new forms of matter. A second factor is the search for technologically useful matter. The fact that the new, super-hard form of matter preserves its high-pressure structure in ambient condition is very important for possible future practical applications.

The research was supported by the Office of Science, National Nuclear Security Administration, the Office of Basic Energy Sciences in the U.S. Department of Energy, and the National Science Foundation. Zeng and Li's portion of the research was also funded in part by the Nebraska Research Initiative.

It's the first time that work from Zeng's lab has been published in *Science*, the journal of the American Association for the Advancement of Science, but it's the 10th time in 11 years that his work has been published in one of the four highest-impact interdisciplinary journals (including twice this summer). His research previously appeared in the other three, *Nature*, the *Proceedings of the National Academy of Sciences*, and *Nature Communications*.

— Tom Simons, University Communications

### 'CNFM' continued from page 5

with very interesting electronic, mechanical and optical properties, whereas Hofmann's group at EE studies chiral metallic nanostructures. The idea of their joint project is to combine these two exciting materials, graphene and metallic nanostructures, to produce a novel hybrid material with new interesting properties and potential applications in gas sensing. Also, in collaboration with Dr. Rebecca Lai (Department of Chemistry) they are working on hybrid graphene-metal oxide materials that may find applications in energy storage.

Check back and visit the CNFM's website for more information about the center and other research updates.

— Article written in part by the UNL's Office of Research and Economic Development Annual Report.

## Reconnect...

### Facebook, Twitter and LinkedIn



The UNL Department of Chemistry is now on Facebook! Become a fan of the University of Nebraska-Lincoln Department of Chemistry today.



Follow the UNL Department of Chemistry on Twitter! Keep up-to-date on department awards, events, and research by following @UNLChemistry on Twitter.



Join the University of Nebraska-Lincoln Chemistry Alumni group on LinkedIn and reconnect with professors, colleagues, classmates, and friends! The Department of Chemistry Alumni group will help you expand and strengthen your professional networks while keeping you posted on all of the happenings in the department.

### Chemistry Alumni Website:

<http://chem.unl.edu/alumni/index.shtml>

### Offering:

#### Class Listings:

Current listings of Ph.D., M.S., and B.S./B.A. graduates.

#### Connections:

Career Networking Services provide links to job listings, help with chemistry job searches, and provide 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.

#### Support the Department:

Learn how to support the UNL Department of Chemistry through a variety of ways.

### Connect to Job Opportunities with Husker Hire Link

Husker Hire Link is UNL's free online service that connects UNL students and alumni with employers. The site allows students and alumni to post and send resumes; search jobs, internships, and employers; request on-campus interviews; and stay updated on career opportunities. Last year, more than 2,200 employers from across the country in a wide variety of career areas used Husker Hire Link to post more than 8,000 jobs and internships.

For more information visit the Husker Hire Link at <http://www.unl.edu/careers/hhl>.



### Where are they now?

Attention alumni! We want to know where you are and what you're doing! Please take a moment to answer the following questions and return your responses by mail to:

University of Nebraska-Lincoln  
Department of Chemistry  
515A Hamilton Hall  
Lincoln, NE 68588-0304

Or, email your responses to: [kerry.vondrak@unl.edu](mailto:kerry.vondrak@unl.edu)

Name: \_\_\_\_\_

Degree: \_\_\_\_\_

Year Earned: \_\_\_\_\_

UNL Adviser: \_\_\_\_\_

Email: \_\_\_\_\_

Current and past career positions: \_\_\_\_\_

Please let us know of any significant events in your life and/or career since leaving the University of Nebraska-Lincoln. Also, please feel free to send any photos and/or recollections of your time here at UNL!

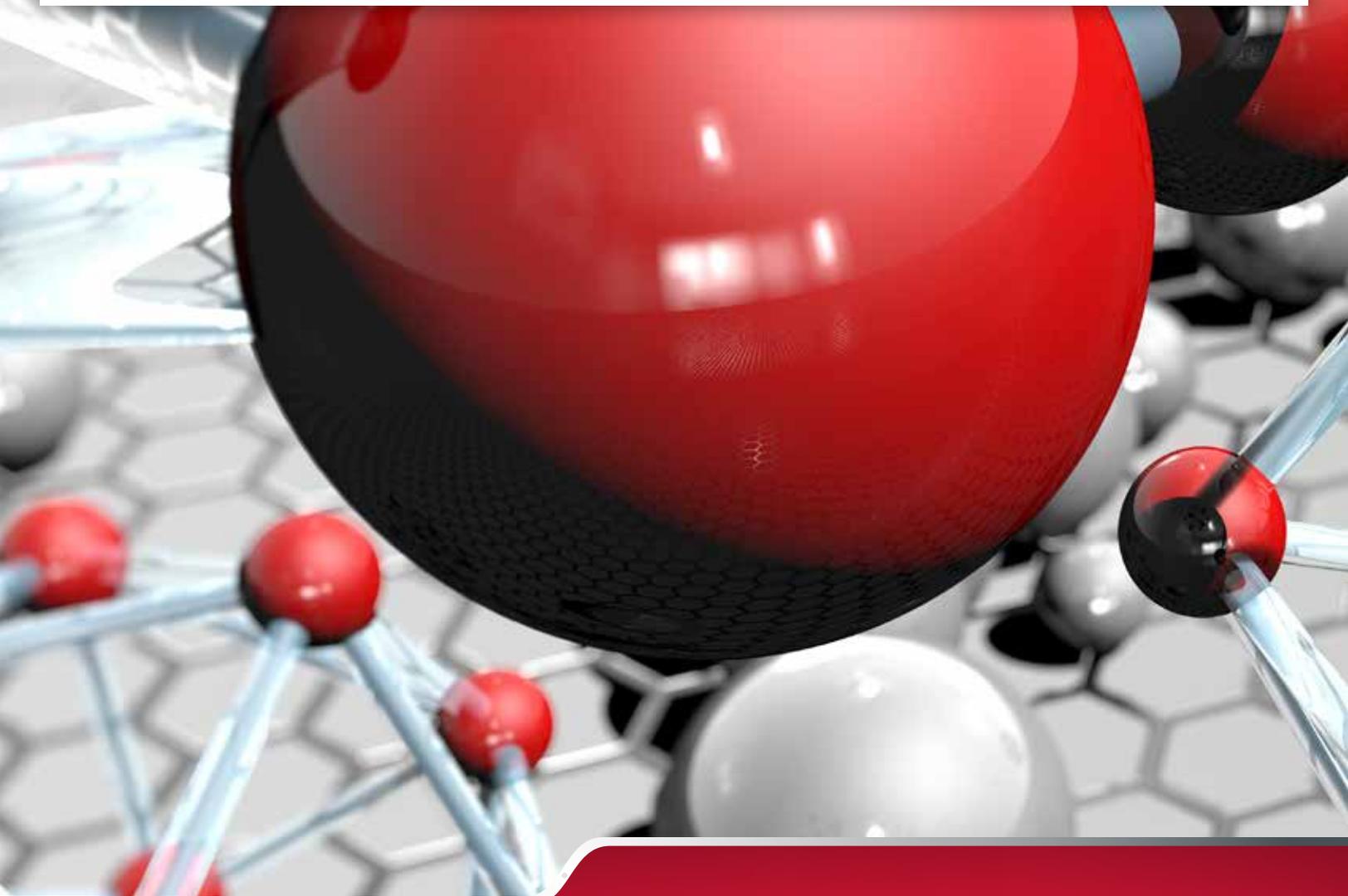
### Update Contact Information:

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

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