

# SPECTRUM

## *Department Moves to 21<sup>st</sup> Century Facilities*

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NO. 25 | FALL 2011 | UNIVERSITY OF NEBRASKA—LINCOLN | ANTHONY F. STARACE, EDITOR  
FOR THE ALUMNI & FRIENDS OF THE DEPARTMENT OF PHYSICS & ASTRONOMY

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The Rube Goldberg ribbon-cutting device designed by Jayme Cox.

# *Department Moves to 21<sup>st</sup> Century Facilities*

To do 21<sup>st</sup> century science, researchers require 21<sup>st</sup> century facilities. With the Department's move in May 2010 to a new building on 16<sup>th</sup> Street, opposite the Walter Scott Engineering Center, faculty, postdocs, and students will have excellent facilities for the Department's growing research and teaching programs. The new \$37 million building was funded by the Nebraska Unicameral as part of the University's request for building renovation funding. However, it was found to be less expensive to construct a new building than to renovate Brace Lab (built in 1906), Ferguson Hall (1948), and Behlen Lab (1965). This move re-unites the Department's faculty, students, and teaching facilities

in a single building. The recently built Diocles Extreme Light Laboratory, occupying the former atomic collisions laboratory located below ground between Richards Hall and Behlen Lab, will remain, and the lower two floors of Behlen will be renovated to accommodate the growing research effort centered on that laboratory.

In addition to the new building for the Department, UNL has received Federal stimulus funding of \$6.9 million from the National Institute of Standards and Technology (NIST) to help fund the \$13.8 million construction cost for a new Nanoscience Metrology Facility located adjacent to the new Department facilities. The non-Federal portions

of the construction costs were provided in part by the University of Nebraska Foundation and in part by the University. NIST is part of the U.S. Department of Commerce; its funding comes from the American Recovery and Reinvestment Act of 2009.

The new 4-story, 124,000 sq. ft. building for the Department includes two lecture halls, four teaching labs, and eight classrooms, as well as modern research space. Key features are atrium spaces extending from the first to third floors and containing two major works of commissioned art by artist Ray King of Philadelphia (for a fly-through, visit King's web site [<http://www.rayking.nu/#/Videos,2/>] and select Tetra/Chiral from the Videos drop

down menu). The building is UNL's second LEED-certified building, i.e., having a sustainable, environmentally friendly design. Nationally-known Perkins and Will Architects designed the new building, with Bahr Vermeer Haecker of Lincoln as the locally-based architectural firm. The building was constructed by Sampson Construction. It is expected to obtain a "Silver" LEED rating.

Jorgensen Hall was dedicated on October 29<sup>th</sup>, 2010. Alan Heeger (B.S. 1957), who won the Nobel Prize for Chemistry in 2000, was the keynote speaker. He recounted how the highlight of his undergraduate years was a course in modern physics taught by Ted Jorgensen that introduced him to quantum physics. Also, he related that he once asked Ted Jorgensen how to succeed in physics. Jorgensen's answer surprised him: Jorgensen inquired about Heeger's grades in English. Ted then went on to explain that being able to communicate well, both verbally and in writing, were essential to success as a scientist.

A highlight of the dedication was the ribbon-cutting ceremony. A very elaborate Rube Goldberg device was used to cut the ribbon. The device was the winning entry in a Department-sponsored contest, open to the general public, for proposals on how best to cut the ribbon. Jayme Cox, a sophomore at Pius X High School in Lincoln, and her father, John, a high school physics teacher there, submitted the winning entry. Their device had six steps, including a swinging bowling ball, an auger, and, to finally cut the ribbon, a large guillotine. Their device extended across much of the length of the rather long new hallway on the first floor of Jorgensen Hall. The six pieces of the ribbon-cutting device were first assembled on the day of the dedication and needed fine-tuning. However, the device worked perfectly at the ceremony as well as after the ceremonies in an encore performance in response to popular demand.

The dedication activities actually extended over an entire week. They included a talk on "Comic Book Physics 101" by Professor and Chairman Dan Claes on October 26<sup>th</sup> that explored physics topics inspired by iconic comic book heroes and a wide-ranging selection of physics demonstrations and experiments



**Demolition of Ferguson Hall**

by Cliff Bettis, Research Associate Professor and Lecture Demonstrations Manager, on October 27<sup>th</sup>. The day after the dedication ceremony was a home football game. So the Department organized an open house and tailgate party before the game, with students giving tours and lab demonstrations and Professor Tim Gay giving his famous "Football Physics" lecture.

The 32,000 sq ft Nanoscience Metrology Facility will provide state-of-the-art laboratories, shared research facilities, and administrative space for UNL's growing nanoscience effort, in which Department faculty play a significant role, as do faculty in several other departments and colleges. The facility is designed to make interdisciplinary collaboration possible by making core research facilities available in a single location. It will provide a low-vibration, temperature-controlled, low-electromagnetic field environment as well as clean rooms for cutting edge research.

The Department has needed new facilities for at least a decade or two, for several reasons. In the late 1980s, for example, the Department decided to increase the number of faculty involved in forefront areas of experimental physics, replacing its predominantly theoretical faculty as they retired. However, this meant that each new experimental faculty hire required new laboratory space that could only be carved out of existing space in Behlen, Brace, and Ferguson. As the number

of experimental faculty grew to more than half the Department's faculty, creating each new laboratory out of existing space became more and more difficult and expensive. In addition, owing to good hiring decisions, the new faculty have been overwhelmingly successful and thus have growing groups of postdocs and graduate students plus associated research faculty, all of whom have required new office space as well as expanded lab space. Furthermore, the success of the condensed matter faculty in building interdisciplinary collaborations in new areas of nanotechnology has required a number of "core facilities," i.e., expensive equipment that is shared by many researchers. Owing to the scarcity of space for such necessary facilities, they heretofore have had to be spread across the UNL campus. Finally, the Department's long-standing successes in adopting new modes of teaching have required technologically-sophisticated space to accommodate more easily the interactive modes of learning that have been shown to be most effective. For all of these reasons, the Department and UNL nanotechnology researchers welcome the new facilities that address these problems of success and growth.

EDITOR'S NOTE: *This article is based in part on articles that appeared in The Scarlet by Troy Feddersen, University Communications, (8 May 2008 and Oct 21, 2010), and by the UNL Office of Research (14 January 2010).*

# New Building Only One Sign of Big Changes in Department

After serving 12 years as Department Chair, **Roger Kirby** stepped down in August 2007 to turn more of his attention to research. (If you wish to drop him a note of appreciation and congratulations, he can most easily be reached through email: rkirby1@unl.edu) His years of service promoting the Department, touting its accomplishments, and lobbying on behalf of its best interests have meant that the Department enjoys an enormous amount of good will and strong support from both the College of Arts & Sciences and the University's central administration. Now that I have assumed the chair's position, I will try my best to fulfill the high expectations upon which that support is based.

We began the move into Theodore Jorgensen Hall in summer 2010. Fall 2010 classes were taught here, and a week of special activities (which we advertised widely as "Physics Week") culminated with a dedication and ribbon-cutting on October 29 that drew an estimated crowd of 350. A Department tailgate with a hundred attendees followed the next day, a football Saturday. The entire Fall proved busy as we settled in and the construction crews worked down the punch list of remaining issues, but I couldn't help but think how historic those same months were 105 years earlier. Then, as well, the Department had just started classes in the lecture hall of its brand new building while construction continued all around them. Early that October (2<sup>nd</sup>) DeWitt Bristol Brace, UNL Physics Department Chair, who had proposed and designed the new building, died at age 46 (as inconceivable as it seems today, of complications from an infected tooth). The building was completed and formally transferred to the University by year's end; that December, the name "Brace Hall" was proposed to honor the physicist's contributions to the University. Right in between those two

events (a month following Brace's death and within a month of the new building's dedication) Ted Jorgensen was born (13 November 1905).

The new building is simply the most visible sign of big changes in the Department of Physics and Astronomy. As the University of Nebraska enters the Big Ten, it is tempting to make comparisons with our new peers. We certainly can make no effort to compete in size. Currently, with 24 faculty, UNL will have the smallest Physics Department in the Big Ten, where the mean/median size is 49(50). We also offer the fewest number of research specialties. However, normalized to undergraduate enrollment, UNL would be expected to have 30 (32) Physics faculty, based on the Big Ten mean (median). This makes the Department's current target of 29 faculty about right. Big Ten physics departments average one specialty area for every 7 faculty. This makes our focus on 3 also seem about right.

Past investments have proven key in placing all our areas competitively. Six Big Ten schools run MRSECs (OSU, NWU, Penn State, U-Minn, UW-M and *Nebraska*). Six operate Tier-2 computing centers: Indiana, Michigan, and MSU (as part of the Atlas experiment); and Purdue, Wisconsin, and *Nebraska* (CMS). Only Michigan and *Nebraska* can boast an ultrafast petawatt laser center. As the single institution with all three, Nebraska is well-positioned for both impact and funding. While below average in total research dollars (\$11M compared to the \$17.4M mean and \$6.5M(NWU)-\$36.595M(MSU) range) in *research dollars/faculty* (\$469K) we rank above the \$369K average, placing 4<sup>th</sup> overall in the Big Ten.

With a (not yet fulfilled) target of 10 faculty, our AMOP group will be tied for 3<sup>rd</sup> in size within the Big Ten. Once it reaches 14 faculty, CMMP will place just *below* the average Big Ten group size. Our HEP group is by far the smallest of all the Big Ten schools (Northwestern's 3 recent retirements will be filled). Like the Department, the HEP members are tightly focused, in this case on a single CERN collider experiment (CMS).

For more evidence of our heady growth, consider:

While for over a decade the Department consistently graduated 10-11 Bachelors annually, the year I arrived (1997) it was merely 3. This reflected a national trend, and for the next several years we faced a slump with a fairly steady graduation rate of 4-5. Our efforts to attract undergraduates into our research teams may have helped to turn that around. Over the past half dozen years the enrollment of Physics and Astronomy majors climbed to where we now have 70 declared majors and are graduating 12-13 students a year.

Since I joined, the Department has pretty much maintained a steady state of 60-65 graduate students. The external committee performing the Department's 2006 *Academic Program Review* suggested the size and projected growth of our research demanded more like 80-90 graduate students. Although we felt constrained by rounds of budgets cuts that had reduced the number of college-funded TA lines, 80-90 became our expressed goal for the past couple years. As of this fall we have 80 graduate students! This growth may be attributed to new and continuing summer REU programs (offering *Research Experiences for Undergraduates*), our annual *WoPHYS Conference for Undergraduate Women in Physics*, a *Big Red Visitors Day* for the graduate school applicants we make offers to, and the all-volunteer-run

8-week *Bridging Program* we offer each summer to the incoming class, as well as the establishment of a number of pipelines with specific undergraduate institutions.

The *Diocles Extreme Light Laboratory*, where work is done with high energy, ultra fast pulses of laser light, has been undergoing an upgrade to a power of 1 petawatt ( $10^{15}$  Watt) – which will make Diocles one of the world’s most powerful lasers. A recent \$1,825,345 grant through the National Science Foundation’s Academic Research Infrastructure Program is funding renovations to the Behlen Laboratory basement and sub-basement, converting the space into a state-of-the-art, collaborative laboratory, the *High Power Laser Science Collaboratory*. This 4,991-square-foot expansion to Diocles will include five laboratories, collaborative research space for laser scientists and a chamber for a second high-power laser, to be built by **Donald Umstadter** and his team, with funding from the Air Force Office of Scientific Research.

UNL’s *Tier-2 Computing Center*, a collaborative effort with Computer Science and Engineering, is one of only seven U.S. CMS Tier-2 sites in the Worldwide LHC Computing Grid, the first truly worldwide grid computing infrastructure. This grid combines the computing power of more than 140 independent computer centers in 34 countries and supports the Large Hadron Collider (LHC) experiments. Data has been transferred at peaks of 10 gigabytes per second, the equivalent of two full DVDs of data a second. **Ken Bloom** serves as Tier-2 coordinator for the US-CMS and is co-primary investigator on the UNL part of the project with **Aaron Dominguez** and computer scientist David Swanson, Director of UNL’s *Research Computing Facility*.

Despite the continued noise and occasional interruption in services, we’re excited that the construction boom continues. Federal stimulus funds of \$6.9 million from the National Institute of Standards and Technology is providing half of the \$13.8 million total construction costs of a new Nanoscience Metrology Facility. The 32,000-square-foot Facility will house the shared research facilities and administrative space (currently located in several buildings across campus) of the *Nebraska Center for Materials and Nanoscience* immediately adjacent to Jorgensen Hall. Complementing this is the \$6.3M Research Development, Testing & Evaluation congressional appropriation that NCMN Director **David Sellmyer** secured, some of which goes toward the purchase of new equipment for the facility.

As always we hope you’ll consider visiting sometime to see some of these changes first hand.

Sincerely,



Daniel R. Claes  
Professor and Chair

## A PROFILE OF DANIEL CLAES



In Fall 2007 Dan Claes was named Department Chair, succeeding Roger Kirby. Claes, an experimental high energy physicist, joined the Department in August 1996. With students and

postdocs and the Department’s tightly-knit High Energy Physics group, he does research at both Fermi National Laboratory (Chicago) and CERN (Geneva). He is also a Principal Investigator on the Cosmic Ray Observatory Project (CROP), an ambitious outreach effort to involve Nebraska high school science teachers and students as contributing collaborators in a large scale study of cosmic ray showers.

Claes received his B.S. degree with honors in physics and mathematics at the University of Northern Iowa and his Ph.D. from Northwestern University (1991). His dissertation concerned the measurement of the cross section for photoproduction of  $D^{*\pm}$  mesons at the Fermi National Laboratory (FNL) fixed target experiment (E687). As a postdoctoral researcher for SUNY-Stony Brook, he worked on the FNL DZero experiment, developing software “trigger” codes (to make real time data selections with the aim of reducing the data collection rates to values manageable by the experiment’s storage systems) and performing a search for the scalar top squark (a theoretical Supersymmetric partner to the top quark). Since joining UNL, he has overseen the upgrade to, and then led, DZero’s trigger effort. He continues conducting searches for exotic extensions to particle physics’ Standard Model, with the aim of setting limits on the existence of a number theoretically-predicted Supersymmetric particles.

## CONTACT US

**Dan Claes**, Chair, and **Anthony Starace**, Editor, encourage you to contact us with your news and comments. Our emails are: [dclaes@unlhep.unl.edu](mailto:dclaes@unlhep.unl.edu) and [astaracel@unl.edu](mailto:astaracel@unl.edu) Also, the Department Web page is: <http://physics.unl.edu/>

# Martin Centurion

In academic year 2008-2009 the Department carried out a search for a tenure-track assistant professor with expertise in experimental atomic, molecular, optical, and plasma (AMOP) physics. Over 50 applications were received, 5 were short-listed and interviewed, and Martin Centurion



of the Max Planck Institute for Quantum Optics (MPQ) in Garching, Germany, was offered the position. He accepted the offer and joined the Department in Fall 2009. At UNL he plans to investigate dynamical processes on an ultrafast timescale and with atomic resolution.

Martin Centurion was born and raised in Paraguay. He earned his B.S. degree at the University of Michigan,

graduating in 2000 with Highest Distinction and High Honors in Physics. He also won Michigan's William L. Williams Award for Best Undergraduate Thesis in Physics. He earned his Ph.D. in physics from California Institute of Technology in 2005. His doctoral research, done under the supervision of Professor Demetri Psaltis, concerned the nonlinear propagation of femtosecond laser pulses. Following graduation, he was awarded an Alexander von Humboldt Foundation Postdoctoral Research Fellowship, which he held while working in the Laboratory for Attosecond and High-Field Physics at the MPQ in Garching, Germany.

Shortly after arriving at UNL, the Department of Energy's Office of Science announced in January 2010 that Martin was awarded a \$750,000 Early Career Research Program grant for his proposal entitled "Ultrafast Electron Diffraction from Aligned Molecules." Funding is being provided by the DOE

Office of Basic Energy Sciences through the Atomic, Molecular, and Optical Sciences program. In 2009 DOE received 1,750 applications for Early Career Research grants and 69 awards were made, giving a success rate of less than 4%.

The goal of Centurion's project is to measure the 3-dimensional structure and dynamics of isolated molecules in the gas phase. The project will provide a means to observe ultrafast dynamics in both space and time in previously inaccessible systems. A new method is proposed to accomplish this. It involves ultrafast electron diffraction and laser-induced alignment to target molecules and ultrafast reactions that cannot be imaged by other methods. If successful, this method could be utilized for elucidating the structure of biomolecules that cannot be crystallized, and has the capability to produce images of fast conformational changes in complex molecules.

# Ilya Kravchenko

Dr. Ilya Kravchenko joined the Department faculty as an Assistant Professor in August 2008.



After receiving his undergraduate and masters degrees at the Moscow Institute of Physics and Technology, Ilya moved to the U.S. to complete a Ph.D. degree

at the University of Kansas in 1999. He then worked for the Massachusetts Institute of Technology (MIT) in different postdoctoral research

positions before coming to UNL.

Ilya brings a broad range of talents to the experimental High Energy Physics (HEP) research group. His Ph.D. research employed the CLEO (short for "Cleopatra") detector at the Cornell Electron Storage Ring (CESR, pronounced "Caesar") to study properties of the tau lepton. As a postdoc at MIT, Ilya first joined the CDF (Collider Detector at Fermilab) experiment at Fermilab's Tevatron Collider where he became a leader studying the characteristics of B mesons, which contain bottom quarks. He then turned to the Compact Muon Solenoid (CMS) experiment being prepared for CERN's Large Hadron

Collider (LHC) and served as the project manager for MIT's Tier 2 computing facility for CMS. Ilya has also been involved in the study of ultra-high energy cosmic-ray neutrinos with the RICE (Radio Ice Cerenkov Experiment) experiment located in Antarctica.

During his first year at UNL, Ilya was successful in obtaining research support from the National Science Foundation and the American Recovery and Reinvestment Act. He continues to work on CERN's LHC experiment as his primary research project while maintaining an active role in particle astrophysics experiments.

— Gregory R. Snow

# Alexei Gruverman

In Fall 2007, Alexei Gruverman joined the Department as Associate Professor of Physics. He brings his expertise in Scanning Probe



Microscopy to both the Department's Condensed Matter and Materials Physics (CMMP) group and the Nebraska Center for Materials and Nanoscience (NCMN).

Alexei studied physics in Yekaterinburg (formerly Sverdlovsk), Russia, which lies in the eastern foothills of the Ural Mountains. In 1990 he completed his Ph.D. in solid state physics at Ural State University, a major center for the study of domains in ferroelectric crystals. Following a postdoctoral appointment there, he joined the National Institute for Research in Inorganic Materials and later the Joint Research Center for Atom Technology in Tsukuba, Japan.

Motivated by applications to the development of nonvolatile memory technologies based on the bi-stable character of ferroelectric polarization, Alexei recognized the need for nanoscale measurement and control of

polarization in ferroelectric thin films. He pioneered a new form of Scanning Probe Microscopy called Piezoresponse Force Microscopy (PFM) that allowed mapping the electric polarization and imaging the domain structure of ferroelectric materials on the nanoscale in a nondestructive manner - a major advantage in comparison with electron microscopy. The PFM approach also opened a possibility to manipulate the domain structure at will, allowing investigation of the switching dynamic properties as well. Gruverman continued this line of research when he joined Sony Corporation in Yokohama in 1997 as a member of the research project aimed at development of ferroelectric random access memory (FeRAM).

Upon joining North Carolina State University in 2000, Gruverman was among the first to apply PFM to a wide range of biological systems, finding that piezoelectricity is pervasive in biological materials. Although it has been known for more than half a century that bone tissue is piezoelectric, using high-resolution PFM Alexei was the first to localize the piezoresponse in the helical fibrils of bone collagen. He has also imaged the nanoscale piezoelectric activity in tooth dentin and other collagen-containing tissues such as, e.g., in the chitin fibers

of butterfly wings!

Gruverman's pioneering development of the PFM technique and his continual advancement of its capabilities to enable their wider use have kept him at the top of the field, even as it grows rapidly due to increasing interest in applications to ferroic materials. He is in high demand as a collaborator, speaker, and conference organizer as his creativity and scholarly accomplishments continue to propel the field forward. In 2004, he was awarded the Ikeda Memorial Foundation Award (Japan) "for significant contributions to nanoscale science and ferroelectric technology." In 2010 he received an Outstanding Achievement Award from the International Symposium on Integrated Ferroelectrics.

At UNL, Alexei has built a new PFM laboratory for investigations of polarization domains and domain dynamics in ferroelectric thin films and nonvolatile memory devices, as well as multiferroic (e.g, combined magnetic and ferroelectric) materials and composites. In addition, he works with most research groups investigating ferroic materials. He is also developing research projects having medical and biological interest in collaboration with the UN Medical Center.

— Stephen P. Ducharme

## INTERIOR VIEW OF JORGENSEN HALL



# Axel Enders

In Fall 2007, Axel Enders joined the Condensed Matter and Materials Physics (CMMP)



group. His background in nanoscale magnetism made him the strongest candidate for the position from amongst a large number of applicants. An important reason

for the search was to attract a candidate who could bring to UNL expertise in scanning tunneling microscopy

for magnetic imaging with atomic resolution.

Enders, a German citizen, obtained his Diplomarbeit (diploma project) in surface science at Martin Luther University Halle in Wittenberg, Germany. He obtained his Ph.D. in physics from the Max-Planck-Institute for Microstructure Physics and the Physics Department of the Martin Luther University, Halle, Germany, in 1998 and received the highest Ph.D. student award. His doctoral research, done under the supervision of Professor Jürgen Kirschner, resulted in his thesis titled, “Mechanical stress and ferromagnetism

in ultra thin films.” From 1999 – 2007 he held postdoctoral and staff scientist positions at the Simon Fraser University, Burnaby, Canada and the Max-Planck Institute for Solid State Research in Stuttgart, Germany. At Simon Fraser University his research was supported by an Alexander von Humboldt Foundation Postdoctoral Research Fellowship focused on experimental and theoretical research on the magnetoresistance of metallic multilayers.

In 2008, soon after arriving at UNL, the National Science Foundation awarded Enders a prestigious \$400,000

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# Bradley A. Shadwick

Bradley A. Shadwick joined the Atomic, Molecular, Optical, and Plasma (AMOP) physics group in Fall 2007. He was the top candidate in a search carried out the prior



academic year for a plasma theorist whose interests and experience focused on the new area of laser-plasma interactions. A prime aim of this search was to

attract a candidate who could provide a theoretical component to the laser-plasma research carried out in the Diocles Extreme Light Laboratory.

Shadwick, a Canadian citizen, obtained his B.Sc. with honors in applied mathematics and theoretical physics at The University of Western

Ontario in London, Ontario and his M.Sc. in physics from the University of Toronto. He obtained his Ph.D. in physics from The University of Texas at Austin. His doctoral thesis research was titled, “On the Hamiltonian Structure of the Linearized Maxwell-Vlasov System.” From 1996 – 2007 he held various postdoctoral and visiting scientist positions at the University of California at Berkeley and at Lawrence Berkeley National Lab. In Berkeley his research focused on intense laser-plasma interactions in order to assist the development of advanced particle accelerators.

Shadwick’s research is a mixture of analytical theory and computer-based investigation, exploring the fundamental physical processes of intense laser-plasma interactions, such as wake generation, particle trapping, and particle acceleration. Although the principal motivation for this research

is to provide the requisite knowledge base for the development of a variety of advanced accelerator applications, the subject of the interaction of short, intense laser pulses with an underdense plasma is rich with new and fundamental plasma physics.

In 2008 Shadwick was invited to speak at the 50th Annual Meeting of the APS Division of Plasma Physics in Dallas, TX, on “Nonlinear Depletion and Dephasing in Laser Wakefield Accelerators.” Also in 2008, the DOE Office of Fusion Energy Sciences awarded Shadwick a three-year Plasma Physics Junior Faculty Award in the amount of \$561,840. This grant is entitled “Wavebreaking and Particle Trapping in Collisionless Plasmas.” Among Shadwick’s recent results is the development of a simple, nonlinear analytical expression for the rate of laser energy loss in laser-plasma accelerators.



# Xia Hong

In academic year 2009-2010 Xia Hong was offered an Assistant Professor position in the Department in the area of experimental Condensed Matter and Materials Physics (CMMP). Hong



was selected from about 120 applicants for the position. Her research expertise lies in the areas of transport phenomena at the nanoscale and in low dimensional systems (such as correlated oxides and graphene), epitaxial growth of complex oxide thin films and heterostructures, nanofabrication, and scanning probe microscopy. She joined the Department in January 2011.

Xia Hong was born and raised in China. She earned her B.S. degree in electronics from Peking University in 1998, where she also won the Beijing

City Excellent Graduate Award and the Peking University Excellent Graduate Award. She received her Ph.D. in applied physics from Yale University in 2006. Her doctoral research was performed in Professor Charles Ahn's group, which is one of the world's leading groups in the physics of complex oxide heterostructures. Following graduation, she was a postdoctoral research associate in physics at Penn State, where she focused on the transport properties of graphene, a material whose properties may potentially have broad implications for nanoelectronics.

At UNL Hong plans to fabricate and study complex oxide heterostructures in which the control of the oxide phase (e.g., ferromagnetic or antiferromagnetic, metallic or insulating) may be achieved by nanostructuring or through electric field effects. Other research directions involve creating and imaging quantum confinement in graphene and

exploring properties of ferroelectric and multiferroic oxide materials at the nanoscale.

Hong's expertise in complex oxide heterostructures will broaden the CMMP group's research activities. Her planned research in the fields of interfacial magnetoelectric phenomena and electronic transport are complementary to research being performed by **Christian Binek**, **Evgeny Tsymbal**, and **Kirill Belashchenko**. Her interests in scanning probe microscopy overlap nicely with the studies of **Alexei Gruverman**, **Axel Enders**, and **Sy-Hwang Liou**. In addition, her expertise in the physics of graphene may lead to collaborations with **Peter Dowben** and **Stephen Ducharme**. Hong's scientific expertise is especially germane for the future development of the Nebraska MRSEC, whose research will be broadened and further strengthened through her studies of complex oxide heterostructures and electron transport.

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Faculty Early Career Development Award for research on "Self-Assembled Magnetic Nanostructures." This research may have applications to computer hard drives and other high-density data storage devices. As part of the grant's outreach component, Enders has organized in Fall 2009 a national conference for undergraduate women in physics UNL (WoPHY'09). The second and third such conferences took place here in Fall 2010 and Fall 2011 (see the 2011 poster at right).

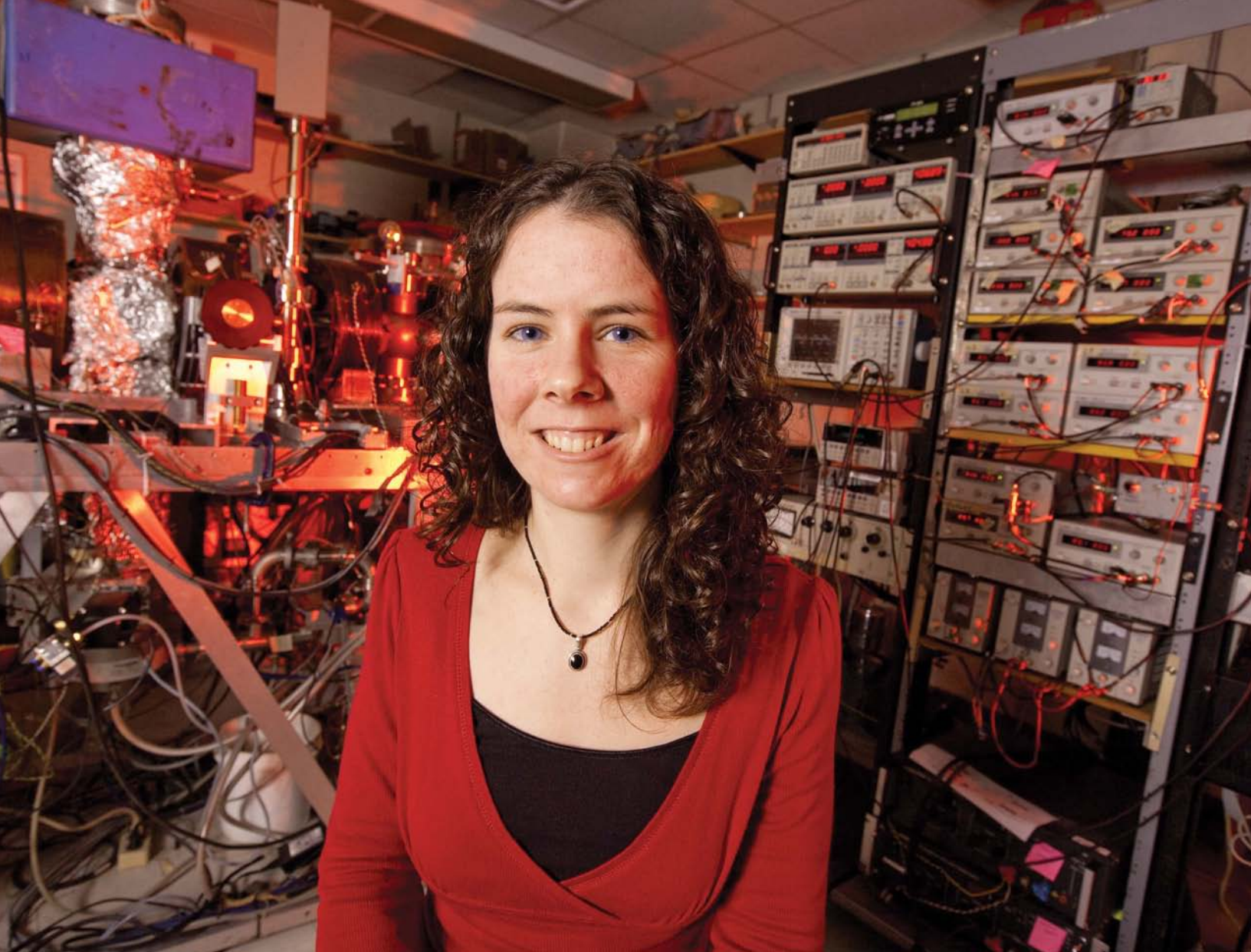
Ender's research concerns surface-supported nanostructures, from single atoms to complex hybrid network structures. His focus is on the study of the electronic properties and the magnetism in such systems and how these properties depend on the atomic

arrangement or interactions with the substrate, molecular ligands, etc. Important aspects are the development of new nanostructure fabrication strategies and the development of instrumentation. He is a regular user of synchrotron radiation at national laboratories for his experiments on nanomagnetism.

Enders was an invited speaker at the 2008 American Physical Society Spring meeting. He is also a Co-PI in the NSF-funded Nebraska MRSEC "Quantum and Spin Phenomena in Nanomagnetic Structures." Among Ender's recent outreach activities is a collaboration with teachers and students from community colleges and local high schools on the development of a scanning tunneling microscope for classrooms.

— Terese M Janovec





Joan Dreiling in her lab.

## *Dreiling Selected to Attend 2010 Lindau Nobel Laureate Meeting*

In June 2010 Joan Dreiling, then a second year graduate student, made her first international trip. Her destination was Lindau, Germany, where Dreiling interacted with 59 Nobel laureates and 670 young research students at the 60th annual Lindau meeting, which in 2010 covered an interdisciplinary range of science areas. The Lindau meetings involve both formal talks by Nobel laureates and social events, including a boat trip to the Isle of Mainau. The

young researchers typically are from more than 60 countries. Dreiling, a native of Ellis, KS, applied at the university level, and her application was selected and forwarded to the National Science Foundation (NSF) by Chancellor Harvey Perlman. The NSF chose a handful of applicants and sent their paperwork on to the conference committee in Germany. The international applicant pool typically is about 10,000. Dreiling is the first UNL student in recent history to attend the

meeting.

“I feel very privileged that I was... chosen to attend the meeting. In the mornings, we attended plenary lectures, and in the afternoons we broke out into small groups where we were able to have discussions with various Laureates. There were many additional opportunities to interact with the Laureates; for example, one evening I had dinner with Prof. Roy

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Glauber (2005 Nobel Prize “for his contribution to the quantum theory of optical coherence”) and the next evening with Prof. James Cronin (1980 Nobel Prize “for the discovery of violations of fundamental symmetry principles in the decay of neutral K-mesons”). I also made many contacts with fellow students from around the world, both within physics and other sciences. It was very enjoyable discussing not only their research but also their cultures and educational systems. This was an incredible experience that I am sure I will reflect upon many times throughout my career.”

Dreiling received her undergraduate degree in physics from Ft. Hays State University, where two of the physics faculty are UNL alums. Says Dreiling, “**Ken Trantham** (Ph.D. 1996) and **Kayvan Aflatooni** (B.S. 1992, M.S. 1994, Ph.D. 1998) are very much responsible for me being both in physics and here at UNL. When ... I took Ken’s intro physics course...I was hooked. Kayvan was also a fantastic teacher .... When it came time to apply for graduate schools, both Kayvan and Ken highly recommended that I apply to UNL. I’m very glad that I took their advice and chose to come to graduate school here.”

At UNL, Dreiling is doing her research under the supervision of Professor **Timothy Gay**. “I look at the scattering of spin-polarized electrons from chiral targets,” she said. “A chiral target is one that has a preferential handedness. There are right-handed molecules and left-handed molecules....We are trying to see if a spin-polarized electron [scatters from] a chiral target of one handedness differently than from one with the other handedness.... I am hoping to find an asymmetry in these interactions....”

Dreiling is still a few years away from receiving her doctorate, but she’s already fairly confident that she would like to teach at a small college. “I enjoyed the small university environment as an undergrad, but we’ll see,” she said. “I never thought that I would be here, so who knows what will happen in a few years.”



John D. Burton

## Burton Receives UNL Postdoctoral Award

John D. Burton (B.S. 2003, M.S. 2006, Ph.D. 2008) was selected by the UNL Office of Postdoctoral Studies to receive the 2010 Outstanding Postdoc Award at its first annual Postdoc and Mentor Awards Luncheon. The event was held April 7th, 2010, as part of the UNL Research Fair. Burton was nominated by his faculty mentor, **Evgeny Tsymbal**, for his outstanding research accomplishments and innovation, his contributions to teaching and mentoring, and his service.

Three years ago, Burton was one of only eight students to receive an NU Presidential Graduate Fellowship for the 2007-8 academic year. These prestigious Fellowships honor NU graduate students – four students at the University of Nebraska-Lincoln, two at the University of Nebraska Medical Center, and two at the University of Nebraska at Omaha – on the basis of high scholastic performance, personal accomplishment and innovative research projects. The Fellowships carry an annual stipend of \$24,000, with funding provided through the University of Nebraska Foundation.

Burton received his Ph.D. in May 2008. His dissertation, on “Magnetoresistive Phenomena in Nanoscale Magnetic Systems,” was supervised by Professor Evgeny Tsymbal. He is currently a postdoctoral research associate in Tsymbal’s group working on emerging phenomena in oxide heterostructures using a new computational technique. He has already published 16 articles in leading

scientific journals, was invited to give talks at two major international conferences, and taught in Spring 2010 an advanced graduate level course (Physics 951, Advanced Topics in Solid State Physics). According to Tsymbal, one of Burton’s most important research contributions is his prediction of a new magnetoelectric effect involving the possibility to change the magnetic order of a material by applying an electric field. “The importance of this result is hard to overestimate because it may lead to a completely new way to manipulate magnetically-stored data,” said Tsymbal.

Burton has also been involved with research groups elsewhere. As a graduate student, he did extensive collaborative work with Seagate Technologies Corporation. More recently, as a result of an invited seminar and visit to Oak Ridge National Laboratory (ONRL), he has spearheaded a new collaboration between the Oak Ridge group and Tsymbal’s group on new multiferroic materials and interfaces.

Throughout his career at UNL, Burton has played an active role in the life of the Department. As a graduate student, he served as the graduate student liaison to the external review team that carried out the most recent Academic Program Review of the Department. As a postdoc, Burton is mentoring graduate students in Tsymbal’s group. Burton’s ultimate career goal is to continue basic research with technological applications.

# Roger D. Kirby

By S. Ducharme and A.F. Starace

Professor Roger D. Kirby retired in May 2011. He served as Chair of the Department for the twelve years from 1995-2007, during which the Department greatly changed the way we teach physics and significantly increased its many research activities. Following his service as Chair, he represented the Department on the committee overseeing the design, construction,



Kirby

and outfitting of Jorgensen Hall. He continues to serve as the Associate Director of the University's Materials Research Science and Engineering Center (MRSEC) and as Director for Education and

Outreach of the Nebraska Center for Materials and Nanoscience (NCMN).

Kirby's twelve years as Department Chair, from 1995 to 2007, was a time of great change. Fourteen faculty members retired and fifteen were hired. It was also a period of building, as we executed our strategic plan to raise our three research concentrations – Condensed Matter and Materials Physics (CMMP), Atomic, Molecular, Optical, and Plasma (AMOP) Physics, and High Energy and Particle Physics (HEP) – to national and international prominence. Under his leadership, the Department became a successful model of a research-centered Department, while continuing to develop the quality and innovation of its teaching and service programs. At present each and every faculty member has a strong research program and the Department's external funding currently exceeds \$10 million annually. As Chair, Kirby's goal was to "convince the administrators to bet on us." They have, providing support in many cases for our ambitious initiatives and praising our strategic planning. Under Kirby's leadership, the Department's successes have amply justified those institutional bets. In

2008 Kirby's research leadership was recognized by the Vice Chancellor for Research, who honored Kirby with an Award for Outstanding Contributions to the Development of Research at the University of Nebraska.

Kirby obtained his B.S. degree in physics from Michigan State University in 1964, and his Ph.D. from Cornell University in 1969. Following a postdoctoral research appointment at the University of Illinois in Urbana-Champaign, he joined UNL in 1971, becoming full professor in 1981.

His early research focus was on the Raman spectroscopy of alkali halide crystals. After coming to UNL, he turned his attention to combining Raman spectroscopy with electrical measurements of quasi-one-dimensional conductors like tantalum trisulfide. Since the late 1980s, he has focused on magnetization dynamics of thin films, primarily by investigating the magneto-optical Kerr effect (MOKE), in which reflection from a magnetic film rotates optical polarization. In recent years, he has developed this technique to the femtosecond time scale using ultrafast lasers. To better interpret the results of the MOKE studies, he developed two complementary models of spin dynamics. His research funding has come from the National Science Foundation, the Advanced Research Projects Agency, the Army Research Office, and the Office of Naval Research. In addition to his current leadership roles in the MRSEC and NCMN centers, during 2003-2007 he developed the W.M. Keck Fast Dynamics Center as part of the W. M. Keck Center for Mesospin and Quantum Information Systems.

Throughout his career, Kirby demonstrated an abiding commitment to excellence in physics instruction. He was among the first in the Department to adopt Interactive Engagement (IE) instructional techniques, which focus on student learning through active interaction with the course materials, the instructor, and each other. He also promoted IE innovations among the faculty, both inside and

outside the Department. He was an early adopter of Peer Instruction, an IE method of particular value in large lecture classes, owing to its use of an electronic student response system that provides instantaneous feedback to the instructor. This technique spread quickly among the Department's introductory courses, and throughout the University, as faculty from other disciplines began adopting the technique. Most UNL classrooms are now equipped with the student response technology. He also developed curricula for a course on the physics of sound and for the advanced physics laboratory courses. Finally, he supervised the thesis research of ten M.S. and Ph.D. students and three B.S. honors students. Kirby's excellence in teaching was recognized by the College of Arts and Sciences' Distinguished Teaching Award in 1991.

Kirby has also been an outstanding role model and mentor to new faculty, largely because of his ability to balance teaching, research, and service while seeking the best approach to each. He has served for a time as director of the highly successful Saturday Science program, which has been giving Lincoln elementary school students a hands-on introduction to physics for nearly four decades. As co-PI of Project Fulcrum, he helped place UNL STEM (Science, Technology, Engineering and Mathematics) graduate students into K-12 classrooms as supplementary instructors. Besides serving as Department Chair, he has also served in other leadership roles, most notably as Chair of the Graduate Committee and as Chair of the Building Committee overseeing the construction of Jorgensen Hall from the early planning stages in 2006 through the final installations and refinements after we moved in 2010.

In retirement, Professor Emeritus Kirby plans to stay in Lincoln and continue his research on magnetization dynamics as well as his activities in improving STEM education and outreach. He will also do some traveling.

# Edward G. Schmidt

By S. Ducharme and A.F. Starace

Professor Edward G. Schmidt is retiring at the end of 2011 after a long career serving the University of Nebraska and the international community of astronomy and astrophysics researchers. From 1996 to 2008 he served as Associate Dean of the College of Arts and Sciences, where he was



known as “a great Associate Dean,” with a genial manner and a “profound knowledge” of the University. On the national level, he served as Program Manager of the Stellar Astronomy and Astrophysics Program of the National Science Foundation (NSF) from 1992-94. At UNL, he was funded by NSF from 1978 to 2005 for his research on Cepheid

variable stars.

Schmidt obtained his B.S. degree in physics from the University of Chicago in 1965 and his Ph.D. in astronomy from the Australian National University in 1969. Following a postdoctoral research position at the University of Arizona in Tucson and a Senior Research Fellow position at the Royal Greenwich Observatory in Herstmonceux, England, he joined the faculty at UNL in 1974, becoming a full professor in 1982. His research focus has been on the observational study of variable stars to better understand their physics and to improve the distance scales used to measure the expansion of the universe. He has been awarded observational time on many of the world’s major astronomical facilities such as, e.g., Kitt Peak National Observatory (Arizona), Cerro Tololo InterAmerican Observatory (Chile), Mt. Wilson Observatory (California), Wise Observatory (Israel), and the NASA International Ultraviolet Explorer Observatory (Maryland).

At UNL, Ed is known as an excellent teacher. He has taught astronomy at all levels and has mentored a number of undergraduate and graduate astronomy students. He developed a successful new course called “Life in the Universe,” which brings together UNL experts in Astronomy, Geosciences and Biosciences to tell the story of how life might thrive on other worlds, and what the wide variety of life on Earth tells us. He was Co-Director of UNL’s Summer High School Astronomy Camp from 2001 to 2006. In 1992 he was selected for the College of Arts and Sciences’ Distinguished Teaching Award.

He continues to serve as Director of Behlen Observatory, a 30-inch research telescope located in Mead, Nebraska, where he does his research and hosts highly popular monthly public nights. In retirement, Professor Emeritus Schmidt plans to stay in Lincoln and continue his research, but he will also do some traveling and teach an occasional course at UNL.

## SEE ALSO

# In The News ...

EDITOR’S NOTE: *Many articles about Department faculty, staff, and students have appeared on the Web. Below is a selection of recent ones that may be accessed by using the URL indicated.*

“Nanotech project receives DOE grant,” *Scarlet*, 7 January 2010: <http://scarlet.unl.edu/?p=5959>

“Ultra-fast molecule research nets award,” *Scarlet*, 4 February 2010: <http://scarlet.unl.edu/?p=6639>

“Physicist aims to create magnetized electron source,” *Scarlet*, 4 March 2010: <http://scarlet.unl.edu/?p=7313>

“New exhibit celebrates emeriti projects,” *Scarlet*, 1 April 2010: <http://scarlet.unl.edu/?p=7947>

“Researchers document spintronics breakthrough,” *Scarlet*, 15 July 2010: <http://scarlet.unl.edu/?p=9163>

“\$1.3M grant to enhance nanoscience research,” *Scarlet*, 15 July 2010: <http://scarlet.unl.edu/?p=9185>

“Nano Science Café features UNL physicists,” *Scarlet*, 15 July 2010: <http://scarlet.unl.edu/?p=9187>

“\$2M grant to enhance laser research,” *Scarlet*, 21 October 2010: <http://scarlet.unl.edu/?p=9512>

“Research sends physics faculty to Chicago, Switzerland,” *Scarlet*, 16 December 2010: <http://scarlet.unl.edu/?p=9750>

“Physicists eye 4D imaging,” *Scarlet*, 27 January 2011: <http://scarlet.unl.edu/?p=9803>

“Tsymbal joins quest for new technologies,” *Scarlet*, 24 February 2011: <http://scarlet.unl.edu/?p=9957>

## BRIEFLY NOTED...

**Donal Burns**, corporation secretary for the NU Board of Regents and professor of Physics and Astronomy, has retired from the university after a 43-year career. His last day was April 5, 2011. Burns' career has included award-winning teaching, research in atomic and molecular physics, and service as an administrator.

**Peter A. Dowben**, Charles Bessey Professor of Physics, was elected a Fellow of the American Vacuum Society (AVS) in 2007. The designation "Fellow of the Society" is intended to recognize members who have made sustained and outstanding technical contributions in areas of interest to AVS. Only 0.5% of the membership are so designated annually. Prior to joining the Department in 1993, Dowben was a faculty member at Syracuse University. Dowben's research focuses on the changes in electronic (band) structure across electronic phase transitions in reduced dimensionality. Of particular interest are ferromagnetism in local moment systems or spatially-restricted systems, ferroelectricity, and the nonmetal to metal transition. The experimental techniques employed include angle-resolved photoemission, resonant photoemission, inverse photoemission and spin-polarized photoemission, characteristic energy loss, low-energy electron diffraction, angle-resolved thermal desorption spectroscopy, X-ray photoemission, and Magneto-optic Kerr effect.

**Beth Farleigh**, Administrative Technician & Assistant to the Department Chair, was selected to receive the College of Arts and Sciences'



**Farleigh**

Her nominators uniformly noted how "extremely knowledgeable" she is about university policies and procedures and that when a new issue arises she very quickly researches the matter, makes the right contracts, and finds the solution or answer. Her deep knowledge of computers and

*Applause Award* in September 2007. Her nominators uniformly noted how "extremely knowledgeable" she is about university policies and procedures and that when a new issue arises she very quickly researches the



**Stephen Ducharme's winning run (photo by He Xi).**

**Stephen Ducharme**, Professor and Vice Chairman of the Department, placed first in his class (E Stock) at the Nebraska Region Sports Car Club of America Solo 4 racing meet, held on 20 July 2008 at Lincoln South West High School. Second and third place winners were 1.5 sec and 3.75 sec behind him. The Sports Car Club of America provides a means for automobile owners to race competitively. According to the Nebraska Region's club web site, the Solo races "emphasize a driver's ability and [his] car's handling characteristics. Speeds are no greater than those encountered on legal highways and city-streets. The combination of competition, concentration, and car feedback creates an adrenaline rushing experience. The fastest single-run time wins!" More recently, Ducharme led the "Sunday with a Scientist" program on February 21st, 2010 at Morrill Hall. The topic on that Sunday was "Nanoscience Makes the Light Fantastic," which examined science and technology at the nanometer scale.

software and her willingness to share her knowledge and explain policies and procedures to others were also extolled.

**Kam-Ching Leung**, Emeritus Professor of Astronomy, was honored by the Ministry of Science and Technology of Thailand at the 8<sup>th</sup> Pacific Rim Conference on Stellar Astrophysics held in Phuket, Thailand, 5-9 May 2008. The Minister of Science and Technology of Thailand awarded Leung a plaque with the inscription, "*National Astronomical Research Institute of Thailand, Ministry of Science and Technology to Professor Kam-Ching Leung in recognition of his dedicated roles and outstanding contributions to the development and advancement of astronomy in Thailand.*" Leung served on the Scientific Organizing Committee of this conference and was also a co-editor of the conference proceedings.



**Leung (left) receiving plaque from the Thai Minister of Science and Technology.**

**BRIEFLY NOTED...**

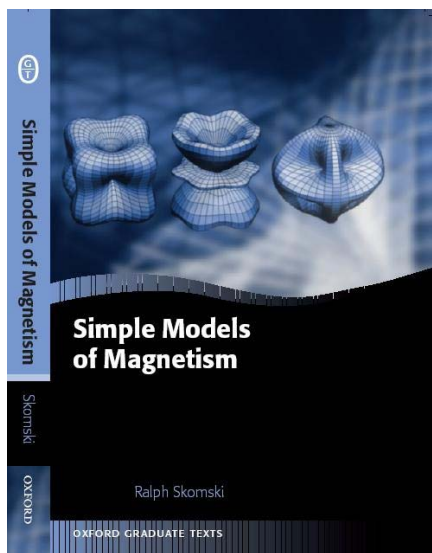


**Marquart**

**Leslie Marquart**, Student Shop Manager in the Department, received the James V. Griesen Award for Exemplary Service to Students at the All University Honors Convocation, held 18 April 2010.



**Group conference photo of WoPHY'10 participants.**



**Ralph A. Skomski**, Research Associate Professor, has published a book, *Simple Models of Magnetism* (Oxford University Press, 2008).



**Skomski**

Skomski notes that although it was originally anticipated to be a very introductory book (though not a popular or outreach publication), it has developed into a graduate textbook, including current research and even some controversial topics. According to a review by Stephen Blundell of Oxford University, "This is a highly readable and thorough account of models of magnetism... that will be of great use to graduate students and experts in the field alike. The appendices are very thorough and contain a lot of helpful information..." A Kindle version of the book is available. Skomski has co-authored two other books on magnetism: In 1999

**Axel Enders**, Assistant Professor, organized a very successful second Conference for Students in Physics (WoPHY'10) during 7-10 October 2010. The purpose of the conference was to encourage undergraduate women and other under-represented groups to pursue careers in physics. In honor of the 50<sup>th</sup> anniversary of the laser, the conference was billed as "Laseralooza" and featured many talks on laser-related research and included a tour of UNL's Diocles Extreme Light Laboratory. According to Enders, "We had approximately 80 participants, most of them women physicists from across the USA, participating in this 3-day event. Highlights of the conference were the talks given by invited students and plenary speakers, a session focusing on career paths for women in science, the combined social event with the annual Ruckman colloquium and dinner (to which area high school physics teachers are invited), which included dinner and a laser show, and a great barbecue in the Department. We received very positive feedback from the participating students and faculty. I believe that they left Lincoln both encouraged [regarding a career in physics] and with a positive impression about our Department, UNL, and Lincoln." The third conference (WoPHY11) was held 20-22 October 2011; see <http://wophy.unl.edu/>

together with J.M.D. Coey he published the monograph entitled *Permanent Magnetism* (Taylor and Francis). More recently, in 2006 **David J. Sellmyer** and he published a monograph on *Advanced Magnetic Nanostructures* (Springer). Skomski's expertise in magnetism has been recognized by the American Physical Society (APS) Topical Group on Magnetism, whose members nominated Skomski for Fellowship in the APS. Skomski received this high honor in 2010. His citation reads as follows: "For his significant contributions to our understanding of magnetic materials, especially permanent magnets and magnetic nanostructures."

**Evgeny Y. Tsymbal**, Charles Bessey Professor of Physics, was named a Fellow of the American Physical Society (APS) "for significant contributions to the understanding of spin-dependent transport in magnetic nanostructures." He was nominated in 2008 by the APS Topical Group on Magnetism. Prior to joining the Department in 2002 he was a senior research scientist at University

of Oxford, United Kingdom, a research fellow of the Alexander von Humboldt Foundation at the Research Center-Jülich, Germany, and a research scientist at the Kurchatov Institute in Russia. Tsymbal's research is focused on computational materials science aiming at understanding the fundamental properties of advanced ferromagnetic and ferroelectric nanostructures and materials relevant to nanoelectronics and spintronics. These relatively new research fields promise to revolutionize the electronic and data storage industries. Tsymbal is Director of the NSF Materials Research Science and Engineering Center (MRSEC) on "Quantum and Spin Phenomena in Nanomagnetic Structures," which involves over twenty faculty members from six departments of the University of Nebraska.



**Tsymbal**

# Greene Awarded 2010 APS Davisson-Germer Prize

**Chris H. Greene** (B.S. 1976) was awarded the American Physical Society's 2010 Davisson-Germer Prize in Atomic Physics. The citation for this prize reads: "For seminal contributions to



**Greene**

JILA and Professor of Physics at the University of Colorado at Boulder since 1989.

Greene's 1976 undergraduate degree at UNL was awarded with High Distinction in both math and physics, with an honors thesis supervised by **Donal Burns**. His doctorate in theoretical atomic physics was earned in 1980 from the University of Chicago,

*theoretical AMO physics, including dissociative recombination, ultracold matter, and high-harmonic generation, and for the prediction of 'trilobite' long-range molecules."*

Chris Greene has been a Fellow of

under his advisor Ugo Fano. Following a one-year postdoctoral stint in Richard Zare's group at Stanford, he joined the faculty at Louisiana State University in 1981. His theoretical research interests are extremely broad, covering much of atomic, molecular, and optical (AMO) physics, notably few-body processes in ultracold gases, dissociative recombination in electron collisions with molecular ions, photon-atom and photon-molecule interactions, and molecular Rydberg state behavior.

Greene has many prior honors. He was awarded an Alfred P. Sloan Foundation Fellowship in 1984, an NSF Presidential Young Investigator Award in 1985, and was elected a Fellow of the American Physical Society in 1990. He was the first recipient of the APS's I. I. Rabi Prize in 1991. In 2007 he held a Visiting Miller Professorship at the University of California-Berkeley, and received an Alexander von Humboldt Award for Senior U.S. Scientists. Among his professional service accomplishments, he served as Chair

of the APS's Division of AMO Physics in 2002-3, and as Chair of JILA during 2005-2006.

The University of Nebraska invited Greene back to campus in November 2006 for Master's Week, an annual event featuring five distinguished UNL alumni who are invited back to campus to interact with current students through class visitations, campus tours, and meetings with clubs and organizations. Most recently, the *Omaha World-Herald* ran a feature article on the remarkable careers of three boyhood friends who all grew up within a 10 mile radius of Ashland, knew each other, and were graduates from the same high school between 1972 and 1977 ("Putting Ashland on the Map," 19 April 2010). The other two besides Chris are Jeff Raikes, former President of Microsoft's Business Division and currently CEO of the Bill and Melinda Gates Foundation, and NASA astronaut Clayton Anderson, who recently finished his second mission in the International Space Station.

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## Reed Receives Presidential Award

**Kennedy J. Reed** (Ph.D. 1978) was honored by President Obama at a ceremony in the East Room of the White House on the afternoon of 6 January 2010. Reed received one of the Presidential Awards for Excellence in Science and Engineering Mentoring. The purpose of the award is to recognize the crucial role that mentoring plays in the academic



**Reed**

to advance the recipient's mentoring efforts. The winners are selected by a panel of distinguished scientists, mathematicians, and educators

and personal development of students studying science or engineering and who belong to minorities that are underrepresented in those fields. It includes an NSF grant of \$10,000

following an initial selection process done at the state level. In announcing the awards, President Obama said, "These awards represent a heartfelt salute of appreciation to a remarkable group of individuals who have devoted their lives and careers to helping others and in doing so have helped us all."

Reed, a theoretical atomic physicist at Lawrence Livermore National Laboratory (LLNL) whose research concerns atomic collisions in high temperature plasmas, has been a leader in national efforts to increase opportunities for minority students and professionals in the sciences. He has been instrumental in the development of programs that have had national impact. Reed initiated and directed the LLNL's Research Collaborations Program for Historically Black Colleges and Universities and Minority Institutions (HBCUs and MIs) - an innovative program that links LLNL scientists with professors and students in forefront

research that benefits both LLNL and the universities. Reed also played a major role in establishing the National Physical Science Consortium - a national coalition of corporations, national laboratories and universities that provide graduate fellowships for women and minorities in the physical sciences.

Reed has been widely honored for his work. He is a fellow of the American Physical Society. He was the 2003 recipient of the John Wheatley Award that cited his contributions to physics research and education in Africa. The California Section of the American Physical Society named an award in honor of Reed, and annually presents the Kennedy Reed Award for Best Theoretical Research by graduate students and/or post-doctoral researchers.

*Editor's Note: This article was compiled from LLNL and White House press releases and a report in The Washington Post.*



# Hieggelke Receives APS Excellence in Education Award

**Curtis J. Hieggelke** (M.S. 1966, Ph.D. 1971), Emeritus Professor of Physics at Joliet Junior College, was part of a three-person Two-Year College (TYC) Team that was awarded the 2009 Award for Excellence in Education by the American Physical Society at its meeting in Denver, Colorado on 4 May 2009. This award is primarily intended to recognize a group, rather than an individual. In addition to Hieggelke, the Two-year College Workshop Team included David Maloney (Indiana-Purdue University, Fort Wayne, IN) and Tom O’Kuma (Lee College, Baytown, TX). The citation for the award reads: “For leadership in introducing physicists in two-year colleges to new instructional methods, in developing new materials based on physics education research, and in fostering faculty networking, particularly in two-year colleges.” In recommending the award, the selection committee noted that “physics faculty members in two-year colleges are frequently very isolated from their colleagues and are usually members of general science departments. Very often, there is only one physicist on the faculty of the institution. Approximately 25% of students who enroll in introductory physics do so at two-year institutions, and the percentage is higher for those students who will become K-12 teachers. In addition, the TYCs are the portal to higher education for minority students and currently constitute the fastest growing segment of higher education in the US. By reaching out to these faculty and building a network among them, the Two Year College Workshop Team has had a critical impact in improving physics instruction.”

Each of the three members of the team gave an invited talk at a special Excellence in Physics Education Award session. Hieggelke’s talk was titled “Revitalizing Introductory Physics at Community Colleges and More,” which described the main



**Curtis J. Hieggelke (center) receiving the Excellence in Physics Education Award from Cherry Murray (right), President of the American Physical Society. Co-winner, David Maloney, is at left.**

activities of the Two Year Community College Workshop. These included new microcomputer-based materials on the topics of rotations, work and energy, sound, and magnetism; a conceptual survey of electricity and magnetism; and various tasks inspired by physics education research.

Joliet Junior College, founded in 1901, is the nation’s first public community college, offering pre-baccalaureate programs for students planning to transfer to a four-year university. Although retired from teaching, Hieggelke has continued his work there with support of an NSF grant. He has recently co-authored a book entitled “Newtonian Tasks Inspired by Physics Education Research: nTIPERs,” which was published in January 2011 by Addison-Wesley in its Series in Educational Innovation.

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# Sorensen Awarded APS Valley Prize

**Paul Sorensen** (B.S. 1996) was awarded the George E. Valley, Jr. Prize at the 2009 meeting of the American Physical Society (APS) in Denver, CO. The Valley Prize recognizes one individual biennially in the early stages of his or her career for an outstanding scientific contribution to physics that is deemed to have significant potential for a dramatic impact on his or her field. The prize consists of \$20,000 and a certificate citing the contribution made by the recipient. Sorensen’s citation reads: “For his role in the discovery of



**Sorensen**

*quark number scaling in the elliptic flow of hadrons in nucleus-nucleus collisions, and its interpretation showing the relevance of quark degrees of freedom in heavy ion interactions.”*

After earning a B.S. in physics from UNL, Sorensen went on to earn an M.S. and Ph.D. in physics, both from the University of California, Los Angeles, in 1999 and 2003, respectively. He was a postdoctoral researcher at DOE’s Lawrence Berkeley National Laboratory for two years before joining Brookhaven National Laboratory (BNL) in 2005 as a Maurice and Gertrude Goldhaber Distinguished Fellow. Sorensen recently became an associate physicist at Brookhaven.

According to BNL, the Valley Prize recognized Sorensen “for his role in discovering that subatomic particles

called quarks are important throughout the expansion of the matter created in heavy ion collisions. The collisions are generated by physicists as they attempt to recreate the matter that existed in the universe one millionth of a second after the Big Bang. They do so by smashing together beams of heavy ions moving at nearly the speed of light in Brookhaven’s world-class accelerator, the Relativistic Heavy Ion Collider (RHIC). The matter that they create behaves like a “perfect” liquid — having almost no viscosity or frictional resistance to flow... Sorensen’s ongoing experiments at RHIC will aim to better understand the properties of the “perfect” liquid, which may shed light on the phase structure of nuclear matter, or how it changes from solid to liquid or gas.”

# Day, Furtak, and Gao Awarded APS Fellowship

In 2010 three Department alumni were named Fellows of the American Physical Society (APS): **Michael A. Day** (M.S. 1978; Ph.D. 1983), **Thomas Furtak** (B.S. 1971), and **Bo Gao** (M.S. 1986, Ph.D. 1989). Each year, no more than one-half of one percent of the membership of each unit of the APS



**Day** are honored by their peers by election to the status of Fellow of the APS. Day was nominated by the APS Forum on the History of Physics, Furtak was nominated by the APS Division of Condensed Matter Physics, and Gao was nominated by the APS Division of Atomic, Molecular, and Optical Physics. In what follows, we sketch briefly the work that won these alumni their honors and indicate also their career paths since leaving UNL.

**Michael Day** was cited *For his thoughtful research, publications, and public presentations on the views of Oppenheimer, Rabi, and Condon concerning science and society.* Day's research over the last decade has resulted in four major publications: "Oppenheimer on the Nature of Science" (Centaurus, 2001), "I. I. Rabi: The Two Cultures and the Universal Culture of Science" (Physics in Perspective, 2004), "E.U. Condon: Science, Religion and the Politics of World Peace" (Physics in Perspective, 2008), and "American Cold War Physicists as Public Intellectuals," a chapter in the book *The Atomic Bomb and American Society* (2009). The publications explore, among other topics, how the three physicists addressed public concerns regarding the revolutionary changes that World War II and the development of atomic weapons brought to scientific activity and society as a whole.

Michael is currently Professor of Physics at Lebanon Valley College (PA). He has a B.S. degree in physics from the University of Idaho. Prior to his graduate work in physics at UNL, Day received M.A. (1975) and Ph.D. (1977) degrees in Philosophy from UNL. Day's doctoral research in physics at UNL focused on the thermodynamic properties of anharmonic solids, carried out under the supervision of Professor **Robert Hardy**. Before becoming a physics professor, he was a geophysicist

in the International Division of Shell Oil Company. He has served as chair of the Lebanon Valley College Physics Department for several years and in 1999 received the Thomas Rhys Vickroy Award, the College's highest award for teaching.

**Thomas Furtak** was cited *For contributions to the understanding of surface-enhanced Raman scattering.* Furtak is an expert in the optical properties of surfaces and interfaces. He has worked to understand phenomena that provide interface selectivity. In particular, his group has made significant contributions in the areas of surface-enhanced Raman scattering (SERS) and surface second harmonic generation and is currently working with surface vibrational sum-frequency generation and infrared polarimetry. He has applied these and other techniques to a wide variety of materials problems, including liquid, solid-state, and polymer junction photovoltaics, fuel cells, organic monolayers, polymeric adhesives, and plasmonic waveguides. One of his recent projects focuses on understanding and controlling the organic/inorganic interface in plastic solar cells in order to optimize charge collection. Another project concerns photoactive monolayers that can be used to control liquid crystal displays. All of his projects involve surface optical spectroscopy, in order to obtain vibrational fingerprints about the molecular structure of an interface. His goals are to understand basic phenomena about these systems as well as to provide insight for practical applications.



**Furtak** Tom is currently Professor and Head of the Department of Physics at the Colorado School of Mines in Golden. After obtaining his undergraduate physics degree at UNL, he entered the graduate program in physics at Iowa State University, obtaining his Ph.D. in 1975. He then took a postdoctoral position and then an associate physicist position at the DOE Ames Laboratory until 1980 when he joined the faculty at the Colorado School of Mines.

**Bo Gao** was cited *For contributions to the quantum-defect theory of cold atom interactions and the analyses of the associated mathematical special functions.*

Gao's formulation of quantum defect theory (QDT) provides a systematic understanding of highly-excited molecular rovibrational states, and a systematic understanding of atom-atom collisions over a wide range of temperatures including the ultracold regime. In addition to the expected advantages of his QDT formulation (such as its efficient parametrization of atomic interactions and its ability to establish the relationship between molecular spectra and ultracold collisions), his formulation provides also a number of insights that were either unknown previously, difficult



**Gao** to understand, or impossible to characterize using other approaches, such as, e.g., analytic descriptions of ultracold shape resonances and Feshbach resonances. Related to his formulation of QDT, Gao has also developed two new classes of special functions corresponding to the solutions of the Schrödinger equation for  $1/r^6$  and  $1/r^3$  types of potentials, respectively. According to a leading theorist who supported his Fellowship nomination, "He has solved in a clear transparent way what were once regarded as insoluble problems."

Gao came to UNL in 1984 as its first CUSPEA student, the China-U.S. Physics Examination and Application program organized by Nobel Laureate Tsung-Dao Lee. Following his graduate work in the group of Professor **Anthony Starace** on the theory of multiphoton processes, Gao was a postdoctoral research associate at JILA and the University of Colorado-Boulder during 1990-1992, where he turned his interests to cold atom collisions. He then joined the radiation oncology physics program at William Beaumont Hospital in Royal Oak, MI for two years. In 1994 he took a faculty position in the Physics Department at the University of Toledo, where he is now a Professor of Physics. During 2001-3, Gao was a member of the Chinese Academy of Sciences' One Hundred Talent Program, under which he was recruited by the Quantum Optics Laboratory of the Shanghai Institute of Optics and Fine Mechanics for his expertise in cold atom physics.

# Donald Schneider Appointed Head of Penn State's Department of Astronomy and Astrophysics

**Donald P. Schneider** (B.S. 1976), Distinguished Professor of Astronomy and Astrophysics at Penn State University, has been appointed as head of the Department of Astronomy and Astrophysics in Penn State's Eberly



**Schneider**

College of Science. Schneider, whose primary research interest is observational cosmology, perhaps is best known for three of his accomplishments: He developed a new technique to measure distances to galaxies; he was the first to detect Comet Halley as it approached Earth in 1982, at a greater distance than any comet had ever been detected up to that time; and he has broken his own and others' records numerous times in the discovery of the most-distant known object in the universe.

Schneider now is particularly interested in finding and determining the properties of distant quasars, which are thought to be massive black

holes that are swallowing stars as they venture too close to the black hole. He uses optical telescopes as time machines to view the distant past, when the universe was only a small fraction of its current size and age.

For the past two decades, much of his research effort has been devoted to the Sloan Digital Sky Survey, which is a large international effort to produce a comprehensive digital map of the sky. Schneider has served as the chairman of the quasar science group and as the science publications coordinator for the project. The first two phases of the survey, completed in July 2008, identified 100,000 quasars — the most luminous objects known in the universe — and have measured the distances to over a million galaxies. During the third phase of the survey, which is ongoing until May 2014, Schneider is serving two roles: as the project's survey coordinator and as a member of its Management Council. Since 2004, Schneider also has served as the Hobby-Eberly Telescope Scientist.

In 2006, Schneider received a C.I. Noll Award for Excellence in Teaching, which is sponsored by the Eberly College of Science Student Council and Alumni Society and is presented

annually to faculty members and instructors in the Eberly College of Science who demonstrate a record of excellence both in teaching and in their interactions with students. For the past several years, Schneider has taught a year-long introductory course for astronomy majors and has been active in placing students in research programs throughout the Department of Astronomy and Astrophysics.

Schneider received a bachelor's degree in physics and mathematics, with highest distinction, from the University of Nebraska in 1976 and, in 2002, he received the University's Alumni Achievement Award. He received a doctoral degree in astronomy from the California Institute of Technology in 1982 and was a research fellow there from 1982 to 1985. From 1985 to 1994, he was a member of the Institute for Advanced Study in Princeton, New Jersey. He joined the faculty at Penn State in 1994 as an associate professor of astronomy and astrophysics, was promoted to professor in 1999, and was named a Distinguished Professor in 2008.

*From an Eberly College of Science (Penn State) News Release of 1 August 2011*

## ADVICE TO GRADUATE STUDENTS FROM AN ALUMNUS

“When I arrived at Nebraska, I thought I was quite intelligent and knowledgeable in physics. What I learned during my first year as a graduate student was that while I may have been reasonably smart, virtually all of my fellow graduate students were at least as smart and the strong majority had more (in some cases far more) native intelligence than I did. After [a] warning letter ... got my attention, I decided that I had to alter my approach. I surmised that the only way I could compete was to outwork everyone, so I dedicated myself to just that, i.e., ‘Some may be smarter, but none will outwork me.’ If the assignment was the odd numbered problems at the end of the chapter, I did them all. If there was a reference

text cited, I obtained a copy and studied it. If someone studied all day Sunday, I studied all day Sunday and half a day Saturday to boot, often to my wife's dismay, but her support was paramount.

“Therefore, I would tell a student who might be struggling or may be discouraged that hard work can make a huge difference. It wasn't easy, but as I look back, I am proud of what I was able to accomplish; it set the tone for my career. It can be that way for many students if they will dedicate themselves to outwork everyone else.”

— *Richard MacMillan* (M.S. 1970)

*Editor's Note:* For a brief account of MacMillan's career, see “We Heard That...” on page 23



## *Bao, Stevenson, and Wang Speak at Recognition Luncheons*

**Bao**

Three Departmental alumni returned to Lincoln recently to speak to graduating students at the annual Departmental Recognition Luncheons. The distinguished alumni are usually chosen from among those who have forged successful careers

outside academe (with which students are already quite familiar). Typically the alumni reminisce about their student days, describe their career paths, and then advise current students of the lessons they have learned along the way.

**Minqi Bao** (M.S. 1992, Ph.D. 1995) was the featured speaker at the May 8<sup>th</sup>, 2008 Recognition Luncheon. Bao is a Senior IT Architect for Server Farms at Cadence Design Systems, Inc., in San Jose, CA. His talk was titled, "From Lincoln to Silicon Valley." He feels his education at UNL from 1990-95 was "excellent": he obtained a solid foundation in physics, learned that different cultures have different approaches to research, and appreciated presenting his work as a grad student at four major national physics meetings. Besides physics, he had many friendships with both faculty and fellow students, learned skills vital to leadership, and developed skill in investing and a passion for good food. His thesis research in the group of Professor **Anthony Starace** involved theoretical and computational modeling of intense laser interactions with atoms. In Fall 1995 he began a brief postdoctoral appointment at the Harvard-Smithsonian Institute for

Theoretical Atomic and Molecular Physics (ITAMP), where he worked with Professor Roy Glauber (who won the Nobel prize in 2005).

In 1996 he went to work for Quantum Development Corp. in Wilmington, DE, where he applied mathematical optimization procedures to businesses such as NYNEX (a former telephone company), Texas Instruments, and Ford. He learned there that optimization is important in everyday life, that spoken English is critical, and that in business teamwork is more important than independent work. In 1997 he moved to Toronto to work for Platform Computing, a leader in distributed, cluster, and grid computing systems. Over the next decade he began as a consultant for cluster/grid implementations and then moved to sales in Silicon Valley. While there, he obtained his MBA degree from the University of California-Berkeley during 2003-6, where he learned about innovation

and intellectual property management, entrepreneurship, and the business approach for reducing poverty and income inequality. In 2007 he took a position as a Senior IT Architect with Cadence Design Systems, which is a leader in electronics design automation for semiconductor chips. He said his plans for the future include building bridges between Eastern and Western cultures and perhaps starting his own business.

Bao then gave a detailed presentation of the history, current status, and future outlook for the electronic design and semiconductor industries and the architecture of their increasingly complex systems. He concluded with the following advice for students: "improve your verbal communication skills; find and learn from a mentor; switch jobs if advancement is not promising; expose yourself to different cultures and peoples; work hard, and play hard."

**Contact:** baominqi@yahoo.com



**Stevenson**

**Roger D. Stevenson II** (B.S. 1998) was the keynote speaker at the May 7<sup>th</sup>, 2009 Recognition Luncheon. Stevenson is a Senior Physicist at New York University (NYU) Medical Center and also the Founder of Coriolis Investment Group, LLC. His talk was titled, “Life’s a Derivative, Not a Sum.” Following his graduation at UNL with honors in physics (and with minors in both mathematics and business administration), Stevenson worked as a project engineer with Chromalloy Co., Inc. in Conshohocken, PA, which develops custom alloys for various industrial applications. In 2000 he enrolled in the M.S. program in medical physics at the University of Pennsylvania. Upon graduation in 2002, he worked as a radiotherapy physicist at Memorial Sloan-Kettering Cancer Center in New York City, moving to the NYU Medical Center in 2005. He noted for students that the median salary for an M.S. graduate in medical physics (in 2009) was \$162,000/annually. In his current position he is the primary physicist for prostate seed implants, for treatment planning with various medical devices, for teaching a physics course to medical residents, and for training dosimetrists in their planning methods.

Besides his main career in medical physics, however, Stevenson has also made good use of his education in mathematics and business. In his talk, he gave an insightful

presentation on the origins of the 2008 financial crisis. In order to help those he knew navigate the treacherous financial environment at that time, he founded the Coriolis Investment Group, LLC. He outlined the value-oriented investment approach he uses, making frequent analogies to physics principles. He gives monthly presentations for Group members on topics vital to investing. In addition, in 2006 he also founded the Gotham Soccer League LLC in order to create a much-desired soccer league. The group organizes soccer matches at prime locations throughout New York City. The implicit message to students of Stevenson’s presentation was to follow your passions and apply your skills to help others. **Contact:** rdstevenson2@yahoo.com



**Wang**

**Dexin Wang** (M.S. 1989, Ph.D. 1993) gave the Recognition Luncheon presentation on 6 May 2010. Following his doctoral work in **David Sellmyer**’s group at UNL, Wang did postdoctoral research on nonvolatile electronics in the Center for Materials for Information Technology at the University of Alabama in Tuscaloosa. In 1995 he joined NVE Corp. in Eden Prairie, MN, where he worked on novel sensors of magnetic fields requiring very small size and very high sensitivity. The sensors are based on spin-dependent tunneling of conduction electrons through a thin film of insulating material. In 2005 he joined Seagate Technologies in Bloomington, MN, a world-wide company with more than 50,000 employees that is one of the leading manufacturers of hard disk drives. These drives are key elements of the infrastructure of our information age.

Wang noted that over the past fifty years, there has been exponential growth in the areal density of information stored on drives. However, the industry is facing fundamental challenges in increasing the density any further. Wang outlined three conflicting requirements: high signal to noise ratio, write-ability, and thermal stability. His own research focus is on the technology of read/write heads for the drives.

Wang cited the influence of Professors Sellmyer and **Kirby** on his research work. His discussion of the latest hard-drive technology was interspersed with many humorous observations about physics and being a physics student. In response to a question, he said that the most important thing that he learned as a student at UNL was how to make friends; in industry, it is very important to make connections with people throughout the company. Dr. Wang encouraged our graduates to use physics as a guide to solving real-world problems. **Contact:** dexin.wang@seagate.com

**Scott Backhaus** (B.S. 1990) is a researcher in the Thermoacoustics group within Los Alamos National Laboratory (LANL)'s Materials Physics and Applications Division. Backhaus recently co-authored a paper analyzing the similarity between stabilizing a cryogenic thermoacoustic refrigerator operating at high frequency and stabilizing an inverted pendulum. This work was the subject of a "Physics Update" in *Physics Today* on November 12<sup>th</sup>, 2009 as well as a "Search and Discovery" article on page 17 of the January 2010 *Physics Today*. *Editor's note: For further information on LANL's thermoacoustics group, see the entry for Gregory Swift below.*

**Balaz, Snjezana** (M.S. 2001) obtained a Ph.D. degree in 2007 in Engineering Physics at UNL working under the supervision of Professor Jennifer Brand in the UNL Department of Chemical and Biomolecular Engineering. She then took a postdoctoral research position at the University of California-Riverside and, most recently, another in the Department of Electrical Engineering at Ohio State University.

**Bass, Robert** (M.S. 1985) teaches physics, calculus, and computer science at Coeur D'Alene Charter Academy, a college preparatory school in northern Idaho that was ranked by *U.S. News and World Report* in 2009 as one of the 100 best high schools in the U.S.A. [www.cdacharter.org]. Bass writes, "I was a systems programmer for a Department of Defense contractor with Tom Hall (class of '84) for 9 years, but my desire to teach physics pulled me out and back into the classroom where I am much happier. I was pretty sick 5 years ago and had a kidney transplant, which is a wonderful blessing! I finally got married [in 2006] to a lovely lady I had met a year before and we now have a 3 year old baby boy – life is very busy, but wonderful." *Email: rbass@cdacharter.org*

**Borca, Bogdan** (M.S. 1998, Ph.D. 2001) is now a consultant with Ortec Finance AG in Pfäffikon, Switzerland, which provides technology and

advisory services concerning risk and return management to pension plans, insurance companies, etc. *Email: bborca@gmail.com*

**Buckley, Bob B.** (B.S. 2007 Engineering Physics) is a graduate research assistant in the Center for Spintronics and Quantum Computation at the University of California at Santa Barbara working with David Awschalom. He recently published a *News and Views* article [*Nature* **461**, 1217 (2009)] with Awschalom on ways to reduce decoherence in quantum communication so that information is preserved.

**Camp, Howard Alan** (B.S. 1999) received his Ph.D. degree from Kansas State University in 2005. His thesis on "Measurements of the time evolution of coherent excitation" was done under the supervision of Brett D. DePaola. Following graduation, Camp joined the Institute for Defense Analyses in Alexandria, VA.

**Caprez, Adam** (M.S. 2005, Ph.D. 2009) is a High Performance Computing Applications Specialist in the Holland Computing Center at UNL. *E-mail: acaprez@cse.unl.edu*

**Demmel, Paul R.** (B.S. 2005) graduated in 2006 with an M.S. degree in Computational Finance from Carnegie Mellon University. He then spent six months traveling in Asia and Brazil and subsequently began working for UBS in Stamford, Connecticut as an equities derivatives trader.

**Engelhardt, Michael** (M.S. 1983, Ph.D. 1988) writes that he is currently living in Newport, MN, a small community in the Minneapolis-St. Paul metro area. "I am married and have three daughters and two step daughters from 21 to 26 years old. [2010 was] a busy year as both step daughters decided to get married... My wife Lesley is a marketing-fundraiser for a small non-profit that operates 24 group homes for people with developmental disabilities. So in addition to doing an occasional Habitat for Humanity

project with my ELCA friends, and Rotary meetings, I'm often at events related to the network of groups that provide for the disabled in the Twin Cities... For the last ten years, I've worked at Arrow Electronics as a computer storage engineer. The 'Arrow ECS Storage and Networking Group' is a distribution partner for EMC, Network Appliance, HDS... I have a lab in our Eden Prairie office from which I manage the EMC portion. It is 15 racks of storage and servers used for demonstrations to close sales opportunities and for partner education. The engineers also teach the accreditation classes required for resellers to actually sell many of the products. We also have to maintain our own certifications, so we are always studying and visiting our local Pearson/VUE test centers."

**Finkler, Paul** (Emeritus Associate Professor), 85 Hoyt St., Lakewood, CO 80226-1070, writes that his new place is next door to his son and his family. *Cell: 720-480-9992*



**Fritz**

**Fritz, Shannon** (M.S. 2008) is in the Ph.D. program in Medical Physics at Louisiana State University. She passed her Ph.D. qualifier in January 2008. *Email: fritz@lsu.edu*

**Hellwig, Russell** (M.S. 1964) visited the Department recently. He obtained his Ph.D. in physics at the University of Wisconsin-Milwaukee in 1973. From 1965-1998 he was a faculty member in physics at the University of Wisconsin-Whitewater. Currently Russ leads weekly walks through the Wisconsin countryside. His blogs about these walks may be viewed here: <http://walworthcountytoday.com/weblogs/weekly-walk/> *Tel.: 262-473-2187; Email: helwig@cni-usa.com*

**Liu, Chihray** (Ph.D. 1988) is Professor and Chief Medical Physicist in the Department of Radiation Oncology,

Shands Cancer Center, University of Florida, Gainesville, FL 32610-0385.  
*Web page:* <http://www.med.ufl.edu/radonc/faculty/physics/liu.shtml>  
*Email:* [liucr@ufl.edu](mailto:liucr@ufl.edu)

**MacMillan, Richard** (M.S. 1970), retired in 2000 from his position as a Project Manager with BP. Reflecting on his career, MacMillan writes: “My entire professional career centered on computers and information technology. Though I never made a great deal of technically-specific use of my physics education, that knowledge enabled me to communicate with engineers and other technical people. As an adjunct to my primary career, I taught both physics and computer-related courses at Plainfield (IL) High School, Joliet Junior College..., and The University of St. Francis. I have worked for four primary employers (Amoco for...21 years [which was taken over by BP in 1997]) yet have never held a position with ‘physicist’ anywhere in the title or job description. Instead, I migrated into the computer field starting as a technical programmer, then becoming an engineering programmer, and have been a ‘computer person’ ever since. My physics education, though rarely utilized explicitly in the workplace, has provided a solid foundation of logical thinking and analytical skills.... While still with Amoco, I started a company (CORAC Industries, Inc.) in 1997 to manufacture a product I patented. [It was] on a device having nothing to do with physics per se, yet I used those skills in designing it. All in all, I have enjoyed a very successful career in fields outside of my formal training. I thank my training in physics for my ability to attain that success!” MacMillan notes that in 2007 he won second place recognition in the “Nebraska” alumni magazine writing competition in the nostalgia category. His topic was Frisbee Golf, which he says he and other graduate physics students engaged in during 1967-69 “as a diversion from our studies.” *Email:* [richmacm@comcast.net](mailto:richmacm@comcast.net)

**Males, Jared R.** (B.S. 1998) Johns Hopkins University Applied Physics

Laboratory, National Security Technology Department, Operational Assessments Group (STP), [443-778-2729 (o), 410-218-7653 (c)] writes “I am no longer on active duty in the Navy. I separated in November of 2005 after 7 years. I was a submarine officer stationed on the *USS Pasadena* in Pearl Harbor, and, later, on the headquarters staff there. Some highlights of my time included obtaining Naval Nuclear Engineer certification, and completing an eight month deployment to the Persian Gulf on *Pasadena* in 2003. I started at JHU-APL in March 2006 on the professional staff....My time here is split about evenly between analysis and project management. Our group specializes in military operations research, and my current projects focus on submarine operations. This is a big and exciting place to work - between our DOD programs and the ‘other half’ that works for NASA there is always something fun going on. Part time I am pursuing an M.S. in Applied Physics from JHU.... So far, my UNL education has served me well. I hope to continue my Physics education, perhaps pursuing a Ph.D. in a year or two. Incidentally, I contacted Dr. **Tim Gay** a while back to discuss returning to academic physics and his advice has been most valuable.

**Marinescu, Mircea** (Former Postdoctoral Research Associate) is the Global Head of Commodities Modeling Group at Barclays Capital, an investment bank. He worked previously for the commodities group at Morgan Stanley.  
*Email:* [mircea.marinescu@barcap.com](mailto:mircea.marinescu@barcap.com)

**Mariyenko, Igor** (Former Postdoctoral Research Associate) joined the staff of Physical Optic Corporation, 20600 Gramercy Place, Building 100, Torrance, CA 90501-1821.

**Maurer, Christopher** (M.S. 1973), 205-N3 Carpenter Rd., SE, Lacey, WA 98503, is a Site Manager for the Washington State Department of Ecology, Toxics Cleanup Program in Olympia, WA. Upon learning of Professor **Robert Fuller**’s retirement in



**Maurer**

during]... my twenty years with the ...Department of Ecology.” *Email:* [cm461@ecy.wa.gov](mailto:cm461@ecy.wa.gov)

**McClelland, Robert** (M.S. 1969), 2405 Grant St, Beatrice, NE 68310-3340, retired in May 2006 after 32 years of teaching physics and mathematics in the Beatrice Public Schools. He rejoined the School District in April 2007 as District Energy Manager. An article in the 17 February 2010 issue of the *Beatrice Daily Sun* (“Senators tout building better schools” by staff writer Chris Dunker), concerning the Nebraska Legislature’s consideration of a bill to help school districts make energy-saving improvements, reported that during the three years McClelland has served as energy manager, the Beatrice Public Schools (BPS) system has achieved a 20% savings in its energy budget of \$350,000. According to the article, the focus in Beatrice has been on reducing natural gas and electricity usage. The article quotes McClelland extensively on how these reductions were achieved: “The key is that it is people-centered,” McClelland said. “I have been working with all staff: maintenance, custodial, food service, the teaching staff, the support staff and administrators. The goal here is getting everyone involved and making everyone aware of things they can do to cut back.” This has been done by simple measures, such as turning off lights in classrooms, shutting down computers when they are not in use, and operating machinery at its most efficient level. “The key is that it has been a cooperative effort,” McClelland said.... “We’ve gotten everyone to realize that we’ve got to pursue this. It’s not one person, it’s not me by any means,” McClelland said. “It helps people see what we’re doing and how it makes a difference.” McClelland said saving

energy in the schools is a learning process, and, not unlike his teaching days, information is not automatically absorbed the first time. "It's a matter of changing habits and becoming more aware of what's going on around them," he said. "We've had to work on this. We're all human and people forget, so it's an ongoing process of reminding people that we've done great, but not to let down their guard."

**Morgan, Thomas** (Emeritus Associate Professor), 11813 Runnymede street, Unit 35, North Hollywood, CA 91605, writes: "I am living in Laguna Woods, a gated retirement community next to Laguna beach in Orange County, CA. I love the trees, mild climate and the friendly people. It is not even expensive here. There is lots to do here and people to do it with."

*Email:* hitommorgan@gmail.com



**Pareek, Prem** (Ph.D. 1983) is Adjunct Professor of Medical Physics in the Department of Radiation Oncology of the University of Alabama at Birmingham.

**Pareek**

His interests concern applications of physics to external beam and brachytherapy, invivo and invitro dosimetric measurements, and in teaching radiation therapy physics. In 2001 the Association of Residents of Radiation Oncology awarded him the Teacher of the Year Award. *Web page:* [http://www.uab.edu/radonc/profiles/prem\\_pareek.php](http://www.uab.edu/radonc/profiles/prem_pareek.php)  
*Email:* ppareek@uab.edu

**Pawlowski, Luke** (B.S. 2006) has been working for The Marex Group, Inc., in Lincoln since graduation. The company is involved with document management system sales and development, conversion services, consulting and integration. Luke writes, "I've had to learn some new skill sets for my new job, [such as] company software and Microsoft SQL, etc.,.... The pay is nice, there are business trips all over the country (all expense paid),

and the skill sets are easily transferable to other positions."



**Pearl, Donald M.** (M.S. 1989, Ph.D. 1994) became Academic Vice President at Sauk Valley Community College, Dixon, IL in July 2007. Tel. 815-835-6311,

**Pearl**

*E-mail:* pearld@svcc.edu; *Web page:* <http://svcc.edu/vice-president/>

**Philson, Joshua** (B.S. 2009) is an Engineering Associate with the Dam Safety Division of the Nebraska Department of Natural Resources in Lincoln.

*Email:* josh.philson@nebraska.gov

**Poulsen, Matthew** (Ph.D. 2007) is a Patent Law Clerk with the Omaha office of Suiter Swantz PC LLO, an intellectual property law firm with offices in Omaha and Beijing.

**Reece, Timothy** (Ph.D. 2007) is now an Assistant Professor in the Department of Physics and Physical Science at the University of Nebraska-Kearney.

**Runge, Alan** (M.S. 1994), President's Office, Concordia University Texas, 11400 Concordia University Drive, Austin, TX 78726, has been the Provost of Concordia University since March, 2007. Prior to that he served as the Dean of Academic Affairs at DeVry University, Houston, TX.  
*Email:* alan.runge@concordia.edu;  
*Website:* <http://faculty.concordia.edu/alan.runge>

**Schlissel, Daniel** (B.S. 1993) writes that he is now a record producer by trade. In 2006 he produced Lewis Black's fifth album, *The Carnegie Hall Performance*, which won the *Best Comedy Album* award at the 49<sup>th</sup> annual Grammy Awards. Learning CD-ROM burning software while working on **Robert Fuller's** CD-ROM Toolkit project at UNL led to Schlissel's first job with Adaptec, and then Roxio, the spun-off software division, until those

jobs were transferred to divisions in Canada and then India. While at UNL, Schlissel launched a music record label



**Schlissel**

("-ismist Records") that focused on Lincoln and Omaha bands. When he moved from Lincoln to Minneapolis, however, he writes that, "it was clear that it was time to stop doing music since I was so far removed from the scene and the markets. I ran into Lewis Black shortly after moving, and pitched a CD idea to him. He accepted, and the rest developed. When the job went away, it let me pursue the label more fully [as producer and president of *Stand Up! Records*, which is an independent label in Minneapolis focused on stand up comedy].... I parted from the hard science path, but learning how to reason logically and think a problem through has been invaluable." *Email:* ismista@yahoo.com A feature article on Schlissel and *Stand Up! Records* by Matt Synders titled "Indie comedy label Stand Up! has produced the edgiest comedy in the country" was published on May 21<sup>st</sup>, 2008 in Minneapolis's citypages.com web site at this URL: <http://www.citypages.com/content/printVersion/467482>

**Sorensen, Christopher M.** (B.S. 1969) was named one of four "Professors of the Year" from 300 candidates by the



**Sorensen**

Carnegie Foundation for the Advancement of Teaching in November 2007. Sorensen, a Distinguished Professor of Physics at Kansas State University, won in the category of doctoral and research universities. He was cited for his innovative teaching methods, including his design of dramatic lab demonstrations for small groups of students and for his replacement of about one third of the standard physics textbook readings with readings from the original works



of Galileo, Newton, Faraday, and Einstein.

*Email:* sor@phys.ksu.edu

**Stenberg, Donald B.** (B.A. 1970) was elected in 2010 as Nebraska State Treasurer. After attaining his B.A. in physics at UNL, Stenberg went to Harvard and earned both law (J.D. cum laude 1974) and business (M.B.A.) degrees there. From 1979-1983 he served as legal counsel to Governor Charles Thone and from 1991-2003 he served as Nebraska State Attorney General.

**Swift, Gregory W.** (B.S. 1974 with High Distinction) is the team leader of the Thermoacoustics group within Los Alamos National Laboratory (LANL)'s Materials Physics and Applications Division. This group includes another alumnus, **Scott Backhaus** (B.S. 1990). Swift and Backhaus recently wrote a paper analyzing the similarity between stabilizing a cryogenic thermoacoustic refrigerator operating at high frequency and stabilizing an inverted pendulum. This work was the subject of a "Physics Update" in *Physics Today* on November 12<sup>th</sup>, 2009 as well as a "Search and Discovery" article on page 17 of the January 2010 *Physics Today*. Two years earlier, on September 24<sup>th</sup>, 2007 the Thermoacoustics group won a *Wall Street Journal* Tech Award in the category of Energy for their development of a method to liquefy natural gas through a thermoacoustic process that cools the gas with sound waves. The process differs from traditional methods because it produces smaller quantities but with much higher reliability and at lower cost. The technology has been licensed to Swift LNG Inc., of Denver. Although this company bears his name, Swift owns no interest in the company.

**Teays, Terry** (Ph.D. 1986) recently published the book *Optimizing Luck: What the Passion to Succeed in Space Can Teach Business Leaders on Earth*, by Thomas Meylan & Terry Teays (Davies-Black Publishing, Mountain View, CA, 2007). According

to the publisher, "Meylan and Teays played an integral part in one of the most successful and longest-lasting astronomy satellite projects in NASA's history. Here, these scientists-turned-managers share how passionate dedication to quality, customer service, and the ideal of success helped a team of ordinary workers achieve sustained growth, market penetration, customer satisfaction, and production efficiency to become the employer of choice within the industry. From hiring and delegation to communication and rewards, *Optimizing Luck* lays out best practices for developing luck-optimizing competencies across the entire workforce." Teays has been recognized with several NASA Group Achievement Awards. He is an Assistant Director of the Maryland Space Grant Consortium, Bloomberg Center for Physics & Astronomy, The Johns Hopkins University, 3400 North Charles Street, Rm. 206C, Baltimore, MD 21218-2686, 410-516-7106 (W), 301-651-5112 (Cell), *Email:* teays@pha.jhu.edu

**Trantham, Kenneth W.** (Ph.D. 1996) is now Associate Professor and Chair of the Department of Physics and Physical Science of the University of Nebraska-Kearney. *Email:* tranthamkw@unk.edu

**Volz, Donald J.** (M.S. 1965, Ph.D. 1969), 27246 Delemos, Mission Viejo, CA 92692, writes: "I have now moved through four careers ... I completed a Postdoctoral Fellowship at Georgia Tech, taught physics at Voorhees College, moved into sales with Xerox, and then started a 29 year career in medical equipment. Early on I helped design Computer Tomography, then designed x-ray equipment to perform vascular interventional procedures. I finished my career in medical equipment managing a small business with about \$80 million in revenues. Now I am interested in teaching. I have been tutoring college and high school students and get a great deal of satisfaction addressing their concerns. There are a number of community colleges near me in California, and I

am applying for a number of teaching positions in math and physics. Mathematics is by far the biggest opportunity." *Email:* djvolz1@cox.net



**Wang, Jin** (Former Jorgensen Postdoctoral Fellow) is now an Assistant Professor of Physics at the University of Michigan-Dearborn. Her research involves both experimental

**Wang** and theoretical work in quantum optics. *Email:* jinwang@umd.umich.edu

**Webster, Gary L.** (Ph.D. 1981) is an aerospace engineer whose career has focused on systems engineering and navigation and guidance of rockets and missiles. Following postdoctoral appointments in theoretical atomic physics at the University of Chicago and at Kansas State University, Gary joined



General Dynamics (San Diego) in 1987, working on cruise missile navigation and guidance. Following the sale of General Dynamics's Space Systems Division to

**Webster** Martin Marietta in 1994 (followed by the latter's merger with Lockheed Corp in 1995 to form Lockheed Martin), Gary moved to Denver where he was a guidance engineer for Lockheed Martin Astronautics, working on flight software guidance and antenna control algorithms for the Titan rocket system. In 2006, Gary joined the United Launch Alliance (ULA), a joint venture of Lockheed Martin and Boeing whose mission is to provide spacecraft launch services for the U.S. Government. He developed flight software guidance, navigation, vehicle steering, and antenna control programs for expendable launch vehicles (such as the Atlas rocket) that put satellites into Earth orbits. Following a ULA downsizing in October 2009, Gary has been pursuing various other interests. *Email:* gleighweb@gmail.com

## John Richard Hardy (1935-2011)

**John Richard Hardy** was born on 9 January 1935 in Hertfordshire, England to Marjorie and Cyril Hardy, formerly of Derby, England. His father worked as a telecommunications engineer for British Railways, and both grandfathers and a great-grandfather were also employed by the railways, which certainly influenced his passion for model trains. John died at age 76 on 5 May 2011 in Lincoln,



**Hardy**

at the U.K. Atomic Energy Research Establishment at Harwell, John arrived in the U.S. as a visiting faculty member in the Department of Physics and Astronomy at the University of Nebraska during 1966-67. He was promoted to the rank of Professor of Physics with tenure in 1968, and he remained with the Department until his retirement in 2003.

John was an international authority in the field of lattice dynamics because

Nebraska. He received his B.S. degree in 1956 and his Ph.D. in 1959, both from Bristol University in England. After holding positions as a Research Fellow at Reading University and Senior Scientific Officer

of his development of his famous Deformation Dipole Model for calculating the vibrational properties of insulators before he arrived in the U.S. He had an outstanding record of training graduate and postdoctoral students and collaborating with other scientists. His Ph.D. students have gone on to distinguished careers in theoretical condensed matter physics at other academic institutions, in industry, and at national laboratories. He is also noted for his highly effective collaboration with experimentalists, maintaining a long-term joint research program with experimentalist Frank Ullman in the study of ferroelectric materials. In 1979, John co-authored a book with Arnold Karo entitled "The Lattice Dynamics of Alkali Halide Crystals." He served as a consultant to both Lawrence Livermore Laboratory and the Naval Research Laboratory. His research was supported by both the Army Research Office and the Office of Naval Research. John was a Fellow of the American Physical Society, the major professional organization.

In 1982, he received the University of Nebraska Chapter of Sigma Xi's Distinguished Scientist Award. John received the 1989 University of Nebraska

Award for Outstanding Research and Creative Activity (ORCA) in 1989. He was cited for his pioneering work on the lattice dynamics and statics of crystalline materials, his development of the deformation dipole model, which is used widely to calculate basic properties of both pure materials and materials containing defects, his extensive work on the theory of shock propagation in solids, and identification of the possible origins of high temperature superconductivity. The ORCA award is the highest accolade the University can bestow in recognition of a faculty member's research. Finally, to honor John for his various accomplishments, the University of Nebraska named him George Holmes Professor of Physics in 1993. John was a kind and caring person who dedicated all his life to mentoring his students and postdoctoral fellows and working with his experimental and theoretical colleagues. Those who knew him always enjoyed his dry sense of humor which replaced his normal shyness after a few beers.

John is survived by his sister Jane, who lives in the family home in England.

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## Edward J. Zimmerman (1924-2010)

**Edward J. Zimmerman**, a longtime UNL physics professor and former department chair, died on 26 December 2010. He was 86.



**Zimmerman**

He began his UNL career after receiving his doctorate from the University of Illinois, Urbana, in 1951. His early research at UNL involved stopping powers of solids and gases with the scintillation of crystals. Later in his career, he focused on the foundations of quantum mechanics.

While serving as chair of the physics department from 1962-66, he oversaw significant growth. Graduate student

enrollment surged and he hired more than a dozen faculty members. At the time, the nation was pursuing a mission to put a man on the moon and there was renewed emphasis on teaching and research in science and mathematics.

Those who knew Zimmerman are quick to note his sense of humor. "A student once told me that entering graduate students at first were afraid of him, perhaps because of his wry sense of humor; but not for long, as they realized that he knew them well and gave them plenty of attention," said **Edgar Pearlstein**, emeritus professor of physics.

Zimmerman was funny, brilliant and kind and valued his role as professor, said Gwen Tilley, Zimmerman's sister-in-law. "He loved students," she said. "He

tried to make it very real for them."

Zimmerman retired in 1988, but his passion for science didn't fade.

In the weeks before his death, Tilley remembers seeing him watching a DVD on physics and the universe. He had ordered it for his grandchildren but wanted to make sure that it met his approval before he sent it to them, she said. Two of his three grandchildren are interested in becoming physicists, she added.

Zimmerman, a Waynetown, Ind., native, is survived by his wife, Dorothy, of Lincoln; daughters, Ann Zimmerman Lucas of Paris, France, and Mary Zimmerman, of Evanston, Ill.; and three grandchildren, Marc, Alice, and Paul Lucas of France, among other loved ones.

## Robert Katz (1917-2011)

**Dr. Robert Katz**, 17 July 1917 to 12 March 2011, emeritus professor of physics at the University of Nebraska, died peacefully at his home Saturday March 12th following a brief illness. He and his sister Gladys were born to immigrant Russian Jewish parents



Katz

in New York City, who operated a delicatessen in the Bronx, not far from Yankee Stadium. He remembered Babe Ruth stopping by for hot dogs, a huge man driving a little sports car; and seeing the NY Giants' Carl Hubbell pitching a 15 inning shutout at the Polo Grounds where double-headers cost \$1.

He came to the University of Nebraska in 1966 from Kansas State University where he had received their Distinguished Graduate Faculty Award for 1962-63 as an outstanding lecturer and researcher. He had developed soft x-ray techniques for assessing insect infestations as well as methods for testing grain density; he co-authored a popular physics text, "Physics" with Henry Semat in 1962, and was author

of "An Introduction to the Special Theory of Relativity" in 1964. He began the study of cosmic ray tracks left in photographic film retrieved from high altitude balloons. These tracks look something like meteors piercing the night sky. It was while at Kansas State that he first developed a theoretical model correlating these images with the effects of radiation on human cells during cancer treatment.

He had earned his B.A. from Brooklyn College in 1937, his M.A. in physics from Columbia University in 1938; and after working as a civilian physicist at Wright Field in Dayton, Ohio during WW II., he earned his Ph.D. at the University of Illinois in 1949. While at Wright Field, he addressed the problem of radio interference on aircraft by designing "pigtailed," which dissipated excess static electricity. He also developed x-ray techniques to identify fatigue fractures in airplane castings. While at the University of Nebraska, he turned his attention to the study of radiation effects and developed the Katz Theory, a computer model capable of predicting experimental results when biological tissue was irradiated, especially the implications for cancer treatment.

Following retirement, he collaborated with Francis A. Cucinotta at NASA to develop an application of his model now used to calculate cancer risks for its astronauts. In retirement, he also enjoyed membership in Polemic Club and Torch Club, where he gave a series of thought-provoking presentations. Recently, he witnessed a scholarly renaissance thanks to UNL's on-line institutional repository, Digital Commons, where the works of active and emeritus professors are publically accessible. To his surprise and delight, he learned that his site was visited frequently and his articles and texts downloaded. He was also featured in a UNL publication, *The Scarlet*, in an article titled, "A Century of Achievements," a look back at sixteen outstanding University of Nebraska professors.

He is survived by his special friend Harriet Turner; sons Steven Joseph Katz and John Hewitt Katz; daughter-in-law Ileana Luisa Soto; nieces Joan Field Lakin and Elaine Field; nephews Ken Field and Richard Field. His former wife, Mildred Popov Katz and his sister, Gladys Field predeceased him.

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## Everett W. Gross (1919-2008)

**Everett W. Gross** (M.S. 1960) taught physics at Doane College in Crete, NE from 1960-1974 following receipt of his M.S. degree in physics from UNL. He lived in Crete until his death on 5

March 2008. In World War II he served during 1940-44 in the Army Air Corp, attaining the rank of First Lieutenant. In addition to teaching physics, he also farmed and was involved with air

traffic control. He was an enthusiastic supporter of the ideas of Henry George, the writer and political economist, and wrote many essays for several Georgist organizations.

## Byron L. Krauter (1954-2010)

**Byron Krauter** (B.S. 1976) died from lung cancer on 22 June 2010. Byron was a member of the same graduating class as **Chris Greene**, **Fred Pinkerton**, and **Don Schneider**. He was born in Lincoln and raised nearby in Cortland. He attended Norris Regional High School, which recently honored him as a Distinguished Alumnus. At UNL Byron earned B.S. degrees in both physics and



**Krauter**

and mathematics and an M.S. degree in electrical engineering (E.E.). He thereupon joined the technical staff at IBM, first in Vermont, then in Austin. In 1995, he received his Ph.D. in E.E. from the University of Texas at Austin. Byron was our Recognition Luncheon speaker on May 8<sup>th</sup>, 1997, which both of his parents attended. [For a report on Krauter's remarks to graduates, see p. 12 of *Spectrum* issue No. 18 (Fall 1997) on the Department web site.] At the 2003 APS March Meeting in Austin, Professors **Roger Kirby** and **David Sellmyer** dined with both Byron and alum **Rebecca Richards Kortum** (B.S. 1985). Byron retired from IBM on 1 June 2010. According to the obituary in the *Austin*

*American-Statesman*, published on June 27<sup>th</sup>, "His joys included ballroom dancing and travel with his wife Barbara, and the occasional glass of a fine red wine."

Upon learning of his classmate's death, **Chris Greene** (B.S. 1976) sent the following remembrances on 23 August 2010: *I got to know Byron Krauter during our undergraduate years 1972-1976, when we were classmates as physics and math majors at UNL. We took many classes together and became great friends, and were lab partners in Ed Pearlstein's two-year advanced undergraduate laboratory course. Byron and I tackled many interesting labs in that sequence, including measurements of the Hall effect, the electrical resistance of thin films, atomic absorption spectroscopy, and a mysterious nuclear resonance spectroscopy experiment with some unknown radioactive materials stashed in a box somewhere in Behlen Laboratory. We also talked a great deal about difficult points and challenging homework problems when we took courses together in the math and physics departments. Those conversations and problem-solving sessions were a vital part of my own education, and Byron often showed me*

*clever ideas and ways to solve problems that I had not seen on my own.*

*After we graduated in spring 1976, I left Lincoln for graduate study in Physics at the University of Chicago, while Byron stayed at UNL to earn his M.S. degree in Electrical Engineering. We stayed in touch and continued to get together occasionally over the years, for a time almost annually after he moved from Vermont's IBM site to his position in Austin where he worked for the rest of his life. At IBM, Byron was a specialist in understanding and controlling the electrical noise that was generated in one part of a circuit but affected a different part. He always stressed how differently his colleagues at IBM, trained with a strictly engineering background, tended to approach their problems. Largely because of those experiences, he was a strong advocate of getting a degree in physics for at least part of one's training, even if one's career ultimately moves into an applied or engineering direction.*

*Byron fought a long and difficult battle with lung cancer, and he poured his energy into understanding and trying to recover from that terrible disease in his final years. He was a wonderful friend, who will be missed.*

## Edward J. Kobetich (1941-2007)



**Kobetich**

**Edward J. Kobetich**, 65, died 15 January 2007, at his home in Hutchinson, KS. He was born 8 October 1941, in Clay Center, the son of John Edward and Hilda I. Ayres Kobetich. In 1959, he graduated from Abilene High School. He received a bachelor's degree from Kansas State University, did his doctoral work in physics with **Robert Katz**

at the University of Nebraska, and obtained an MBA degree from the University of Pennsylvania. He was an executive engineer managing research and development for Toyota Technical Center in Ann Arbor, Michigan for most of his career. He is survived by his wife, Jane Ella Birney, and two sons and two daughters.

## Larry L. Smalley (1937-2010)

**Larry Lee Smalley** (B.S. 1959, M.S. 1964, Ph.D. 1967) passed away on January 16, 2010. He was born in Grand Island, Nebraska, and served as a lieutenant in the U.S. Navy from 1959-1962. His doctoral research in theoretical high energy physics was carried out under the supervision of Professor **David Joseph**. He spent 35 years of his professional career as a faculty member in the Physics Department at the University of Alabama at Huntsville. What follows are excerpts from the lengthy obituary published in *The Huntsville Times* on 31 January 2010:

*He served as Physics Department Chair from 1973 to 1985, during which time [the department] grew both in number of students as well as sponsored research, and he helped lay the foundation for the present specializations in optics, space physics and astrophysics .... He also served as Associate Director of the*

*Gravitoelectromagnetic (Super G) Science Laboratory in the 1990s. His research interests included fluid dynamics, general relativity as it relates to the subatomic gravitational forces where space and time interact, and experimental gravity modifications. He mentored many in the field of physics, directing to completion numerous students' doctoral dissertations, as well as providing an encouraging voice for both undergraduates and postgraduates. He authored or coauthored more than 80 articles published in peer reviewed physics journals, as well as over 40 Reports and 50 critical reviews in The Mathematical Reviews.... He was [an Alexander von] Humboldt Fellow at the Institut für Theoretische Physik at the University of Cologne, Germany on three separate occasions [and was an invited professor] at L'Université de Paris VI (Pierre et Madame Curie) in 1993.... He never lost the curiosity of a student, receiving his BA in French in 1987.*

*Dr. Smalley put his academic knowledge to practical use, working as a part-time permanent astrophysicist at NASA's Marshall Space Flight Center, as well as a consulting scientist for Teledyne-Brown Engineering and for the United States Army. He was co-recipient of several patent grants, the most recent in 2008 based on work done through NASA. Dr. Smalley's interests were eclectic and always challenging, as he enjoyed applying his many skills to everyday life. He built his own house, acting as general contractor. He enjoyed woodworking and furniture making. He was a gardener, even spending several years growing his own grapes and making wine. He was an avid connoisseur of classical music and opera, and for more than 40 years attended the Huntsville Symphony Orchestra. Later in life he spent many pleasurable hours enjoying the game of golf at the Redstone Arsenal officers' club with his son-in-law and former students.*

## Sjur Refsdal (1935-2009)



Refsdal

Norwegian astronomer **Sjur Refsdal** was on staff with a fellowship at the University of Nebraska from 1967-1970 while he was working on his Ph.D. in astronomy from the University of Oslo, which he received in 1970. During the period 1970-2001 he was a professor of astrophysics at Hamburg Observatory, and he was also an adjunct professor

at the University of Oslo from 1991 and emeritus professor after 2001. He is best known for his pioneering work in the field of gravitational lensing. One of his former students and colleagues, Dr. Håkon Dahle of the University of Oslo has written an excellent remembrance of Refsdal at this URL: [http://cosmicdiary.org/blogs/hakon\\_dahle/?p=49](http://cosmicdiary.org/blogs/hakon_dahle/?p=49)

## Margaret Keefe (1915-2008)

**Margaret Keefe** worked in the Department's Business Office from 1967-1978. She died Monday, 3 November 2008 in Lincoln at the age of

93. Her daughter, Patty, was married to alum **George Freund** (M.S. 1976, Ph.D. 1979), one of Professor **Roger Kirby's** former graduate students.

**Freund** died tragically as a result of a bicycle accident in 2002 [see p. 26 of *Spectrum* Issue No. 23 (Fall 2004) on the Department web site].

## Menno Fast (1916-2008)

**Menno Fast**, 91, of Hesston, Kan., died March 23, 2008. Fast was the first full time lecture demonstration manager in the history of the Department, serving from 1968-1981.



**Fast**

He completely changed students' experiences of introductory physics. His diligent service, caring, and helpful attitude transformed the lecture demonstrations used by physics

faculty to teach the large introductory physics classes. Thousands of students who took introductory physics courses benefited from his outstanding service.

He was born April 16, 1916, to Isaac and Aganetha Unruh Fast on the Unruh homestead east of Goessel, KS. He attended Bethel College in North Newton, KS for two years, which qualified him to teach all eight grades at Emmenthal School for three years. He then returned to Bethel and graduated in 1942. In fall 1942, he began graduate school at the University of Kentucky in Lexington, where he earned a master's

degree in physics education. Then for one year he taught high school physics in Chicago.

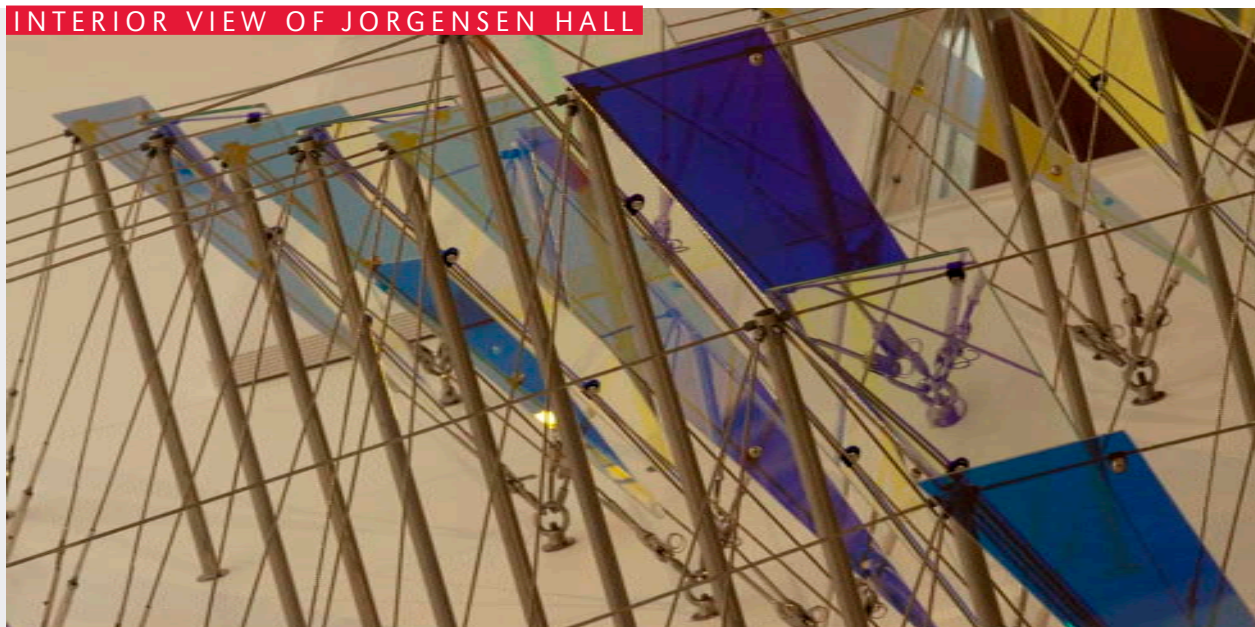
During World War II he entered Civilian Public Service as a conscientious objector. In June 1946, he left for Poland as assistant director of the tractor unit, a joint project of United Nations Recovery and Rehabilitation Act and the Mennonite Central Committee (MCC). This six-month project to rebuild agricultural technical ability destroyed by the war put him in contact with local farmers and authorities, and he discovered many refugees who had lost their families. So the MCC asked him to continue in Poland to work with the refugee relocation effort. He concluded this work in the summer of 1949.

He then taught physics at Bethel College and farmed with his father. In 1954 he joined the physics department at the University of Kentucky. In 1968 he joined the Department at UNL as its first lecture demonstrations manager until his retirement in 1981. From 1987 to 2001 he and his wife, Naomi, lived on the family farm near Goessel, KS. In 2001 they relocated to an assisted living facility in Hesston, KS.

### *Menno Fast Memorial Fund Is Created*

The Department of Physics and Astronomy has established the Menno Fast Memorial Fund to honor Menno's life and work. Income from the endowment fund will enable the Department to continue to update its lecture demonstration equipment. Additional information and contributions to the Fund can be made by using the link on the Department website, [physics.unl.edu/memorials/Menno\\_Fast.shtml](http://physics.unl.edu/memorials/Menno_Fast.shtml). As of summer 2011 the fund is close to the \$10,000 minimum needed before distributions can be made. Alumni and friends are urged to send contributions that will take the fund over this threshold.

INTERIOR VIEW OF JORGENSEN HALL



# Acknowledgments

The Department is very grateful to the individuals and corporations listed below for their new and continuing financial contributions during the period 1 November 2006 – 31 July 2011. These contributions have been made in support of major items of capital equipment, an endowed professorship, graduate fellowships, undergraduate scholarships, and invited lectures as well as for unrestricted purposes. Those who have not been contacted by one of the University of Nebraska Foundation's telephone campaigns or who might be considering an additional tax-deductible gift to us should note that we have the following general accounts at the UN Foundation:

- 1) **Physics & Astronomy Development Fund** [for unrestricted gifts] (Account No. 2557.0)
- 2) **Physics & Astronomy Lecture Endowment Fund** [for Colloquia and Seminars] (Account No. 3321.0)
- 3) **Physics & Astronomy Alumni Scholarship Endowment Fund** (Account No. 3303.0)

Alternatively, former students, friends, and/or colleagues of Professors Sitaram Jaswal, Ted Jorgensen, and David J. Sellmyer as well as of Lecture Demonstrations Manager Menno Fast may wish to contribute to the following endowment funds:

- 4) **Banti & Mela Ram Jaswal Fund** [for undergraduate scholarships] (Account No. 6843.0)
- 5) **Ted Jorgensen Fund for Physics** [for undergraduate scholarships] (Account No. 8846.0)
- 6) **David J. & Catherine J. Sellmyer Fund** [for support of condensed matter and materials science] (Account No. 6781.0)
- 7) **Menno Fast Memorial Fund** [for lecture demonstration equipment] (Account No. 10681.0)

Contributions to any of these may be made conveniently using the contribution card and return envelope enclosed with the mailing of this newsletter, or through the NU Foundation website at: <http://nufoundation.org>. Checks should be made payable to the University of Nebraska Foundation and should indicate for which account the money is intended. Those contributors whose employers have a matching gift program should indicate this.

**Adenwalla, Shireen**  
**Agrawal, Bishan Swarup**  
(M.S. 1973, Ph.D. 1974)  
**Aylesworth, Kevin Donald**  
(M.S. 1986, Ph.D. 1975)  
**Bade, W. Christopher**  
**Bao, Minqi** (M.S. 1992, Ph.D. 1995)  
**Barrett, William Avon**  
(B.S. 1952, M.S. 1953)  
**Beels, Elisabeth A.**  
**Benfer, John P.**  
**Bloom, Kenneth A.**  
**Boyer, Larry Lee** (M.S. 1968, Ph.D. 1970)  
**Bryan, Blaine D.** (B.S. 1960)  
**Burrow, Paul D. & Mary**  
**Cadence Design Systems, Inc.**  
**Caplan, Louis James**  
(M.S. 1963, Ph.D. 1974)  
**Carlson, Alden Carl**  
**Carol Benfer Revocable Trust**  
**Claes, Daniel R.**  
**Cronin, Jamie Renae**  
**Dairiki, Setsuo** (M.S. 1945)  
**Davey, Paul Oliver** (Ph.D. 1964)  
**Dilly, Virgil** (M.S. 1976)  
**Duffey, James Roy**  
(M.S. 1972, Ph.D. 1978)  
**Dunn, Daniel Edward** (B.S.Eng.Phys 1984)  
**Eddy, Stephan McChesney** (B.S. 1978)  
**Finkler, Paul**  
**Fmc Corporation**  
**Friedman, Stephen Jeffrey** (M.S. 2004)

**Fuller, Robert G. & Margaret**  
**Gabbard, Fletcher**  
**Galliardt, Donald Wayne**  
(M.S. 1975, Ph.D. 1983)  
**Gay, Timothy J. & Chris**  
**Goodrich Foundation Partners In**  
**Giving Plan**  
**Gray, David Michael** (B.S. 1977)  
**Hawthorne, Maurice Ray** (B.S. 1964)  
**Heigele, Vernie**  
**IBM Corporation**  
**Iburg, Donald Edward**  
**Jacobs, Loyd Donald** (M.S. 1958)  
**Jaacks, Duane H. & Janet**  
**Jaswal, Sitaram S. & Alice**  
**Kaestner, Steven P.**  
**Kaufman, Delmer**  
**Keifer, David Warren** (B.S. 1968)  
**Kennedy, Neal Duncan**  
**Kirby, Roger D. & Suzanne K.**  
**Krauter, Byron Lee** (B.S. 1976)  
**Kruhmin, Larry** (M.S. 1978)  
**Lannan, William Joseph** (M.A. 1956)  
**Lansdowne, Robert**  
**Lehman, Byron**  
**Lewis, Michael Kevin** (B.S. 1992)  
**Liphardt, Martin Michael**  
(M.S. 1992, Ph.D. 1997)  
**Loose, Nathan Lawrence** (B.A. 2003)  
**Macek, Joseph H. And Ellen A.**  
**Macmillan, Richard Douglas**  
(M.S. 1970)

**Males, Jared Robert** (B.S. 1998)  
**McConnell, Henton**  
**McEllistrem, Marcus T.**  
**McKnight, Ronald Hugh**  
(M.S. 1964, Ph.D. 1970)  
**Munson, Neil Lambert**  
**Natarajan, Marappan** (M.S. 1976)  
**Nebraska Alumni Association**  
**Niva, Gordon David**  
(M.S. 1975, Ph.D. 1979)  
**Pearlstein, Edgar A.**  
**Pilalis, Labros Evaggelos** (B.S. 1978)  
**Pinkerton, Frederick Eugene** (B.S. 1976)  
**Polsky Architects**  
**Polsky, Donald Perry**  
**Ruckman, Jerry E.** (B.S. 1962)  
**Rudd, M. Eugene** (Ph.D. 1962) & **Eileen**  
**Schmidt, James Joseph**  
(B.S. 1956, M.S. 1957)  
**Sellmyer, David J. & Catherine J.**  
**Smith, Lawrence Charles**  
**Spencer, Cary Ray** (B.S. 1971)  
**Starace, Anthony F. & Katherine F.**  
**Stevenson, Roger Dean** (B.S. 1998)  
**Stoddard, Robert Hugh**  
**Teays, Terry John** (Ph.D. 1986)  
**The Boeing Company**  
**Thomas, Sue**  
**Tveten, Alan Brian** (M.S. 1959)  
**Valk, Henry S.**  
**Weymouth, John W. & Laura**  
**Xu, Yuanguang** (M.S. 1997, Ph.D. 2001)

# THE RECORD

EDITED BY JENNIFER LYNN BECIC

## 2005-2006 Degree Recipients

### BACHELOR OF SCIENCE

**Nathan A. Chandler-Smith** (May 2006) went to work full-time for Donald Umstadter in the Diocles Laser Laboratory at UNL.

**Paul R. Demmel** (August 2005) entered the master's degree program in Computational Finance at Carnegie Mellon University.

**William M. Griffel** (May 2006).

**Peter A. Jacobson** (May 2006) entered the graduate physics program at Tulane University in New Orleans.

**Jonathan L. Kauk** (May 2006).

**Jason D. Keller** (May 2006) enrolled in the graduate physics program at UNL working with Professor Gregory Snow.

**Masatoshi Shoji** (May 2006) enrolled in the graduate astronomy program at the University of Texas at Austin.

**Benjamin H. Williams** (December 2006) began working as a firmware engineer at Server Technologies ([www.servertech.com](http://www.servertech.com)) in Reno, Nevada.

### MASTER OF SCIENCE

**Snjezana Balaz** (August 2005) entered the doctoral program in Engineering Physics at UNL working under the supervision of Professor Jennifer Brand of the UNL College of Engineering.

**John D. Burton** (May 2006) entered the doctoral program in physics at UNL working with Professor Evgeny Tsymbal.

**Adam P. Caprez** (August 2005) entered the doctoral program in physics at UNL working with Professor Herman Batelaan.

**Andrei Y. Istomin** (August 2005) entered the doctoral program in physics at UNL working with Professor Anthony Starace.

**Petru Lunca Popa** (August 2005) entered the physics Ph.D. program at the Institut de Physique et Chimie des Matériaux de *Strasbourg* (IPCMS) [*Institute of Physics and Chemistry of Materials, University of Strasbourg*], France.

**Jonathan P. Reyes** (August 2005) entered the physics Ph.D. program at UNL.

**Ildar F. Sabirianov** (December 2005) entered the Engineering Physics Ph.D. program at UNL working with Professor Jennifer Brand.

**Adam M. Scheer** (May 2006) entered the chemistry Ph.D. program at the University of Colorado-Boulder working with Professor G. Barney Ellison.

**Jiawei Tan** (May 2006) entered the Ph.D. program in physics at the University of Illinois – Urbana/Champaign.

**David S. Wisbey** (August 2005) entered the physics Ph.D. program at UNL working with Professor Peter Dowben.

### DOCTOR OF PHILOSOPHY

**Andrei Y. Istomin** (August 2005) took a postdoctoral research associate position in computational biology and structural bioinformatics at the University of North Carolina in Charlotte.

**Brandon J. Jordan-Thaden** (December 2005) took a postdoctoral position in the synchrotron lab of Andreas Wolf in Heidelberg, Germany.

**Christina M. Othon** (December 2005) took a postdoctoral research position in the group of Nobel Laureate Ahmed Zewail at Caltech.

**Luis G. Rosa** (December 2005) took a postdoctoral position in the Department of Chemistry at Princeton University.

**Ildar F. Sabirianov** (December 2005) took a postdoctoral position in the Department of Chemical and Biomolecular Engineering at UNL working with Professor Jennifer Brand.



# 2006-2007 Degree Recipients

## BACHELOR OF SCIENCE

- Bob Buckley** (*Engineering Physics*, May 2007) enrolled in the graduate physics program at the University of California-Santa Barbara.
- Laurel Burk** (May 2007) enrolled in the graduate physics program at the University of North Carolina at Chapel Hill.
- Christopher Corder** (May 2007) enrolled in the graduate physics program at the State University of New York at Stony Brook.
- Stephanie Gilbert** (May 2007) enrolled in the graduate physics program at Vanderbilt University.
- Ceceilia Hedrick** (May 2007) enrolled in the graduate astronomy program at Penn State University.
- Dmitry Kolesnikov** (May 2007) is enrolled in the M.S. degree program in Information Technology and Business Administration at Creighton University.
- Luke Pawlowski** (December 2006) took a position with The Marex Group, Inc. in Lincoln.
- Timothy Scarborough** (December 2006) enrolled in the graduate physics program at UNL working with Professor Cornelius Uiterwaal.
- Kathleen Wheeler** (May 2007) began training for the US Olympic Trials in swimming, held in July 2008 in Omaha.
- Zachary Wolff** (December 2006) entered the graduate program in Teaching, Learning, and Teacher Education at UNL.

## MASTER OF SCIENCE

- Mikhail Bragin** (December 2006) entered the physics Ph.D. program at UNL working with Professor Ilya Fabrikant.
- Xumin Chen** (August 2006) entered the physics Ph.D. program at UNL working with Professor Axel Enders.
- Shannon Fritz** (August 2006) entered the medical physics graduate program at Louisiana State University.
- Thomas George** (August 2006) entered the physics Ph.D. program at UNL working with Professor David Sellmyer.
- Shawn Hilbert** (May 2007) entered the physics Ph.D. program at UNL working with Professor Herman Batelaan.
- Zhen Li** (December 2006) entered the physics Ph.D. program at UNL working with Professor Roger Kirby.
- Yushun Lin** (December 2006) entered the physics Ph.D. program at UNL working with Professor Sy-Hwang Liou.
- Jing Liu** (December 2006) entered the physics Ph.D. program at UNL working with Professor Peter Dowben.
- Srinivas Polisetty** (August 2006) entered the physics Ph.D. program at UNL working with Professor Christian Binck.
- Yi Wang** (December 2006) entered the physics Ph.D. program at UNL working with Professor Stephen Ducharme.
- Xiaohui Wei** (December 2006) entered the physics Ph.D. program at UNL working with Professor David Sellmyer.
- Jie Xiao** (August 2006) entered the physics Ph.D. program at UNL working with Professor Peter Dowben.
- Yao Zhao** (August 2006) entered the graduate program in materials science at Rice University.

## DOCTOR OF PHILOSOPHY

- Brett Barwick** (May 2007) took a postdoctoral research associate position with Nobel Laureate Ahmed Zewail at Caltech.
- Glen Gronniger** (December 2006) took a metrology engineer position at the National Nuclear Security Administration's Kansas City Plant, operated by Honeywell Federal Manufacturing & Technologies.
- Lu Yuan** (December 2006) took a postdoctoral research associate position at the National Institute of Standards and Technology (NIST) in Boulder, Colorado.

## INTERIOR VIEW OF JORGENSEN HALL



# 2007 – 2008 Degree Recipients

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## BACHELOR OF SCIENCE

**Maya Fabrikant** (December 2007) was a graduate research assistant in physics at UNL prior to enrolling in the graduate physics program at the University of Colorado-Boulder.

**Amanda Fricke** (December 2007) enrolled in the graduate physics program at the University of Rochester.

**John Mullins** (May 2008) enrolled in the graduate program in Biomedical Engineering at the Mayo Clinic Graduate School, College of Medicine in Rochester, MN.

**Robert Mumgaard** (May 2008) enrolled in the graduate program in Nuclear Engineering at MIT.

**Levi Neukirch** (December 2007) enrolled in the graduate physics program at the University of Rochester.

**Ryo Namba** (December 2007) enrolled in the graduate physics program at the University of Minnesota.

**Daniel Williams** (May 2008) enrolled in the graduate program at the Institute of Optics, University of Rochester.

## MASTER OF SCIENCE

**Chad Petersen** (May 2008) enrolled in the graduate physics program at UNL working with Professor Donald Umstadter.

**Yong Wang** (December 2007) enrolled in the graduate physics program at UNL working with Professor Evgeny Tsymbal.

## DOCTOR OF PHILOSOPHY

**John D. Burton** (May 2008) took a postdoctoral research associate position at UNL working with Professor Evgeny Tsymbal.

**Danqin Feng** (August 2007) took a postdoctoral research associate position in the Chemistry Department at the University of Chicago.

**Jihe Kim** (May 2008) joined the order of the Carthusian Nuns, Monastère de l'Annonciation, 399 ChungBuk, Boeungun, sanoemyeon, Daewon-li 376-873, South Korea.

**Steven Michalski** (December 2007) took a postdoctoral research associate position in the Department working with Professor David J. Sellmyer.

**Matthew Poulsen** (December 2007) enrolled in the UNL College of Law.

**Timothy Reece** (December 2007) took a postdoctoral research associate position in the Department working with Professor Stephen Ducharme.

**David Schmitter** (August 2007) took an Adjunct Assistant Professor position with the Applied Physics Program at Providence College, Rhode Island.

**James Strohaber** (May 2008) took a postdoctoral research associate position in the Physics Department at Texas A&M University.

# 2008 – 2009 Degree Recipients

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## BACHELOR OF SCIENCE

**Evan Brunkow** (May 2009) enrolled in the graduate physics program at UNL.

**Taylor Chonis** (December 2008) enrolled in the graduate astronomy program at the University of Texas at Austin.

**Benjamin Hage** (May 2009) enrolled in the graduate physics program at UNL.

**Nathaniel Hunt** (May 2009) enrolled in the graduate program in bio-mechanics at UNO.

**Nicholas Johnson** (December 2008).

**Jin Kwang Kim** (May 2009) is an electrical/electronic manufacturing professional in Korea.

**Amanda Kruse** (May 2009) enrolled in the graduate physics program at the University of Wisconsin-Madison.

**Jia Fu Low** (December 2008) worked for the UCSB HEP group at CERN for one year and then enrolled in the graduate physics program at Florida State University.

**Timothy Miller** (May 2009).

**Eric Petersen** (May 2009) enrolled in the graduate astronomy program at the University of Florida in Gainesville.

**Joshua Philson** (May 2009) took an Engineering Associate position in the Dam Safety Division of the Nebraska Department of Natural Resources in Lincoln.

**Aaron Watkins** (May 2009).

**Noah Weiss** (May 2009) enrolled in the applied mathematics graduate program at Northwestern University.

## MASTER OF SCIENCE

**Geoffrey Rojas** (August 2008) entered the doctoral program in physics at UNL working with Professor Axel Enders.

## DOCTOR OF PHILOSOPHY

**Andrew Baruth** (May 2009) took a postdoctoral research associate position in the Physics Department at the University of Minnesota.

**Adam Caprez** (May 2009) is an HPC Applications Specialist in the Holland Computing Center at UNL.

**Shawn Hilbert** (May 2009) is an Assistant Professor of Physics at Texas Lutheran College.

**Carolina Ilie** (August 2008) is an assistant Professor of Physics (tenure track) at the State University of New York at Oswego.

**David Wisbey** (December 2008) took a postdoctoral research associate position at the National Institute of Standards and Technology in Boulder, CO.

## 2009 – 2010 Degree Recipients

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### BACHELOR OF SCIENCE

**Maria Becker** (May 2010) enrolled in the graduate physics program at UNL.

**Anas Bouzid** (May 2010) enrolled in the graduate physics program at UNL.

**William Echthenkamp** (May 2010) enrolled in the graduate physics program at UNL.

**Ashley Ernesti** (May 2010) enrolled in the graduate physics program at the University of Rochester.

**Keith Jones** (May 2010) entered a training program at Novartis in Lincoln.

**Estefania Larsen** (December 2009), enrolled in the graduate program in Teaching, Learning and Teacher Education at UNL.

**Frank Lee** (May 2010) enrolled in the graduate physics program at the University of Texas at Austin.

**Bradley Nordell** (May 2010) enrolled in the graduate physics program at the University of Missouri-Kansas City.

**Eric Norrgard** (May 2010) enrolled in the graduate physics program at Yale University.

**Benjamin Plowman** (December 2009).

**Paul Prosocki** (May 2010) enrolled in the graduate program in geosciences at Texas Tech University.

**Nathan Schulz** (December 2009) is President and CEO of Theatrical Media Services in Omaha.

**Timothy Struble** (May 2010).

**Jeffery Thomas** (May 2010) enrolled in the graduate program in physics and applied physics at the University of Massachusetts at Lowell.

### MASTER OF SCIENCE

**Joan Dreiling** (May 2010) entered the doctoral program in physics at UNL working with Professor Timothy Gay.

**Keisuke Fukutani** (May 2010) entered the doctoral program in physics at UNL working with Professor Peter Dowben.

**Jason Keller** (December 2009) entered the doctoral program in physics at UNL working with Professor Daniel Claes.

**Tony Kelly** (August 2009) entered the doctoral program in engineering physics at the Air Force Institute of Technology, Kettering, OH.

**Lingmei Kong** (December 2009) entered the doctoral program in physics at UNL working with Professor Peter Dowben.

**Joshua Machacek** (August 2009).

**Emily Petermann** (May 2010).

**Liangwen Pi** (December 2009) entered the doctoral program in physics at UNL working with Professor Anthony F. Starace.

**Pankaj Sharma** (May 2010) entered the doctoral program in physics at UNL working with Professor Alexei Gruverman.

**Yang Sun** (May 2010) entered the doctoral program in physics at the University of North Carolina in Chapel Hill.

**Zhengzheng Zhang** (August 2009) entered the doctoral program in physics at UNL working with Professor Peter Dowben.

### DOCTOR OF PHILOSOPHY

**Dale Johnston** (May 2010).

**Jack Maseberg** (August 2009) is an Assistant Professor of Physics at Fort Hayes State University, KS.

**Srinivas Polisetty** (December 2009) took a postdoctoral research associate position in the physics department at West Virginia University in Morgantown working in the group of Professor Mikel Holcomb.

**Ning Wu** (August 2009) took a postdoctoral research associate position in physics at UNL working with Professor Peter Dowben.

**Aleksander Wysocki** (December 2009) took a postdoctoral research associate position in physics at UNL working with Professor Kirill Belashchenko.

**Jie Xiao** (August 2009) took a postdoctoral research associate position in the Department of Physical Chemistry of the University of Erlangen-Nuremberg working with University Professor Dr. Hans-Peter Steinrück.

## 2004-2005 Fellowships and Traineeships

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### ***Borrison Fellowship***

Andrei Istomin

### ***Chancellor's Fellowship***

Jack Maseberg

### ***Othmer Fellowship***

John D. Burton

Carolina Ilie

Kristin Kraemer

### ***Bucky Fellowship***

Anthony N. Caruso

### ***Larson Fellowship***

Jonathan Reyes

## 2005-2006 Fellowships and Traineeships

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### ***Avery Fellowship***

Abhijit Mardana

Suman Mukherjee

Geoffrey Shelburne

Nitin Srivastava

### ***Chancellor's Fellowship***

Geoffrey Shelburne

### ***Larson Fellowship***

Aramis Buenrostro

### ***Project Fulcrum Fellowship***

Krisin Kraemer

### ***Wheeler Fellowship***

Danqin Feng

### ***Centennial Fellowship***

Abhijit Mardana

Adam M. Scheer

Yi Wang

### ***Othmer Fellowship***

Karolina Janicka

## 2006-2007 Fellowships and Traineeships

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### ***Avery Fellowship***

Pamela Jeppson

Tony Kelly

### ***GAANN Fellowship***

John D. Burton

James Gasbrenner

Shannon Fritz

Jason Keller

Emily Petermann

### ***Othmer Fellowship***

Nathan Powers

### ***Fling Fellowship***

Danqin Feng

## 2007-2008 Fellowships and Traineeships

---

### ***Avery Fellowship***

Scot McGregor

### ***Larson Fellowship***

Juan Colon-Santana

### ***Undergraduate Teaching Fellowship***

Evan Brunkow

Taylor Chonis

Lucy Geisbrecht Potter

Brian Hemen

Amanda Kruse

Timothy Miller

Danielle Rogalla

Melissa Test

Aaron E. Watkins

### ***GAAN Fellowship***

James Glasbrenner

Jason Keller

Kristin Kraemer

Emily Petermann

Timothy Scarborough

### ***Othmer Fellowship***

Karolina Janicka

Nathan Powers

### ***Presidential Fellowship***

John D. Burton

## 2008-2009 Fellowships and Traineeships

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### ***Degering Fellowship***

Roger Bach  
Juan Colon-Santana  
Joan Dreiling  
Malcolm Tassi

### ***GAANN Fellowship***

Roger Bach  
Joan Dreiling  
Tony Kelly  
Scot McGregor

Malcolm Tassi

### ***Heppner Fellowship***

Karolina Janicka

### ***Othmer Fellowship***

Joan Dreiling

### ***Undergraduate Teaching Fellowship***

Justin Nitz

Danielle Rogalla

Melissa Test

Aaron Watkins

Taylor Chonis

Amanda Kruse

Tim Miller

Eric Petersen

Evan Brunkow

Estefania Larsen

Frank Lee

Ashley Ernesti

## 2009-2010 Fellowships and Traineeships

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### ***Bridging Program Fellowship***

Oleksiy Golovin  
Benjamin Hage  
Daniel Knowlton  
Alexander Stamm  
Chun Yang  
Le Zhang

### ***Chancellor's Fellowship***

Daniel Knowlton

### ***GAANN Fellowship***

Oleksiy Golovin  
Benjamin Hage  
Nathan Powers  
Alexander Stamm  
Chun Yang

### ***NASA Nebraska Space Grant Fellowship***

Maria Becker

### ***Othmer Fellowship***

Chun Yang

### ***Physics 151 Distance Education Fellowship***

Justin Nitz

### ***Undergraduate Research Fellowship***

Justin Nitz

### ***Undergraduate Teaching Fellowship***

Cassandra Etmund

Estefania Larsen

Melissa Test

Taylor Chonis

Amanda Kruse

Tim Miller

Eric Petersen

Matt Burke

Ashley Ernesti

Timothy Struble

## 2005 – 2006 Scholarships

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### ***John E. Almy Scholarship***

Ryo Namba  
Masatoshi Shoji

### ***R.M., S.M., and A.M. Eddy Scholarship***

John Bowman

### ***Edward J. Hirsch Scholarship***

Laurel Burk  
James Carraher  
Christopher Corder  
Aaron Watkins

### ***Banti & Mela Ram Jaswal Scholarship***

Amanda Fricke

### ***Cheunjit Katkanant Memorial Scholarship***

Daniel Williams

### ***Henry H. Marvin Scholarship***

Nathan Chandler-Smith  
Christopher Corder  
Stephanie Gilbert  
Kyle Scheele

### ***Physics & Astronomy Alumni Scholarship***

Eric Petersen

### ***Joel Stebbins Fund Scholarship***

Charles Beer  
John Bowman  
Ryo Namba  
Masatoshi Shoji

### ***Stowell Fund Scholarship***

Charles Beer  
Amanda Fricke  
Alicia Gilmore  
Ananda Fife Griffith  
Ceceilia Hedrick  
Dmitry Kolesnikov  
Levi Neukirch  
Timothy Scarborough  
Lauren Thacker-Lynn  
Daniel Williams  
Zachary Wolff

### ***U.S. Harkson Scholarship***

Nathan Chandler-Smith  
Jason Keller

## 2006 – 2007 Scholarships

---

### ***John E. Almy Scholarship***

Jeremy Johnston

### ***Dr. William L. Bade Scholarship***

Stephanie Gilbert

### ***R.M., S.M., and A.M. Eddy Scholarship***

Estefania Larsen

### ***Banti & Mela Ram Jaswal Scholarship***

Benjamin Hage

### ***Cheunjit Katkanant Memorial Scholarship***

Frank Lee

### ***Henry H. Marvin Scholarship***

James Carraher  
Aaron Watkins

### ***Physics & Astronomy Alumni Scholarship***

Ashley Ernesti  
Tucker Zeleny

### ***Joel Stebbins Fund Scholarship***

Ceceilia Hedrick  
Ryo Namba

### ***Stowell Fund Scholarship***

Laurel Burk  
Taylor Chonis  
Christopher Corder  
Amanda Fricke  
Dmitry Kolesnikov  
Levi Neukirch  
Eric Petersen  
Daniel Williams  
Zachary Wolff

## 2007 – 2008 Scholarships

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**Dr. William L. Bade Scholarship**

Sarah Arthur  
Caleb Pickard

**R.M., S.M. and A.M. Eddy  
Scholarship**

Noah Weiss

**Ed Hirsch Scholarship**

Jeremy Johnston  
Frank Lee

**Banti & Mella Ram Jaswal  
Scholarship**

Jordan Sis

**Cheunjit Katkanant Memorial  
Scholarship**

Corrine Hodges

**Henry H. Marvin Scholarship**

Jeremy Johnston  
Tucker Zeleny

**Kurt Meyer Physics Scholarship**

Corrine Hodges

**Physics & Astronomy Alumni  
Scholarship**

Eric Norrgard  
Caleb Pickard  
Noah Weiss

**Joel Stebbins Fund Scholarship**

James Carraher

**Stowell Fund Scholarship**

Ashley Ernesti  
Eric Petersen  
Caleb Pickard

## 2008 – 2009 Scholarships

---

**John E. Almy Scholarship**

Eric Petersen  
Noah Weiss

**Dr. William L. Bade Scholarship**

Maria Becker

**R.M., S.M., and A.M. Eddy  
Scholarship**

Noah Weiss

**Banti & Mella Ram Jaswal  
Scholarship**

Amanda Kruse

**Cheunjit Katkanant Memorial  
Scholarship**

Noah Weiss

**Henry H. Marvin Scholarship**

Benjamin Hage  
Aaron Watkins

**Kurt Meyer Physics Scholarship**

Maria Becker  
Amanda Kruse

**Physics and Astronomy Alumni  
Scholarship**

Corrine Hodges  
Shawn Roberts  
Nathanael Spaulding

**Joel Stebbins Fund Scholarship**

Maxwell Gregoire

**Stowell Fund Scholarship**

Taylor Chonis  
Samuel Davis  
Kathryn DeJong  
William Echtenkamp  
Ashley Ernesti  
David Foote  
Maxwell Gregoire  
Corrine Hodges  
Ryan Hotovy  
Amanda Kruse  
Frank Lee  
Jia Fu Low  
Collin McAcy  
Eric Norrgard  
Caleb Pickard  
Aaron Watkins  
Noah Weiss

# 2009 – 2010 Scholarships

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## **John E. Almy Scholarship**

Derek Wietjes

## **Dr. William L. Bade Scholarship**

Eric Norrgard

## **R.M., S.M., and A.M. Eddy Scholarship**

Collin McAcy

## **Banti & Mela Ram Jaswal Scholarship**

Peter Hansen

## **Cheunjit Katkanant Memorial Scholarship**

Collin McAcy

## **Henry H. Marvin Scholarship**

Kyle Bunkers  
Caleb Fangmeier  
Peter Hansen  
Ryan Hotovy  
Collin McAcy

## **Kurt Meyer Physics Scholarship**

Peter Hansen

## **Physics & Astronomy Alumni Scholarship**

Kyle Bunkers  
Nathanael Spaulding

## **Stowell Fund Scholarship**

Maria Becker  
Cameron Bravo  
Susan Cooper  
Samuel Davis  
David Foote  
Maxwell Gregoire  
Kevin Jerger  
Frank Lee  
Eric Norrgard  
Caleb Pickard  
Nathanael Spaulding  
Kyle Tobin

# 2005 – 2006 Honors

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## **Distinguished Graduate Teaching Assistant Award**

Aramis Buenrostro

## **College of Arts & Sciences Outstanding Graduate Research Assistant Award**

Luis G. Rosa

## **2005-2006 UNL Society of Physics Students Officers**

President: Levi Neukirch

Vice President & Treasurer: Amanda  
Fricke

Secretary: Maya Fabrikant

## **Excellence in Graduate Education Award (Graduate Studies)**

Peter A. Dowben

## **Multidisciplinary Research Award (College of Engineering)**

Peter A. Dowben

## **Outstanding Scientist Award, UNL Chapter of Sigma Xi**

David J. Sellmyer

## **Promotion to Rank of Emeritus Professor**

Robert J. Hardy

## **UNL Parents Association Certificate of Recognition for Contribution to Students**

Aaron Dominguez  
C. Martin Gaskell  
Carl Lundstedt  
Gregory Snow

## INTERIOR VIEWS OF JORGENSEN HALL





# 2006-2007 Honors

**Arts & Sciences College  
Outstanding Graduate Research  
Assistant Award**  
John D. Burton

**Outstanding Graduate Teaching  
Assistant Award**  
Jason Keller  
Tony Kelly II

**Lowe R. and Mavis M. Folsom  
Distinguished Doctorial  
Dissertation Award**  
Lu Yuan

**2007 Sigma Xi Outstanding  
Graduate Student Award**  
Danqin Feng

**2007 Sigma Xi Outstanding Poster  
Award**  
Andrew Baruth  
John D. Burton  
Carolina Ilie

**Phi Beta Kappa**  
Ryo Namba  
Daniel Williams

**Best Student Poster Award at the  
54<sup>th</sup> Midwest Solid State Conference**  
John D. Burton  
Jihee Kim  
Steven Michalski  
Srinivas Polisetty  
Alexsander Wysocki

**Outstanding Poster at the 2008  
UNL Research Fair**  
Andrew Baruth  
Nina Hong  
Zhen Li  
Abhijit Mardana

**Invited Talk at 2007 DAMOP  
Undergraduate Research  
Symposium**  
Maya Fabrikant

**2007 Gordon Research Conference  
Young Investigator Competition  
Award**  
Carolina Ilie

**2007-2008 Society of Physics  
Students Officers**  
*President:* Levi Neukirch  
*Vice President:* Amanda Fricke  
*Secretary:* Maya Fabrikant  
*Treasurer:* Laila Gharzai

**UNL Parent's Association  
Certificate of Recognition for  
Contributions to Students**  
Axel Enders  
Timothy Gay

**Fellow of the American Vacuum  
Society**  
Peter Dowben

**Named "Outstanding Referee" by  
the American Physical Society**  
Robert Hardy  
Anthony Starace  
Donald Umstadter

**Promotion to Rank of Full  
Professor**  
Daniel Claes  
Gregory Snow

**Granted Tenure as Associate  
Professor**  
Shireen Adenwalla

**2008 UNL Service Award**  
Marisol Baquerizo-Birth

**Co-Authored Aung San Suu Kyi:  
Fearless Voice of Burma, Second  
Edition**  
Robert Fuller

## INTERIOR VIEWS OF JORGENSEN HALL



## 2008-2009 Honors

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**Outstanding Graduate Teaching Assistant Award**

Joan Dreiling

**Outstanding Undergraduate Teaching Assistant Award**

Estefania Larsen

**Undergraduate Merit Award for Academic Performance**

Eric Norrgard

**Undergraduate Award for Excellence in Research**

Justin Nitz

**Phi Beta Kappa**

Taylor Chonis

**2008-2009 Society of Physics Student Officers**

President: Josh Philson

Vice President: Frank Lee

Treasurer: Laila Gharzai

**Promoted to Associate Professor with Tenure**

Christian Binek

Kenneth Bloom

Aaron Dominguez

Cornelius Uiterwaal

**Research Corporation Cottrell Scholarship Award**

Kirill Belashchenko

**Elected Fellow of the American Physical Society**

Evgeny Tsymbal

**Charles Bessey Professor of Physics and Astronomy**

Evgeny Tsymbal

**UNL Parents Association/Teaching Council Certificate of Recognition for Contributions to Students**

Peter Dowben

**Elected to the Division of Materials Physics Executive Committee**

David Sellmyer

**Named "Outstanding Referee" by the American Physical Society**

Ilya Fabrikant

Timothy Gay

## 2009-2010 Honors

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**Selected to Attend the Lindau Nobel Laureate Meeting**

Joan Dreiling

**Folsom Distinguished Doctoral Dissertation Award Honorable Mention**

Jia Xiao

**Distinguished Graduate Teaching Assistant Award**

Liangwen Pi

**Distinguished Undergraduate Teaching Assistant Award**

Ashley Ernesti

**Undergraduate Merit Award for Academic Performance**

Kyle Bunkers

Ryan Hotovy

**Undergraduate Award for Excellence in Research**

Frank Lee

**2009-2010 Society of Physics Students Officers**

President: Frank Lee

Vice President: Cameron Bravo

Treasurer: Laila Gharzai

**Promoted to Full Professor**

Herman Batelaan

**UNL Parents Association/Teaching Council Certificate of Recognition for Contributions to Students**

Orhan Yenen

**2010 James V. Griesen Chancellor's Exemplary Service to Students Award**

Leslie Marquart

**University Continuing Education Association (UCEA) Great Plains Regional Excellence in Teaching Award**

Kevin Lee

**Outstanding Service Towards NCMN Outreach**

Christian Binek

Stephen Ducharme

Axel Enders

Roger Kirby

**40 Year UNL Employee Service Award**

Leslie Marquart

**Named "Outstanding Referee" by the American Physical Society**

Sitaram Jaswal

**Distinguished Lecturer at the University of Kentucky**

David Sellmyer

# 2005 Fall Semester Colloquia

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September 1

**Dr. Chris Quigg**, Fermilab  
“The Coming Revolution in Particle Physics”

September 8

**Dr. Bill Louis**, Los Alamos National Laboratory  
“Searching for Neutrino Oscillations: Early Results from the MiniBooNE Experiment at Fermilab”

September 15

**Professor Stephen O’Brien**, Columbia University  
“Scale Your Enthusiasm: Designing Nanomaterials”

September 29

**Dr. Daniel Savin**, Columbia Astrophysics Laboratory  
“Cosmology in a Can: Atomic & Molecular Physics from High  $z$  to Low  $Z$ ”

October 13

**Dr. Michelle Thaller**, NASA JPL, Caltech  
“In the Heat of the Night: New Views of the Infrared Universe from the Spitzer Space Telescope”

October 20

**Professor James Kakalios**, University of Minnesota  
“Conductance Fluctuations: From Amorphous Semiconductors to the Cerebral Cortex”

October 27

**Dr. Dan Green**, Head of the US-CMS Collaboration, Fermi National Accelerator Laboratory  
“The CMS Experiment at CERN’s Large Hadron Collider”

November 10

**Professor Timothy Gay**, University of Nebraska – Lincoln  
“A Molecule with One Atom Too Many: An Atomic Collision Physicist’s Attempt to Learn About Simple Homonuclear Diatomic Molecules”

December 8

**Dr. Gail Glendinning**, Lawrence Livermore National Lab  
“Experiments at Extreme State – X-Games Physics on the National Ignition Facility”

# 2006 Spring Semester Colloquia

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January 19

**Dr. Erwin Poliakoff**, Louisiana State University  
“Vibrationally-Resolved Electron Spectroscopy of Polyatomic Molecules: Mode-Selective Behavior in Complex Systems”

February 2

**Dr. Martin Gaskell**, University of Nebraska – Lincoln  
“The Solid-State Physics of Quasars: Dust & High-Energy Photons Near Supermassive Black Holes”

February 14

**Dr. Deniz D. Yavuz**, University of Wisconsin, Madison  
“Quantum Computing with Trapped Neutral Atoms”

February 16

**Dr. Wolfgang Kleemann**, University of Duisburg-Essen  
“Universal Domain Wall Dynamics in Ferrioc Materials with Disorder”

February 20

**Dr. Irina Novikova**, Harvard-Smithsonian Center for Astrophysics  
“Manipulation of Light with Atomic Ensembles (and vice-versa)”

February 23

**Dr. Agapi Emmanouilidou**, Georgia Tech  
“Multi-Electron Collision Dynamics: A Key to Exploring Ionization”

March 2

**Dr. Manuel Hegelich**, Los Alamos National Laboratory  
“Brighter than a Trillion Suns – Ultrahigh Intensity Laser Research at Los Alamos National Laboratory”

March 6

**Dr. Arvinder Sandhu**, JILA and the University of Colorado, Boulder  
“Ultrafast Science – Exploring the Attosecond and Nanometer World”

March 8

**Dr. Kiyong Kim**, Center for Integrated Nanotechnologies  
“Ultrafast, High-Intensity Laser Interactions with Gases and Nanoscale Clusters”

March 23

**Dr. Andreas Ney**, Universität Duisburg-Essen  
“Magnetic Moments and Semiconductors: Spintronics and Magnetologic”

March 27

**Dr. Seok-Hwan Chung**, Argonne National Laboratory  
“A Novel Approach to Biomagnetic Sensing”

April 6

**Dr. T. Mitch Wallis**, National Institute of Standards and Technology (NIST) and Colorado State University  
“Sliding Atoms and Trembling Cantilevers: Nanoscience from the Bottom and the Top”

April 13

**Dr. Enrique del Barco**, University of Central Florida  
“Quantum Dynamics of High-Spin States in Single Molecule Magnets”

April 27

**Dr. Sergei V. Kalinin**, Oak Ridge National Laboratory  
“A Biased View on the Nanoworld: Transport and Electromechanics on the Nanoscale”

# 2006 Fall Semester Colloquia

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August 24

**Professor Dan Claes**, University of Nebraska - Lincoln  
“Deep Space Messages, Deep Underground”

August 31

**Dr. George G. Malliaras**, Cornell University  
“Ions: The Neglected Carriers in Organic Electronics”

September 7

**Dr. Indrin Chetty**, University of Nebraska Medical Center  
“Applications of the Monte Carlo Method in Radiation Therapy Treatment Planning”

September 18

**Dr. Axel Enders**, Max Planck Institute for Solid State Research  
“Self-Assembled Magnetic Nanostructures”

September 28

**Dr. B.A. Shadwick**, LOASIS Program, Lawrence Berkeley National Laboratory  
“Hamilton Models of Laser-Plasma Interactions”

October 5

**Dr. Terry Teays**, Maryland Space Grant Consortium  
“Student Balloon Payload Project: An Example of Engaging Students in Real-World Science and Engineering”

November 2

**Dr. Chris Greene**, JILA & University of Colorado  
“What Do Beam-Foil Spectroscopy, Bose-Einstein Condensation, and Hybrid Corn Genetics have in Common?”

November 9

**Dr. Brenna Flaughner**, Fermi National Accelerator Laboratory  
“The Dark Energy Survey (or How to Find the Missing 70% of the Universe)”

November 16

**Dr. Antoine Rousse**, Laboratoire d'Optique Appliquée (LOA), CNRS, ENSTA, Ecole Polytechnique  
“Generation of X-Ray Beams Using Lasers and Their Application in Ultrafast X-Ray Science”

October 30

**Dr. Thorsten Kampen**, Fritz-Haber-Institute der Max-Planck-Gesellschaft, Germany  
“Organic Molecules – Self-Assembly and Chirality”

# 2007 Spring Semester Colloquia

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January 18

**Professor Anthony F. Starace**, University of Nebraska – Lincoln  
“Novel Physics of Intense, Short Laser Pulses”

January 25

**Dr. Robert Hilborn**, University of Nebraska – Lincoln  
“How to Increase the Number of Undergraduate Science Majors”

February 15

**Dr. Xiao Cheng Zeng**, University of Nebraska – Lincoln  
“Computational Study of Nanostructured Matter”

February 21

**Dr. Scott Sepke**, University of Nebraska – Lincoln  
“High Field Science in the Diodes Laser Lab: Electron Beam Conditioning and the Roll of the Off-Polarization Field Components”

February 22

**Dr. Paul Mantsch**, Fermi National Accelerator Laboratory  
“The Pierre Auger Observatory – Capturing Messengers from the Extreme Universe”

February 27

**Dr. Bradley A. Shadwick**, Institute for Advanced Physics  
“Physics and Applications of Laser-Plasma Interactions”

March 1

**Dr. Maxim Tsoi**, University of Texas at Austin  
“Spintronics: From Ferromagnets to Antiferromagnets”

March 2

**Dr. Igor Jovanovic**, Lawrence Livermore National Laboratory

“Ultrahigh Intensity Lasers and Nonlinear Optics: New Frontiers in Technology and Applications”

March 22

**Dr. Oren Cohen**, JILA and University of Colorado at Boulder  
“Attosecond Nonlinear Optics”

April 5

**Dr. Harry Shipman**, University of Delaware  
“Developing Physics Students’ Capabilities for Baloney Detection”

April 9

**Dr. Casey Miller**, University of California – San Diego  
“Contemporary Issues in Spin-Dependent Tunneling”

April 12

**Dr. Debra Fischer**, San Francisco State University  
“Planet Formation and Evolution”

April 16

**Dr. Alexei Gruverman**, North Carolina State University  
“Polarization Phenomena at the Nanoscale: From Ferroelectrics to Biocomposites”

April 19

**Dr. Timothy Solberg**, University of Nebraska Medical Center  
“Targeting Cancer with Radiation Technology for Focused Delivery and Image Guidance”

April 26

**Professor André D. Bandrauk**, Université de Sherbrooke, Quebec, Canada  
“Molecules in Intense Laser Fields: Femto- to Attosecond Dynamics”

## 2007 Fall Semester Colloquia

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August 30

**Dr. Brendan Casey**, Fermi National Accelerator Laboratory  
“Searching for New Physics and CP Violation in Beauty and Charm Mixing and Decay”

September 13

**Dr. Christian Binek**, University of Nebraska, Lincoln  
“Electric and Magnetic Field Control of Exchange Bias”

September 20

**Dr. Dennis P. McNabb**, Lawrence Livermore National Laboratory  
“Isotopic Imaging with Quasi-Monochromatic Photon Sources”

September 27

**Dr. Maxim Tsoi**, University of Texas at Austin  
“Spintronics: From Ferromagnets to Antiferromagnets”

October 11

**Dr. Susan Enders**, University of Nebraska-Lincoln  
“Get Attached! (Combining Biology and Materials Science)”

October 18

**Professor Chii-Dong Lin**, Kansas State University  
“Attosecond Physics: The Art of Harold Edgerton in This Century”

October 25

**Dr. Eric Fullerton**, University of California-San Diego  
“Resonant X-Ray Scattering from Nano-Structured Magnetic Materials”

November 1

**Dr. Paul Corkum**, National Research Council, Ottawa, Canada  
“Attosecond Science”

November 8

**Dr. Leszek Frasinski**, Imperial College London  
“Models of the Quantum World: Probing Molecules with Intense Lasers”

November 15

**Professor Don Madison**, University of Missouri – Rolla  
“Why Would Anyone be Interested in Charged Particles, Ionizing Atoms and Molecules?”

November 29

**Dr. Hai-Jun Yang**, University of Michigan  
“Search for Neutrino Oscillation with the MiniBooNE Detector”

December 6

**Professor R.J. Dwayne Miller**, University of Toronto  
“Femtosecond Electron Diffraction: Making the Molecular Movie”

## 2008 Spring Semester Colloquia

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January 17

**Professor Roger D. Kirby**, University of Nebraska-Lincoln  
“Nanoscale Magnetism: Physics and Applications”

January 31

**Professor David Z. Besson**, University of Kansas  
“Catching Neutrinos in the Antarctic Icecap”

February 7

**Professor Michel Pleimling**, Virginia Tech  
“Aging Phenomena in Magnetic Systems”

February 14

**Professor Gregory Snow**, University of Nebraska-Lincoln  
“We Know Where They’re Coming From!! Recent Physics Results from the Pierre Auger Cosmic Ray Observatory”

February 21

**Professor Kathie Newman**, University of Notre Dame  
“Lessons on Climate & Curriculum for Physics”

February 28

**Dr. Carl B. Schroeder**, Lawrence Berkeley National Laboratory  
“Laser-Plasma Accelerators with Applications to Coherent Radiation Sources”

March 24

**Dr. Ronald Moore**, Fermi National Accelerator Laboratory  
“Tevatron Run 2: Rise of the Machines”

March 27

**Dr. Thomas Wright**, University of Michigan & Fermi National Accelerator Laboratory  
“Searching for Higgs Bosons at the Tevatron”

March 31

**Dr. Kevin Lannon**, Fermi National Accelerator Laboratory  
“Digging Up Top and Higgs at the Tevatron”

April 3

**Dr. Ilya Kravchenko**, Massachusetts Institute of Technology  
“B Physics at CDF: What It Takes to Make a Flagship Measurement at a Collider Experiment”

April 9

**Dr. Don Lincoln**, Fermi National Accelerator Laboratory  
“The Physics of Generations: The Next Layer in the Cosmic Onion”

April 10

**Dr. Cliff Surko**, University of California-San Diego  
“Physics with Low-Energy Antimatter”

April 14

**Dr. Ben Brau**, Fermi National Accelerator Laboratory  
“Using Leptons and Bosons to Search for New Physics in Hadron Collisions”

April 17

**Dr. Olga A. Shenderova**, Head, Nanodiamond Laboratory, International Technology Center, Raleigh, NC  
“Detonation Nanodiamond & Onion-like Carbon: Synthesis, Properties & Applications”

May 1

**Professor Philip D. Mannheim**, University of Connecticut  
“Dark Matter & Dark Energy – Fact or Fiction?”

# 2008 Fall Semester Colloquia

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September 4

**Professor Cornelius Uiterwaal**,  
University of Nebraska–Lincoln  
“Intense-Field Ionization of Molecules: The Photodynamical Test Tube”

October 16

**Professor David Reitze**, University of Florida, Gainesville  
“Chasing Gravitational Waves”

October 23

**Professor Jay Dittmann**, Baylor University  
“Where Have All the Physicists Gone?”

October 30

**Professor Patrick LeClair**, University of Alabama  
“Electron Tunneling: From Quantum Weirdness to Your Hard Disk”

November 6

**Professor Justin Peatross**, Brigham Young University  
“Photo Emission by Individual Electron Wave Packets in Strong Laser Fields”

November 13

**Professor Brett Esry**, Kansas State University  
“Ultracold Three-Body Collisions & Efimov Physics”

November 20

**Professor Giti Khodaparast**, Virginia Tech  
“Narrow Gap Semiconductors: Spin Splitting with No External Magnetic Field”

# 2009 Spring Semester Colloquia

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January 15

**Professor Aaron Dominguez**,  
University of Nebraska–Lincoln  
“Using Silicon Trackers To Do High Energy Physics”

February 5

**Professor Terry D. Oswalt**, Florida Institute of Technology  
“Digging in the Stellar Graveyard: What White Dwarf Stars Tell Us About the Age of the Universe”

February 12

**Dr. Xianglin Ke**, Pennsylvania State University  
“Geometrically Frustrated Magnets: Dirty & Artificial Spin Ice”

February 18

**Dr. Sergei Urazhdin**, West Virginia University  
“Current-Induced Excitations in Magnetic Bilayers: Why does the Polarizer Behave Differently from the Free Layer?”

February 19

**Dr. Elizabeth McCormack**, Bryn Mawr College  
“The Detection and Analysis of Long-Range States of Molecular Hydrogen”

February 24

**Dr. Hiromichi Niikura**, National Research Council of Canada  
“Attosecond Re-Collision Dynamics”

February 26

**Dr. Wen Li**, JILA, University of Colorado & NIST  
“Probing Coupled Electronic and Nuclear Dynamics Using Coherent Electrons and X-Rays”

March 2

**Dr. Martin Centurion**, Max Planck Institute for Quantum Optics  
“Ultrafast Imaging of Plasma and Molecular Dynamics Using Electron Pulses”

March 5

**Dr. Valery Milner**, University of British Columbia  
“Coherent Scattering with Incoherent Light: New Spectroscopy with Ultra-Short Laser Pulses”

March 9

**Dr. Gretchen K. Campbell**, JILA and University of Colorado – Boulder  
“Probing Quantum Coherence and Ultracold Collisions with an 87 Strontium Optical Lattice Clock”

April 2

**Professor Beatriz Roldan Cuenya**, University of Central Florida  
“Atomic Vibrations in Metal Nanostructures”

April 9

**Professor Gordon Berry**, University of Notre Dame  
“Science Literacy: Milton Meets Einstein”

April 16

**Dr. David Keavney**, Argonne National Laboratory  
“Imaging of Magnetization Dynamics Using X-Ray Microscopy”

## 2009 Fall Semester Colloquia

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August 27

**Professor Kenneth Bloom**, University of Nebraska–Lincoln  
“Gigabit, Teravolt, Petabyte”

September 10

**Professor David Asner**, Carleton University  
“The CLEO Experiment”

September 17

**Dr. Hans-Christian Kaestli**, Paul Scherrer Institut  
“Hybrid Pixel Detectors for Particle and X-Ray Detection”

October 8

**Professor Chong-Yu Ruan**, Michigan State University  
“Towards Material Imaging at Space-Time Limit”

October 15

**Professor Andreas Becker**, JILA & University of Colorado  
“Molecules in Intense Laser Fields”

October 29

**Professor James Linnemann**, Michigan State University  
“Imaging the Universe in a Bucket of Water”

November 5

**Dr. Markus Guehr**, Stanford PULSE Institute  
“New Perspectives for Time Resolved Chemistry,  
Using High Harmonic Generation and Free Electron Lasers”

November 12

**Professor Meenakshi Narain**, Brown University  
“Particle Physics at a Crossroads”

## 2010 Spring Semester Colloquia

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January 14

**Dr. Rush D. Robinett III**, Sandia National Laboratory  
“Renewable Energy Electric Grid Integration”

January 21

**Professor Herman Batelaan**, University of Nebraska–Lincoln  
“A Strong Future for a Weak Quantum”

February 4

**Dr. Sander Otte**, National Institute of Standards and Technology  
“Spin Manipulation in Atomically Engineered Nanostructures”

February 15

**Professor Tingyong Y. Chen**, Johns Hopkins University  
“Ballistic Transport Via Point Contacts”

February 18

**Dr. Xia Hong**, Pennsylvania State University  
“Intrinsic and Extrinsic Scattering in Graphene”

February 22

**Dr. Sung Seok A. Seo**, Oak Ridge National Laboratory  
“Atomic Scale Oxide Heterostructures That Work with  
Strongly Correlated Electrons”

April 8

**Dr. Anil Seth**, Harvard-Smithsonian Center for Astrophysics  
“Nuclear Star Clusters and Black Holes”

April 29

**Professor Zhiwen Liu**, Pennsylvania State University  
“Coherent Anti-Stokes Raman Holography”

May 6

**Professor Federico Capasso**, Harvard University  
“Sub-Wavelength Photonics: From Light Manipulation to  
Quantum Levitation at the Nanoscale”

## 2010 Fall Semester Colloquia

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September 2

**Drs. Sarah Michaels, Drew Tyre & Richard Rebarber**, UNL  
Public Policy Center  
“Risk & Uncertainty Unplugged: Physics”

September 16

**Professor Qi Li**, Pennsylvania State University  
“Multiferroic Tunnel Junctions: New Functional Spintronics”

September 30

**Dr. Eun-Joon Ahn**, Fermilab  
“Recent Results from the Pierre Auger Observatory”

October 7

**Professor Travis Rector**, University of Alaska  
“Research-Based Science Education: Teaching Students  
Science by Having Them Do Science”

October 21

**Dr. Wei Ku**, Brookhaven National Laboratory  
“Ferro-Orbital Order & Rich Magnetic Structures of Iron-  
Based Superconductors”

November 4

**Professor Christian Binek**, University of Nebraska–Lincoln  
“Isothermal Electric Switching of Interface Magnetization: A  
Route to Voltage-Controlled Spintronics”

November 11

**Dr. Samuel A Werner**, National Institute of Standards and  
Technology  
“Observation of Aharonov-Bohm Effects by Neutron  
Interferometry”

November 18

**Professor Allen Landers**, Auburn University  
“The Tortoise and the Hare on an Atomic Scale”

December 2

**Dr. Michael Eads**, University of Nebraska-Lincoln  
“The Quest for the Higgs Boson at DZero”

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Lincoln, NE 68588-0299

## *Ray King at work*

