

*Happy 50th!*



# new•generation

newsletter for alumni and friends

Nuclear, Plasma, and Radiological Engineering

University of Illinois at Urbana-Champaign

summer 2009



Celebrating 50 years  
of nuclear engineering  
at the University of Illinois  
9/12/2008



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### NPRE teachers ranked excellent by their students!

#### Spring 2008:

Roy A. Axford, George H. Miley, William K. Roy, David N. Ruzic, Clifford E. Singer, James F. Stubbins.

#### Fall 2008:

Roy A. Axford, James F. Stubbins, Rizwan Uddin.



### On the Front

Department Head Jim Stubbins (middle) unveiling a paver that marks NPRE's 50<sup>th</sup> Anniversary. With him on the Alice Campbell Alumni Center east patio are NPRE stalwarts (from left) Emeritus Prof. Dan Hang and Profs. Roy Axford, Barclay Jones and George Miley.

## The people of NPRE

### faculty

Roy A. Axford  
Daniel E. Hang  
Brent J. Heuser  
Barclay G. Jones  
Ling Jian Meng  
George H. Miley  
David W. Miller  
Magdi Raheb  
David N. Ruzic  
Clifford E. Singer  
James F. Stubbins  
*department head*  
Rizwan Uddin

### other faculty

Michael Aref  
*adjunct assistant professor*  
Thomas J. Dolan  
*adjunct professor*  
Randolph Flaunta  
*postdoctoral research associate*  
Masab H. Garada  
*adjunct assistant professor*  
Brian E. Jurczyk  
*adjunct assistant professor*  
Mohammed Almad Khasawneh  
*visiting research associate professor*  
Kyong-Nam Kim  
*postdoctoral research associate*  
Kyu Jung Kim  
*visiting scholar*  
Sung Kyu Kim  
*visiting scholar*  
Nie Luo  
*visiting research assistant professor*  
Charles P. Marsh  
*adjunct professor*  
Richard F. Nelson  
*adjunct assistant professor*  
Martin J. Neumann  
*adjunct research assistant professor*  
Suzanne L. Rohde  
*adjunct professor*  
William K. Roy  
*adjunct professor*  
Robert Stubbins  
*adjunct assistant research professor*

### staff

Shelly R. DeAtley  
*account technician*  
Idelle D. Dollison  
*office administrator*  
Richard L. Holm  
*research engineer*  
Gail S. Krueger  
*office support specialist*  
Becky J. Meline  
*admissions and records representative*  
Susan K. Mumm  
*alumni coordinator, newsletter editor*  
Rhonda R. Stebbins  
*budget & research planning director*  
Stoyan A. Toshkov  
*research scientist*  
Autumn West  
*research programs coordinator*





*Department Head Jim Stubbins and the TRIGA reactor cake. Not only did the cake remind guests of the former reactor, it tasted good!*

## 50 years and counting!

NPRE is still celebrating the achievements of our students, alumni, faculty and staff as we enter our second half-century. We were extremely pleased that so many of you could join us to celebrate our first 50 years and we sincerely appreciate all the well wishes we received from the rest of you. As you will see from the cover of our newsletter, as well as the stories inside, we marked the 50th anniversary of NPRE in style.

We would like to again express our gratitude to Profs. Axford, Hang, Jones and Miley who have dedicated so much of their careers and intellect to our students, past and present. It is extraordinary to think that between Profs. Axford, Jones and Miley, they have a total of 137 years as NPRE faculty members; each individually well beyond 40 years. This level of dedication is beyond admirable and is the foundation of the success of our program. We know that all of you have had the pleasure interacting with these extraordinary faculty members. For many of you, these stalwarts of our program helped with the first, formative steps of your professional lives. We all owe them a great debt of gratitude for their dedication and service.

While this past year has been one of celebration, the current financial crunch has had a major impact on our University. NPRE is facing some difficult financial times along with the rest of Campus and many of our friends everywhere. The budget for higher education will likely remain

tight again this year so NPRE along with other College of Engineering departments will see some further belt-tightening. Nevertheless, we continue to enjoy strong funding for our research programs and continued strong undergraduate and graduate enrollments. In fact, NPRE has the highest percentage increase in undergraduate applicants of any program in the College of Engineering this year. We are meeting the new students as they come for summer preregistration, and we already have met many of them during introductory events we held this spring. We expect this strong application trend to increase undergraduate enrollments. The job market remains very good; in fact, so good that many of our seniors had job offers and jobs as they started their senior year last Fall. This is a very positive sign of the continuing demand for engineers in our field. The high job demand has also had a hand in changing our outlook on graduate student enrollments. With such a strong job market, a much larger fraction of our seniors are joining the workforce directly and a smaller fraction will consider grad school.

The budget has had an impact on faculty hiring as well. For the time being, the College of Engineering has frozen almost all faculty openings, including those for NPRE. We are hopeful that this situation will improve in a few months with the start of the next academic year.

We think you will be proud as you read about the achievements of our students, faculty, and alumni in the following pages. These accomplishments reflect the excellence to which we continually aspire. They serve to increase the Department's visibility and value to all our constituents, and are the result of our collective efforts.

We thank you for your important contributions to these recent successes. As we continue to grow, we appreciate your advice and support, and encourage you to build upon your connection to the Department and University. We will do our best to attract and retain the very best and brightest students and faculty – people who will reflect the fine qualities of our graduates over the years. Together we can build, grow, and succeed!

James F. Stubbins  
*Professor and Head, NPRE Department*





NPRE students and faculty are all smiles as Department Head Jim Stubbins (left) and NRC Chairman Dale Klein (right) hold up the check symbolizing NRC's nearly \$740,000 grant to NPRE.

## NPRE at 50:

# A Golden Celebration!

**F**ifty years of nuclear engineering programs at the University of Illinois were celebrated in golden style September 11-13, as alumni and friends of Nuclear, Plasma, and Radiological Engineering reflected on past accomplishments and learned more about plans and challenges for the future.

### NRC Visit

The celebration featured a star-studded group of speakers, including **Dale E. Klein**, Chairman of the federal Nuclear Regulatory Commission. Klein came early in the day September 11 to officially present NPRE Department Head Jim Stubbins with an NRC check for nearly \$740,000. The funds have supported scholarships and fellowships in the Department, as well as Prof. Rizwan Uddin's research on the VisBox, a 3-D visual system designed to simulate a nuclear power plant's operations.

Klein was joined later that afternoon by **William E. Burchill**, NPRE alumnus and American Nuclear Society President, and **Charles "Chip" Pardee**, Chief Nuclear Officer, Exelon Nuclear; Senior Vice President, Exelon Corporation, in a panel

## View from campus and beyond

discussion, "Vision for the Future of Nuclear Energy," held at the Alice Campbell Alumni Center. Later in the evening, **John B. Ritch III**, Director General of the World Nuclear Association, presented the lecture, "Accelerating the Nuclear Renaissance: A Human and Environmental Imperative."

### Invited Talks

Activities on September 12 included a day's worth of invited talks by these speakers:

- **Brian L. Renwick**, Executive Vice President, Sargent & Lundy<sup>LLC</sup>, "The University of Illinois - Sargent & Lundy Relationship."
- **David D. Carlson**, Sandia National Laboratory, "The Role of the National Nuclear Security Administration (NNSA) Laboratories in Securing National Security."
- **Mark T. Peters**, Deputy Associate Laboratory Director for Science Programs, Energy Sciences & Engineering, Argonne National Laboratory, "The Role of Long-Term R&D and the National Laboratories in Securing a Sustainable Energy Future."
- **William W. Moses**, Lawrence Berkeley National Laboratory, "Positron Emission Tomography Instrumentation: Present Status and Future Directions."
- **Robert L. Hirsch**, Senior Energy Advisor at MISI, "Oil Peaking & Mitigation."
- **David N. Ruzic**, Director, Center for Plasma Material Interactions; NPRE Professor, "Plasma Engineering - Absolutely Essential for Modern Life."

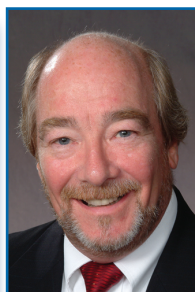
### Poster Session

In the gallery area just outside the Alice Campbell Ballroom where the talks were held, NPRE students hosted a poster session, with 30 posters informing viewers about the students' work. Many of the posters will continue to be displayed in Talbot Laboratory and in the Nuclear Radiation Laboratory.





Dale E. Klein



William E. Burchill



"Chip" Pardee



John B. Ritch III



Brian L. Renwick



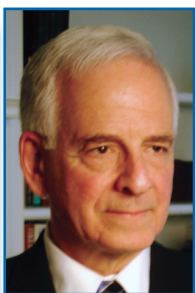
David D. Carlson



Mark T. Peters



William W. Moses



Robert L. Hirsch



David N. Ruzic

#### ***Paver, reactor cake***

During the evening, September 12, the 50<sup>th</sup> Anniversary was officially commemorated with the dedication of a paver near the east entrance to Alice Campbell Alumni Center. Joining in the dedication were Stubbins and long-time NPRE faculty members, Emeritus Prof. Dan Hang and Profs. Roy Axford, Barclay Jones and George Miley. Guests attending the reception and dinner that followed got to wish the beloved professors well, and marvel at the unique cake, a replica of the now-decommissioned TRIGA nuclear reactor.

#### ***Distinguished Alumni Awards, DVD***

The evening events included the presentation of NPRE's very first Distinguished Alumni Awards to Burchill and Hirsch (see story on page 10). Another highlight was a video, "NPRE: Celebrating 50 Years at Illinois," that presented the department's powerful past, current endeavors, and promising future. A DVD of that video, including chapter-length interviews of Hang, Axford, Jones and Miley, can be purchased in a package with a second DVD set, "NPRE 50<sup>th</sup> Anniversary – Live," featuring all the anniversary talks. Contact Susan Mumm s-mumm@illinois.edu, for details.

#### ***Tent party, tours***

On September 13 the final day of festivities, guests joined in a tent party on the Engineering Quad, then took a tour of NPRE and Engineering College facilities. The highlight for many of the guests was walking through the now-closed Nuclear Reactor Building and getting to see for one last time the decommissioned TRIGA reactor.

#### ***An anniversary to remember***

"We believe this event was an excellent public service in that we gathered together so many experts who are knowledgeable about nuclear energy and the needs we will have of it in the future," Stubbins said of the 50<sup>th</sup> celebration. "Meanwhile, we appreciate that so many alumni and friends returned to visit with faculty and long-time acquaintances."

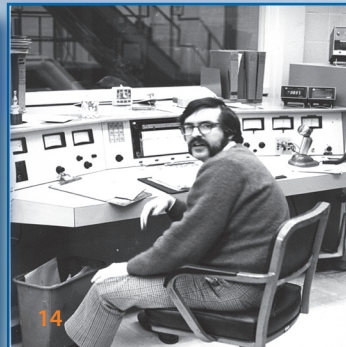
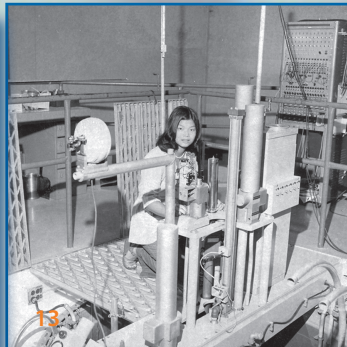
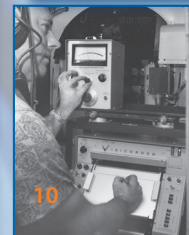
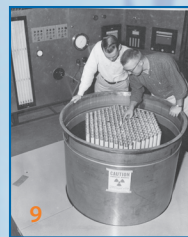
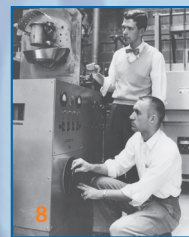
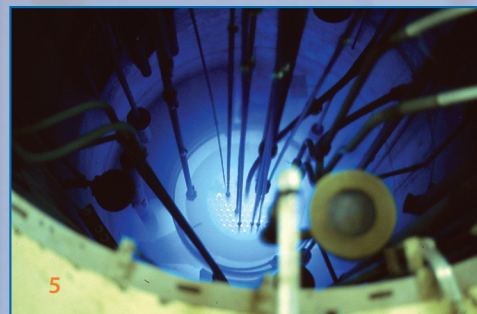
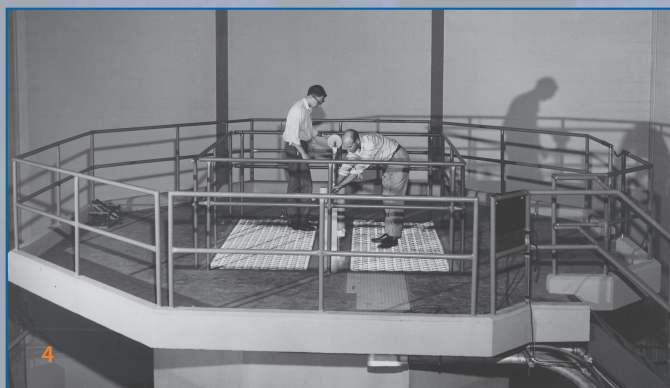
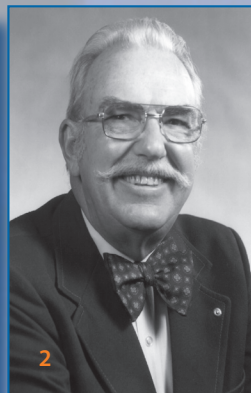
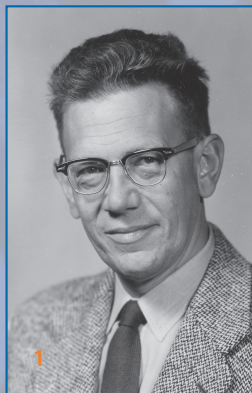
He added, "Our celebration was greatly enhanced by the generosity of our sponsors, Exelon Corporation, Sargent & Lundy<sup>LLC</sup>, Starfire Industries, the College of Engineering Dean's Office and the University of Illinois Center for Advanced Study.



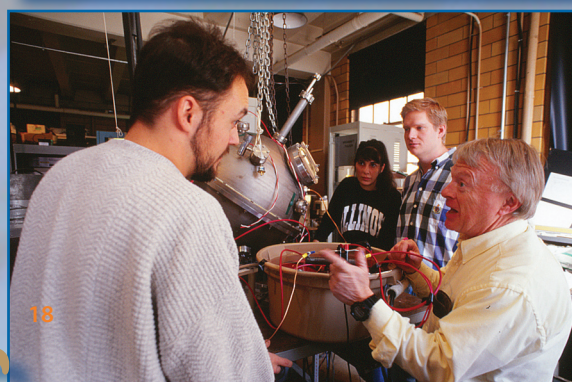
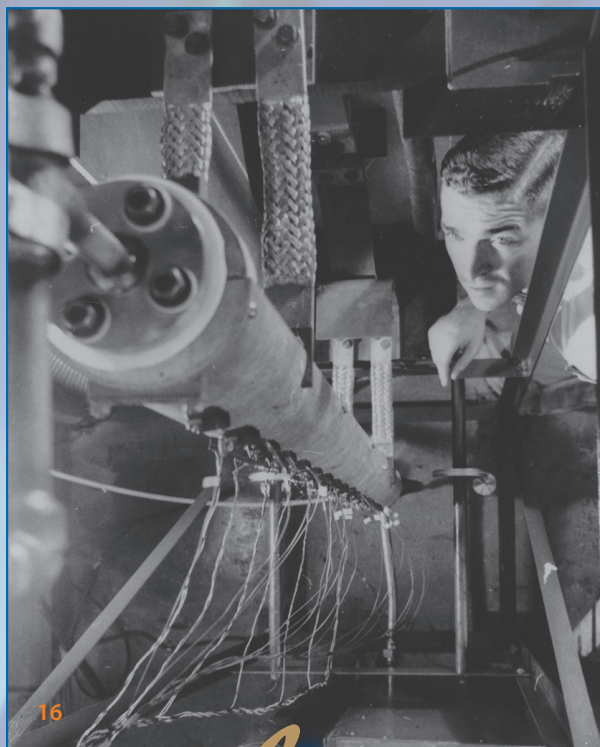
Center for Advanced Study  
College of Engineering Dean's Office



Among NPPE's early heroes were 1) Felix Adler, 2) Ross Martin, 3) B.T. Chao, 16) Barclay Jones and 17) Marvin Wyman. Photo 5 shows the pulse of the TRIGA reactor, photo 7 is of the now-closed Nuclear Reactor Building, and photo 15 shows a group parading in support of nuclear energy. Photos 4, 6 and 8-14 are early scenes of the TRIGA reactor and control room, with alumnae Patricia Eng in photo 13 and Craig Pohlod in photo 14. Photo 18 features (from left) Brian Jurzyck, Mike Williams, Robert Stubbers and Giovanna Selvaggi Danagoulian







## Saluting the past...

Talk began as early as 1951 about the need to create a nuclear engineering program at the University of Illinois. The matter took on more urgency when President Dwight D. Eisenhower made nuclear energy a priority, and the Atomic Energy Act of 1954 became law. Ross J. Martin, former Associate Dean of the University of Illinois College of Engineering, addressed the program's beginnings when its 25<sup>th</sup> anniversary was celebrated in 1982. "Within the college," in the mid 50s, Martin noted, "there was a number of people interested and knowledgeable about nuclear engineering and nuclear energy." Those people included such founders as Marvin E. Wyman and Felix Adler, the first two professors hired to build the Nuclear Engineering program; Bei Tse Chao, now emeritus mechanical engineering professor; Arthur B. Chilton, founder of the Office of Arms Control, Disarmament, and International Security; and Daniel F. Hang, who today, as an emeritus professor, continues to come to his NPRE office most every day. Through their efforts and the help of others, the program began with a master's degree curriculum in the 1958-59 academic year. Curriculum for the PhD degree soon followed.

The early founders joined forces with Argonne National Laboratory scientists, who concentrated much of the facility's work on nuclear power and peaceful uses of atomic energy. The benefits from that early collaboration continue through this day. A dedication of the TRIGA nuclear reactor on the University of Illinois campus on October 21, 1960, further enhanced the program. And, recalled Martin, "We had a red letter day, a beautiful day, in June 1964, with the commencement of the first PhD in nuclear engineering being presented to Robert L. Hirsch. Alumnus Hirsch has been particularly noted for his work on the report, "Peaking of World Oil Production: Impacts, Mitigation, and Risk Management."

By 1961, the internationally renowned George H. Miley had started at Illinois his prolific research into fusion systems, and later served a stint as program chair. By 1966, the program attracted Roy A. Axford, the first nuclear engineering PhD in this country. Axford established at Illinois his impressive teaching career, while building among his former students a research web of national lab collaborators. Barclay G. Jones came to Illinois in the late '50s to earn a

*continued on page 9*





**Scenes from NPRE's 50th Anniversary celebration:** 1) Posing with the reactor cake, from left, Dan Hang, George Miley, Anne Axford, Roy Axford, Barclay Jones, Barbara Hirsch, Bob Hirsch. 2) Carolyn Tomchik explaining her poster to, from left, David Miller, Patricia Eng, Dan Hang. 3) Dan Hang. 4) Terrill and Debbie Laughton. 5) Craig Pohlod. 6) Tour group. 7) Tour group on the reactor bridge. 8) From left, Bernie Wehring, William Croisant, Jr., Magdi Ragheb, George Miley. 9) From left, John Cook, Paul Sefranek, Craig Pohlod. 10) From left, J'Tia Taylor, Richard Wheeler, Jim Stubbins. 11) From left, Barbara Ragheb and Carol Mathis. 12) Banquet group. 13) Gabriel Chavez and Steve Wang. 14) Steve Coggeshall and Roy Axford. 14) Purdue University Prof. Chan Choi, Xiaoling Yang and Hsingtzu Wu. 15) Pete Planchon and Magdi Ragheb.



50th celebration



50th  
celebration

# ...Celebrating the future

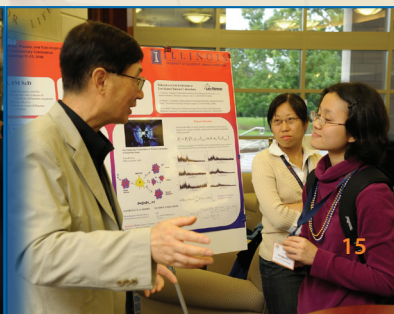
master's and then a PhD, and stayed for half a century: teaching, contributing to reactor research, and leading the department as head for 14 years.

By 1976, the program had graduated its first bachelor's degree earners. By the late 70s, nuclear engineering counted up to 129 undergraduates, and as many as 99 graduate students. Ten years later, on March 13, 1986, the University of Illinois Board of Trustees approved changing Nuclear Engineering's status from "program" to that of "department." By 1999, the unit's name was changed to the "Department of Nuclear, Plasma, and Radiological Engineering," to reflect the three paths typically followed by its students, and the wide variety of courses available to them.

In the years following the Three Mile Island nuclear reactor accident of 1979, NPRE survived several setbacks. Among them was a decline in enrollment, a reflection of a downturn in the nuclear power industry; the shuttering of the TRIGA nuclear reactor in 1998; and an effort in the early 2000s to reorganize the College of Engineer-

ing and dissolve the Department. Now, as NPRE enters its second half century, a new promise of a bright future emerges. Enrollments are nearing the highs of the late '70s, as industry, government and academia compete vigorously for nuclear engineering graduates. The federal government is considering granting many new licenses for construction and operation of nuclear power plants, as utilities strive to meet consumer demands for alternative energy sources. This push creates a need for more nuclear engineers, and more nuclear engineering research. The College of Engineering has re-committed its support for NPRE, with intentions to grow the faculty and provide more space for the Department.

"We are looking forward to a bright future while we grow our program and support the growth in the nuclear industry," said NPRE Department Head James F. Stubbins. "We are proud of the accomplishments of our faculty and alumni in the past 50 years, and we look forward to continuing this leadership with new students and new ideas in the next 50 years."







*Robert L. Hirsch*  
BS 1958, Mechanical Engineering  
MS 1959, University of Michigan  
PhD 1964, NPRE

*for his leadership in energy management and technology, and fusion science and engineering, and for his loyal support of NPRE*

## *NPRE '08 Distinguished Alumni*

The Department of Nuclear, Plasma, and Radiological Engineering is proud to announce the first winners of the NPRE Distinguished Alumni Award: Robert L. Hirsch and William E. Burchill. Hirsch and Burchill were recognized at the NPRE Alumni and Friends 50<sup>th</sup> Anniversary Dinner held Friday, Sept. 12, 2008, at the Alice Campbell Alumni Center.

*Robert L. Hirsch* is a Senior Energy Advisor at MISI and a consultant in energy, technology, and management. His primary experience is in research, development, and commercial applications. He has managed technology programs in oil and natural gas exploration and production, petroleum refining, synthetic fuels, fusion, fission, renewables, defense technologies, chemical analysis, and basic research.

Hirsch has served as a consultant and on advisory committees for government and industry. He holds 14 patents and has over 50 publications in energy. He is past Chairman of the Board on Energy and Environmental Systems of the National Research Council, the operating arm of the National Academies, has served on a number of National Research Council committees, and is a National Associate of the National Academies. In recent years, he

has focused on problems associated with the peaking of world conventional oil production and its mitigation.

Previous management positions include:

- Senior Energy Program Advisor, SAIC (World oil production)
- Senior Energy Analyst, RAND (Various energy studies)
- Vice President of the Electric Power Research Institute (EPRI)
- Vice President and Manager of Research and Technical Services for Atlantic Richfield Co. (Oil and gas exploration and production)
- Founder and CEO of APTI, a \$70 million/year company now owned by BAE Systems. (Commercial & Defense Department technologies)
- Manager of Exxon's synthetic fuels research laboratory
- Manager of Petroleum Exploratory Research at Exxon. (Refining R & D)
- Assistant Administrator of the U.S. Energy Research and Development Administration (ERDA) responsible for renewables, fusion, geothermal and basic research. (Presidential Appointment)
- Director of fusion research at the U.S. Atomic Energy Commission and the Energy Research and Development Administration.





*William E. Burchill*  
BS 1964, University of Missouri-Rolla;  
MS 1965, NPRE  
PhD 1970, NPRE

*for his leadership in nuclear engineering science and education, and for his loyal support of NPRE*

*William E. Burchill* served as President of the 11,000-member American Nuclear Society for a year starting in June 2008.

Retired as Head of Texas A&M University's Nuclear Engineering Department, Burchill said upon assuming the ANS presidency that his primary objective is "to strengthen ANS' role as the preeminent technical and professional representation of the U.S. nuclear community."

The American Nuclear Society is a not-for-profit, international, scientific and educational organization. It was established by a group of individuals who recognized the need to unify the professional activities within the diverse fields of nuclear science and technology. December 11, 1954, marks the Society's historic beginning at the National Academy of Sciences in Washington, D.C. ANS has since developed a multifarious membership composed of approximately 11,000 engineers, scientists, administrators, and educators representing 1,600 plus corporations, educational institutions, and government agencies. The society is governed by four officers and a board of directors elected by the membership.

ANS core purpose is to promote the awareness and understanding of the application of nuclear science and technology. ANS is the recognized credible advocate for advancing and promoting nuclear science and technology.

Said Burchill, "Through its professional divisions, ANS must provide the broadest spectrum of technical knowl-

edge and experience in nuclear science, engineering, and technology to be found in any professional society. Through its national meetings, topical meetings, executive conferences, and workshops, ANS must provide the most effective and efficient venues for timely exchange of this knowledge and experience. Through its publications, ANS must provide the best opportunities for critical peer review, archives for corporate memory, standards of practices, and objective policy and position statements for use by the public and decision makers. And, ANS must provide opportunities for meaningful involvement of its members at both the national and local levels."

Burchill has 37 years of experience working for an NSSS vendor, two nuclear utilities, a university, a defense facility and a national laboratory. Within ANS, he has been a member of a division program committee, seven topical meeting program committees, and two executive conference program committees. He has served as chair of two professional divisions, has served on the Board of Directors and the former Executive Committee, and has been an Executive Assistant to a vice president/president. His research interests include: nuclear power, nuclear safety, risk management, reactor regulation, reactor operations, and reactor design.

***To nominate a candidate for the NPRE Distinguished Alumni Award, please contact Susan Mumm at s-mumm@illinois.edu.***



*David D. Carlson*  
BS 73 Astrophysics, Indiana University  
MS 1974 UIUC Astronomy  
MS 1976 UIUC NPRE

*for his leadership in advancing nuclear power reactor risk management to benefit our nation's nuclear deterrent, and for his loyal support of NPRE*



## NPRE '09 Distinguished Alumni

NPRE alumni David D. Carlson (MS 1976) and Nicholas Tsoulfanidis (MS 1965, PhD 1968) have been honored with the 2009 NPRE Distinguished Alumni Awards.

*David D. Carlson* directs Sandia National Laboratories' Nuclear Weapons Special Projects Center. For the past year, he has been leading development of laboratory strategy for assuring the nuclear weapons stockpile safety. He reports directly to the Deputy Laboratories Director for Nuclear Weapons. Previously, Carlson served as the Chief Operating Officer of the Nuclear Weapons Strategic Management Unit, leading the management of the nearly \$1 billion nuclear weapons program at Sandia.

After earning his Illinois degrees, Carlson came directly to Sandia in 1976 as a technical staff member in the nuclear reactor systems safety analysis group. He helped develop the Probabilistic Risk Assessment (PRA) methods and their early applications to following the Reactor Safety Study.

In 1979, Carlson served as a principal investigator for the U.S. Senate investigation of Three Mile Island. As group leader, he led the investigation into the accident's causes, and the Senate's inquiry into improving the Nuclear Regulatory Commission's emergency response capabilities.

Carlson was promoted to Supervisor of the Light Water Reactor Safety Technology Department in 1982. He developed the cooperative DOE/EPRI/SNL/nuclear industry program for extending the licensed lifetimes of commercial reactors. The first license extensions were recently granted, providing the basis for substantial additional years of production capacity at limited cost.

Carlson was asked in 1990 to lead an effort to explore the application of probabilistic safety methods to weapons safety. This led to the development of Model-Based Safety Assessment methods now integral to Sandia's weapons safety assessments. While Carlson managed the Assessment Technologies Department, additional capabilities were developed to assess and improve weapon security. His department also provided key support to developing safety authorization basis for nuclear weapon operations at Pantex.

Carlson became Director of the Surety Assessment Center in May 2000, and was responsible for evaluating the safety, security, reliability, quality, and surveillance of the nation's nuclear weapon stockpile. He led efforts toward improving Sandia's safety culture after the Columbia accident, as well as develop integrated surety solutions for current and future nuclear weapon designs.





*Nicholas Tsoulfanidis*  
BS 60 Physics, University of Athens, Greece  
MS 65 UIUC NPPE  
PhD 68 UIUC NPPE

*for his contributions to nuclear engineering knowledge through his teaching, books and editorship, and for his leadership in the American Nuclear Society*

*Nicholas Tsoulfanidis* joined the faculty of the NE program University of Missouri-Rolla in 1968. There, he served until 2004 as a faculty member, Chairman of the Department, Interim Vice Chancellor for academic Affairs (one year), and Associate Dean of the School of Mines and Metallurgy for Graduate Studies and Research for more than 10 years.

In addition to his teaching and administrative duties he performed research in the area of radiation transport, radiation protection/health physics, and the Nuclear Fuel Cycle. He has written numerous technical papers and a book entitled *Measurement and Detection of Radiation*, now in its 2nd Edition. Tsoulfanidis currently is working on the 3rd edition. He is the co-author of the book, *The Nuclear Fuel cycle: Analysis and Management*, also in its 2nd Edition.

Since June 1997, Tsoulfanidis has been serving as Editor of *Nuclear Technology*, an international technical Journal published by the American Nuclear Society. He is a Fellow of ANS and was elected and served as a member of its Board of Directors from 2003-2006.

From July 1, 2005 to July 31, 2007, Tsoulfanidis served as Interim Chair of the Chemical & Metallurgical Engineering Department at the University of Nevada-Reno. He is

now an Adjunct Professor at UNR and also serves as a part-time Judge for the ASLB.

Tsoulfanidis has received many awards, the most prominent being the Glenn Murphy Award (1995) given by the American Society for Engineering Education [ASEE] for "outstanding contributions in the profession and teaching of nuclear engineering".

Carlson and Tsoulfanidis received their awards at NPPE's 2009 Honors Banquet, held April 30. The two alumni also presented the evening's talks: Carlson, spoke about "Nuclear Safety: Perspectives on Design and Management," and Tsoulfanidis presented, "A Retired Professor... Reflectit."

**To nominate a candidate for the NPPE Distinguished Alumni Award, please contact Susan Mumm at [s-mumm@illinois.edu](mailto:s-mumm@illinois.edu).**



# The Strengths Of Sampson

*Editor's Note: Congratulations to NPRE alumnus Henry T. Sampson, Jr., 2009 winner of the College of Engineering Alumni Award for Distinguished Service! The award will be presented during the College of Engineering Awards Convocation on May 1.*

**By Deb Aronson**

The first time Henry T. Sampson, Jr., MS 65, PhD 67, lost himself in the microfiche room of the UCLA library, it was to blunt the trauma of his recent divorce.

Little did he know that out of that misery would emerge his "passionate obsession," a decades-long quest that would bring to the world the previously untold history of American blacks in film, television and radio.

"What drives me is curiosity," Sampson says. "I love to learn. To me, that's what living is."

And indeed, the courtly Southerner has lived a life full of discovery – as a nuclear engineer at The Aerospace Corp., as a man refusing to be trapped within the confines of racial segregation and as a human being whose hobby inadvertently turned him into both history buff and movie expert.

An organized, focused and precise man in both body and habits, Sampson at times seems bemused by his unsought and unforeseen spot in history. An acclaimed engineer noted for his co-discovery of the Gamma Electric Cell and the owner of several patents, he seems fated to leave his mark on both the scientific and artistic worlds. At 73, with his energetic air and a voice still carrying the flavor of his Mississippi childhood, Sampson appears to be having a great time in unfolding his story, not for the silver screen but for the printed page.

## Newspapers to the rescue

The seed for Sampson's expertise on blacks in entertainment was planted during his childhood in Jackson, Miss., where films with all-black casts portraying characters other than "mammies, servants and buffoons," as he put it, left a big impression on him.

Who made those movies, Sampson wondered in 1974 as his marriage dissolved, and how many were there? He headed to the library to find out.

By 1913, when blacks first entered the motion-picture industry, most U.S. cities with a sizable minority population carried one or more black weeklies. These weeklies held a treasure trove of information, and UCLA had an extensive collection of them.

"I started from the very beginnings, the 1900s, collecting information, issue by issue," Sampson said. "It was fascinating. You can imagine how long it took to collect it all."

What he painstakingly unearthed was a well-organized black movie industry running parallel to the white one. In the early 20th century, black-owned companies used all-black casts to make films that were distributed to black-owned theaters for their audiences to enjoy. Plots ranged from Westerns, adventures and action to romances and musicals.

Despite Sampson's intense and challenging job as director of mission development and operations of U.S. Air Force satellites at The Aerospace Corp. in California, he found himself becoming more and more intrigued by the film research he was conducting in his spare time. Upon returning home from the library, Sampson would transcribe every note, first with a typewriter and, eventually, a computer. When his job took him on the road, he would take the opportunity to peruse other libraries as well.

Soon, Sampson realized that he had collected a great deal of information. "It was very, very fascinating, and nobody had written anything," he recalled, "so I said, 'Hey, look, I didn't know beans about writing, but ... maybe I should try to write a book.'"

That first effort, published in 1977 as "Blacks in Black and White: A Source Book on Black Films," is a seminal, 700-page reference book filled with synopses of black movies, biographies of black actors, five appendixes, as well as a history of the making and distribution of movies by blacks. Sampson's other books over the years have included "Blacks in Blackface," about blacks in musical shows; "Ghost Walks: A Chronological History of Blacks in



Show Business, 1865-1910"; "That's Enough, Folks," about the portrayal of blacks in cartoons; and most recently, "Swingin' on the Etherwaves" (2005), which, at 2,500 pages-plus, sells for more than \$400. That book documents how the radio industry, foundering amid the lackluster lectures it was broadcasting, turned to airing shows directly from nightspots in Harlem. In essence, big band leaders like Duke Ellington and Cab Calloway revived the dying radio business.

"After that first book came out," Sampson said, "suddenly everybody got aware of all these African-American films, so people started doing research on this area.

"My book sparked that," he said, with a smile in his voice. "You've got people all over the country now claiming I am the expert."

According to Paula Massood, an associate professor of film studies at Brooklyn College of the City University of New York, "Blacks in Black and White" is becoming more significant for film scholars as time passes, because it wasn't until the last decade that historians began to uncover many of the titles mentioned in the book.

By digging around in the archives, Sampson "did a lot of the 'dirty work' for subsequent scholars," she said, "and his work joins a group of recent studies that point to the long and quite rich history of African-American film in this country.

"Blacks in Black and White' illustrates the sheer numbers of people involved and the variety of films made during the early part of the 20th century," Massood said.

## From Mississippi to Illinois

Sampson's interest in intellectual challenges began when he was a child, following the example set by his parents, Henry T. Sampson and Esther Ellis Sampson-Marshall, both of whom enjoyed the life of the mind. The elder Sampson, an esteemed professor of mathematics, was executive dean of Jackson State University (the library of the Mississippi institution was named in his honor in 1970). Sampson's mother, alive today at age 96, was the first black social worker in Jackson and the executive director of the Head Start program there.

Although he started out on the pre-med track at Morehouse College, Sampson soon turned to engineering. He enrolled in Purdue University's chemical engineering pro-



*Henry T. Sampson Jr., MS 65, PhD 67*

gram (despite never having seen a slide rule).

Denied good work in Mississippi because of racial discrimination, the new graduate took a civil service job with the U.S. Naval Ordnance Test Station at China Lake, Calif., on the edge of the Mojave Desert. For someone who had never been west of the Mississippi River, the landscape was mind-boggling.

"My parents put me on a train, and I rode across the country," said Sampson. "I can remember vividly seeing the country change. ... I could see the trees disappear, and

*Summer*





*Henry T. Sampson Jr., right, with his NPRE advisor and mentor, George H. Miley in the 1960s.*

then the desert appeared. And I thought, 'Oh gee, what have I got myself into!'" While in California, he earned a master's degree in nuclear engineering and met and married his first wife, Elizabeth.

Deciding to pursue a doctorate in nuclear engineering, Sampson sought a school with a working reactor. According to George Miley, a University of Illinois nuclear engineering professor and Sampson's eventual thesis advisor, Illinois held the most advanced one at the time, an advance trigger reactor that, when it pulsed, produced 1,000 megawatts of power.

But Sampson's ability to enroll at Illinois depended upon being able to find housing for a black family in Campaign-Urbana. Fortunately, the Sampsons (who had Henry T. Sampson III by then) found married student housing immediately.

"That decided us on the University of Illinois," he said. "It was a truly great experience. There were high-charged people from all over the world. And the faculty and students were very close-knit."

Sampson remembers fondly many cookouts and softball games mixed in with hard work. Miley, in turn, recalled Sampson as "a delight to work with. He was very self-motivated, congenial and collegial."

"I'm pretty sure that Henry was the first black Ph.D. in nuclear engineering anywhere in the country," said Miley. "But within [our] department, everyone was so used to

diversity that we didn't even recognize or fully appreciate that until he left."

At Illinois, Sampson worked with Miley to develop and test a Gamma Electric Cell, a new device that was able to turn gamma radiation energy directly into electrical energy, thus providing a faster and more accurate way to detect radiation. "It was a great challenge," said Miley.

Having earned his doctoral degree, as well as a patent, Sampson then was wooed by The Aerospace Corp., based in El Segundo, Calif.

## Work and play

The issue of housing reared its head again as he considered moving back

to the West Coast.

"I told [Aerospace], 'I am not going to work for you guys unless you can find a place for me to live that is no more than 10 minutes from where I work,'" Sampson said.

"I didn't know at that time that that was a challenge because the beach cities – Redondo Beach, El Segundo, Manhattan Beach, Hermosa Beach – were all highly segregated."

After renting a home in El Segundo, the Sampsons bought a house on a quarter acre lot in Palos Verdes Estates. Eventually, their neighbors' anxiety about integration disappeared, and the neighborhood children befriended each other.

His professional life was also a success. In addition to Sampson's competitive work at Aerospace, he wrote papers on rocket propulsion, direct conversion of nuclear energy to electricity and computer simulation of electrical systems.

## A 'blessed' existence

While Sampson wears a warm and ready smile, he remains no pushover. When society told him in the 1950s that he couldn't work in the oil business near his Southern home, he went to California. When society told him his family couldn't live in a white neighborhood, he bought a house anyway and moved in. When someone threw eggs at his home, he called the police and said, "Listen, I don't care




what happens to me, but nobody better mess with my family.”

Sampson doesn't take any grief, but he doesn't give any, either. The retired engineer remains philosophical about life's turnings (one of them being that, despite his extensive research on films, he'd rather read a book than see a movie). Sampson regrets the demise of the black film industry, muscled out by the financial power of a white market. He somewhat rues the fact that because of the attention he has cast on black films, the movie stills and lobby cards that he used to pick up for a quarter at flea markets now go for astronomical prices.

And when Sampson has bumped into ignorance over the course of his years, he's nodded and gone around it. Sampson still lives in the modest, tidy Palos Verdes Estates house, with its book-lined study and large windows overlooking the ocean. His air of contentment suggests that life doesn't get better than that.

“Even those things that were setbacks in my life turned out to be beneficial,” he said. “I'm not very spiritual, but I do think I've been blessed.”


Case in point: While Sampson's interest in writing books grew from the pain of divorce, in the end it helped rejuvenate his love life. Set up on a date because they both were authors, he and Laura Young, an associate professor of language, literature and culture at Cal State San Bernardino, found that they indeed had something in common. They married this past spring and honeymooned in St. Thomas.

They enjoyed it so much they bought a second home there. None of the neighbors complained. 

*This story originally appeared in the January/February 2008 issue of Illinois Alumni magazine. Aronson is a freelance writer who lives in Urbana with her husband and two children.*

## **Sampson receives College alumni award**

Henry T. Sampson, Jr., BS 65, PhD 67, was one of eight College of Engineering alumni honored May 1 with the Alumni Award for Distinguished Service.


Sampson was cited for inventions, including the gamma electric cell; contributions concerning direct conversion of nuclear energy to electricity, rocket propulsion, and computer simulation of electrical systems; and contributions as a writer and historian in tracing the Black film industry. 



*Henry T. Sampson Jr., left, with George H. Miley at the May 1, 2009, College of Engineering Awards Convocation.*

Sampson is the retired Director of Planning and Operations Directorate of the Space Test Program at Aerospace Corporation in El Segundo, California.

As director of planning and operations for the company's space test program, he led senior engineering staff in the planning, acquisition, development, launching, and space operation of several satellites. During his 30 years at Aerospace, he performed studies to evaluate the application of nuclear, photovoltaic, and magnetohydrodynamic power for advanced, high-power satellite programs. He also developed a computer simulation program to evaluate the performance of various types of hybrid automobile and city bus power systems over standardized driving cycles. His group planned and provided lead technical support for various Air Force contractors who developed and successfully launched and operated 13 low earth-orbit satellites carrying experimental payloads. Sampson also served on an independent launch readiness review team for the first launch of Milstar, a satellite communications system that provides secure, jam-resistant, worldwide communications to meet wartime requirements for the U.S. military.

In addition to his work at Aerospace Corporation, Sampson is known as one of the most important Black writers of this century. His area of concentration is the Black presence in the film and entertainment industries. His extensive writings are recognized as important source material for anyone researching this long-neglected area of American history. 



# Classes



Alumni "Bud" Cherry, left, and Fazir Husain, right, with Jim Stubbins at the NPRE Reception in Washington, D.C. in March

## 1960s

**Bernard "Bud" Cherry**, BS 62 Chemistry, MS 63 NPRE, is Chief Executive Officer of Energy 5.0<sup>LLC</sup>, headquartered in West Palm Beach, Fla. The principals of the privately held company have over 40 years of experience in renewable energy power project development and renewable technology application utilizing cogeneration, geothermal, solar and wind technology. Energy 5.0 has assembled a team to undertake the Florida Solar I Project, a proposed 25-megawatt (MW) solar PV electric generating station. Tampa Electric recently signed a 25-year contract beginning in 2011 to become the sole buyer of solar power from the facility. Said Florida Gov. Charlie Crist, "I applaud TECO and Energy 5.0 on this exciting partnership that moves Florida closer to our goal of increasing energy diversity and reducing greenhouse gas emissions. Two years ago, I challenged Florida to find the 'gold in green,' and we continue to see companies investing in innovative solutions that promote the use of renewable energy while saving money for consumers." Over its 25-year proposed contract term, the project is expected to avoid the emission of up to 1.45 million tons of carbon dioxide when compared to a natural gas-fired peaking combustion turbine. The project will consist of silicon-based PV panels that generate electricity when exposed to sunlight. The 25-MW facility is expected to produce more than 48,000 MWh of electricity per year – enough output to serve the electric en-

ergy needs of more than 3,400 homes. The average home in Tampa Electric's service territory uses about 14,000 kWh per year.

**William E. Burchill**, MS 65, PhD 70, is the past president of the American Nuclear Society. During his presidency, (June 2008) he visited and gave talks to 19 ANS local sections including five outside the United States; five ANS student sections; 13 national conferences including PARTRAM, WIN, two ANS Student Conferences, Nuclear Non-Operating Owners Group, California Clean Innovation Conference, and three ANS topical meetings; eight universities; and five international conferences: the ANS Latin American Section, the IAEA General Conference, the Mexican Nuclear Society, the Slovenian Nuclear Society, and the PBNC. He toured numerous nuclear facilities throughout the world. Said Burchill, "It is a tremendous pleasure to represent ANS in meeting so many peers."

## 1970s

**David P. Weber**, MS 70, PhD 74, directs the Transportation Research and Analysis Computing Center at Argonne National Laboratory. TRACC's staff is charged with designing computer simulations to model intricate transportation infrastructures. "By enlisting both high-performance computing resources and technical staff with expertise in parallel computing and engineering analysis applications, TRACC represents a valuable resource for the DOT (Department of Transportation) research community," Weber said. TRACC will become a hotbed of focused computation-based research in areas of critical importance to DOT.



David P. Weber



Alumni Neil Howard and Rod Krich at the NPRE Reception in Washington, D.C. in March

**Neil M. Howard**, MS 71, PhD 74, recently was named Chief Nuclear and Environmental Engineer for Bechtel Power Corp., headquartered in Frederick, Maryland. Bechtel recently returned to structuring Nuclear and Environmental Engineering as a separate engineering discipline. Howard reports that this uniqueness had been the case in the past until nuclear receded in the mid-1990s. Neil claims to be the perfect candidate for this job because he held it previously from 1987-1992 and therefore in the truest sense of Nuclear and Environmental Engineering is a "Recycled Chief."

**Rodney M. Krich**, MS 73, has spent much of 2008 consulting for AREVA, responsible for the Nuclear Regulatory Commission construction and operating license application for a gas centrifuge uranium enrichment plant outside Idaho Falls, Idaho. Prior to that, Krich had helped Constellation Energy complete the NRC construction and operating license application for the Calvert Cliffs Nuclear Power Plant, Unit 3. Currently, he is involved on a number of international nuclear projects, and is an outside member of the Exelon Nuclear Corp. Nuclear Safety Review Board.

**Mark A. Prelas**, MS 76, PhD 80, professor and director of research at the University of Missouri-Columbia Nuclear Science and Engineering Institute, wrote an article, "Wanted: Nuclear Engineers, Staffing the Future Fleet," for the May/June 2008 issue of *EnergyBiz*. In the article Prelas stated, "As a professional nuclear engineer who has worked in the field for many years, I find myself wishing that I were 30 years younger because the demand for nuclear engineers is great and it will only get better."



# Classes 1980s

**James A. Haried, Sr.**, BS 79, manager at Ernst & Young in Chicago, presented the NPRE Undergraduate Seminar on Feb. 19. Haried joined colleagues from General Electric, Sarah Leverage and Eric Loewen, to present the topic, "General Electric Update on the Global Nuclear Energy Partnership (GNEP) Industrial Study."



*Kenneth D. Lewis, left, with Ilesanmi Adesida, Dean of the College of Engineering at Illinois*

**Kenneth D. Lewis**, MS 79 Applied Mathematics, PhD 82 NPRE, Dean of the College of Science, Mathematics, Technology and Engineering at South Carolina State University in Orangeburg, South Carolina, has been recognized with the 2008 College of Engineering Alumni Award for Distinguished Service. Prior to becoming Dean at one of the country's Historically Black Colleges and Universities, Lewis was Senior Staff Engineer II with BWXT at the Oak Ridge Y-12 National Security Complex, formerly operated by Lockheed Martin Energy Systems, Inc., in Oak Ridge, Tennessee. As a nuclear engineering expert, Lewis' support to the DOE projects has directly impacted national and world security and public health. This ability was perhaps most clearly demonstrated during the "Sapphire" project, a secret U.S. mission in 1994 to retrieve approximately 600 kilograms of very highly enriched weapons-grade uranium (sufficient to construct several Hiroshima-size atomic bombs) from the former Soviet Republic before it could fall into terrorists' hands. The work he performed earned him a letter of personal appreciation from then-President Bill Clinton, as well as the thanks of U.S. ambassadors, and the secretaries of Energy, Defense, and State.

**Brian J. Davis**, BS 82, MD 92, ran as the Republican nominee for Minnesota's First Congressional District. An oncologist at Mayo Clinic in Rochester, Minnesota, Davis lost his bid to Democratic incumbent Tim Walz. The race was Davis' first venture into politics. In addition to his NPRE degree, Davis holds a master's and PhD in mechanical engineering from Massachusetts Institute of Technology.

**Melinda A. Bogart**, BS 83 NPRE, MS 93 Finance, recently accepted a new position with GE-Hitachi in Wilmington, North Carolina. She is the Project Manager-Training Content Development.

**Kenneth R. Riemer**, BS 84, Branch Chief and **Nirodh Shah**, BS 89, Project Engineer in the Division of Reactor Projects, Nuclear Regulatory Commission Region III in Lisle, Illinois, returned to campus in February to give an NPRE Undergraduate Seminar: "NRC - Who We Are; What We Do"

Riemer has regulatory oversight responsibilities for the LaSalle, Duane Arnold, and Monticello plants. After earning his bachelor's degree, Riemer worked at the Norfolk Naval Shipyard as a nuclear Shift Test Engineer and Supervisor prior to joining the NRC. Since then, he has had a progressive career in the NRC. Prior to his Branch Chief assignment in the Division of Reactor Projects, he served as the Chief of the Plant Support Branch in the Region III Division of Reactor Safety. The Plant Support Branch had oversight responsibility for Emergency Preparedness, Security, and the Region III Incident Response facility. Prior to being made Branch Chief, Riemer served as a Resident Inspector/Senior Resident Inspector at the Fermi 2, Duane Arnold, Dresden, and LaSalle facilities.

After earning his degree, Shah worked in the Health Physics group at Brookhaven National Laboratory and then as a consultant with Dames and Moore. He has had a progressive career since joining the NRC, beginning as a Plant Support Specialist, focusing on radiological protection, environmental controls and emergency preparedness issues in the Division of Ra-

diological Safety and Safeguards. He then moved into the Division of Reactor Safety as a reactor engineer, specializing in mechanical engineering reviews. In 2000, Shah was named the resident inspector at the Braidwood nuclear plant, a pressurized water reactor located just south of Chicago. Shah became the senior resident inspector at that site in 2005, and has held his current position since 2007.

**Shin Chang Hu**, MS 86, PhD 92, is Section Chief with the Department of Nuclear Regulation, Atomic Energy Council, in Taiwan. Hu was the first woman to have earned a PhD in NPRE.

# 1990s

**Michael J. Giacobbe III**, BS 91, MS 95, PhD 99, was presented the 2008 Loyalty Award by the University of Illinois Alumni Association. Giacobbe was recognized for his initiative in starting the Catherine Pritchard Scholarship Fund in NPRE, as well as helping to build the Barclay G. Jones Endowed Fellowship. Giacobbe also serves on NPRE's Constituent Alumni and Industry Advisory Board.



*Paula Havlik, University of Illinois Alumni Association, presents the Loyalty Award to Michael J. Giacobbe III.*

**Jeffery F. Latkowski**, BS 91, received his PhD from Berkeley and is working at Lawrence Livermore as an engineer in the fusion area. He recently celebrated the birth of his third son.

**Luis Chacon**, MS 97, has accepted a position at Oak Ridge National Laboratory.



# Classes

## 2000s

**Nazir A. Husain**, BS 98, MBA 03, is working in the field of Islamic Finance.

**Jean Paul Allain**, MS 00, PhD 01, was selected for the 2008 Best Teacher Award in the School of Nuclear Engineering at Purdue University. An assistant professor, Allain previously worked at Argonne National Laboratory. He is a member of NPRE's Constituent Alumni and Industry Advisory Board.

**Monica M.C. Allain**, MS 00, PhD 04, former associate director of undergraduate education in Purdue University's College of Engineering, has been named managing director of the Birk Nanotechnology Center in Discovery Park. Allain was the lead materials engineer for Exelon Corp.'s Nuclear Integrated Surveillance Program. She also has performed research at academic and national laboratories such as the Frederick Seitz Materials Research Laboratory and Argonne National Laboratory at the advanced photon source. She arrived at Purdue in October 2007 to lead the Purdue Women in Engineering Program's K-5 outreach effort and the Innovation to Reality Program for students in grades 6-8. Allain also worked with the College of Engineering's recruitment office and the Minority Engineering Program at Purdue, focusing on the recruitment and retention of underrepresented students in engineering. Allain returned to the University of Illinois Urbana campus on October 28 as the guest speaker for the Women in Nuclear Luncheon.



Purdue University Prof. Chan Choi, left, with Jean Paul and Monica Allain at NPRE's 50<sup>th</sup> Anniversary celebration

**Ayten Celik-Aktas**, MS 01, works in the Electron Microscopy Lab in Ankara University, Turkey.

**Carlos H. Castano**, MS 02, PhD 06, is Assistant Professor of Nuclear Engineering at the Missouri University of Science and Technology in Rolla, Missouri.

**Thomas D. Belchik, Jr.**, BS 03, is receiving his Master of Professional Studies in Leadership, Education, and Development from the University of Maryland, College Park, this May. Beginning in April, he started serving as the 2<sup>nd</sup> Company Officer at the United States Naval Academy. Belchik and his wife, Elizabeth, have two children, Sara, 9, and Nathan, 5.



From left, alumni Jen Gall, Tom Belchik and wife, Elizabeth, and Eric Rozek at the NPRE reception in Washington, D.C., in March.

**Eric J. Rozek**, MS 03, is working for the Defense Nuclear Facility Safety Board in Washington, D.C.

**David J. Gennardo**, BS 07 NPRE, served in 2008 on the Washington, D.C.-based Nuclear Engineering Student Delegation. Gennardo is an NPRE graduate student working with Associate Prof. Brent Heuser.

**Patrick J. Mangan**, BS 07, works for Starfire Industries in Champaign, Illinois.

**David J. Papke**, BS 07, is in the University of Illinois' MD/PhD program, working on ion channel simulations with Prof. Claudio F. Grossman of the Molecular & Integrative Physiology Department.

**Vinay A. Patel**, BS 07, does material science and mechanical engineering work with glass and ceramics for Corning, Inc.

**Federico E. Teruel**, PhD 07, is working at Centro Atómico Bariloche in Bariloche, Argentina.

**Linchun Wu**, PhD 07, is working for HyperV Technologies Corporation in Chantilly, Virginia.

**Michael K. Antonelli**, BS 08, is a computer engineer and part of the Informa-

tion Systems-Plant Systems group (ISPS) for Energy-Northwest, supplying power to the Northwest part of the country. His job involves maintaining and modifying plant monitoring systems, from the plant process computer to the ERDS system that reports emergency information to the Nuclear Regulatory Commission and operators. Antonelli also works on digital security, a part of a new set of NRC policies requiring a high level of computer network security on any plant or safety systems, along with measures to protect those systems both physically and digitally. He is further assigned as a technical advisor to a project replacing the PRNM system that monitors the core power and also connects into the reactor safety systems.

## In Memorium

**Eric D. Schneider**, BS 03, 27 years old of Lansing, Illinois, died at his home on February 5, 2008, of an undiagnosed illness. He survived by his mother, Kathleen; stepfather, David Lerner; cousin, Mark Sartain; aunt and uncle, Judy (Dennis) Sartain; father, Ed Schneider.

**Trent W. Silver**, 20, an NPRE undergraduate, died May 10, 2009, from cancer. He was a member of Sigma Phi Delta Engineering fraternity and the Powerlifting Illini. Surviving are his parents, Darryl and Susan Silver of Urbana; his brother Kyle, his grandparents John and Beth Chato and Frank and Doris Silver all of Urbana, several aunts and uncles, cousins and many good friends.

**Kenneth D. Brienzo**, BS 74 Physics, MS 75 NPRE, 57 years old of Blue Island, Illinois, died Sept. 4, 2008, after more than a year and a half battle with brain cancer. Brienzo was the founding partner of Project Quality Assurance LLC. Survivors include his wife, Karen; sons, Ben and Sam; parents, Dan and Marge; and brother, Jim.

**Herman Cember**, 85, a loyal supporter of NPRE's North American Technical Center educational and training program, died March 7, 2009, in Indianapolis. An adjunct professor at Illinois, Cember spent the bulk of his illustrious career at Northwestern University as a professor of environmental health.



# Welcome New Alums!

(Listing of NPRE graduates earning degrees from December 2007-May 2009, and their latest known employer.)

## Bachelor's of Science Degrees December 2007

**Jeffrey Cardoni:** Knolls Atomic Power Laboratory  
**Kristen Geiger:** Sargent & Lundy, Chicago  
**David Lartonoix:** U.S. Navy, Officer Training  
**Ryan Rymarczyk:** Enercon Services, Naperville, Illinois  
**Lam Tuwin**

## May 2008

**Jill Anderson:** graduate school, NPRE at Illinois  
**Justin Conley**  
**Ryan Craffey:** Nuclear Regulatory Commission (NRC), Washington, D.C.  
**Joel Dixon**  
**Jennifer Gall:** NRC, Washington, D.C.  
**Alyssa Heydt:** Exelon, Oyster Creek  
**Benjamin Holtzman:** graduate school, NPRE at Illinois  
**Rachael Jabusch:** Exelon  
**Dean Knox**  
**Jessica Kubo:** graduate school, Statistics Department

at Illinois

**Cheuk Lau:** Knolls Atomic Power Laboratory  
**Robert Lofgren:** graduate school, NPRE at Illinois  
**Thomas Martino:** Sargent & Lundy, Chicago  
**Jennifer Ong:** Los Alamos National Laboratory  
**Harrison Pappas:** graduate school, NPRE at Illinois  
**Nathan Peld:** graduate school, International Relations, Maxwell School of Citizenship and Public Affairs, Syracuse University  
**Ian Percel:** graduate school, NPRE at Illinois  
**Alex Prochaska:** graduate school, Nuclear Engineering, University of Wisconsin  
**Eric Reside:** graduate school, NPRE at Illinois  
**Cole Richter:** Ski Instructor, Steamboat Springs Colorado  
**April Scarbeary:** NRC, NSDP training program for two years, then located in Region III Lisle, Illinois, as a Resident Inspector  
**Vanessa Snead**

## August 2008

**Joshua Bauer**  
**Luis C. Bohorquez**

## December 2008

**Michael K. Antonelli:** Energy Northwest, State of Washington  
**Arthur A. Childs:** Sargent & Lundy, Chicago  
**Muad Y. Rafati**

## May 2009

**Adam Bracke:** Exelon, Three Mile Island  
**Marshall Burhoff:** U.S. Navy  
**Stephan Burtschi**  
**Jacob Coutre:** U.S. Navy  
**Drew Griffiths:** Exelon, Quad Cities  
**Mark Hejney**  
**Stephen Kohlhase:** Exelon, LaSalle  
**Ryan Lenahan:** Westinghouse  
**Joseph Lucido:** U.S. Navy  
**David Palm**  
**Bret Richard**  
**Jose Rivera:** graduate school, NPRE at Illinois  
**Thomas Sowinski:** Exelon, Dresden  
**John Tramm:** Sargent & Lundy at Chicago

## Master's of Science Degrees December 2007

**Jose Caro:** General Electric  
**Ji Li:** PhD program, Department of Petroleum Engineering, University of Texas at Austin  
**Wayne Lytle:** PhD program, NPRE at Illinois  
**Surya Saripella:** Financial consulting company, India

## May 2008

**Rebecca Romastoski:** Sargent & Lundy, Chicago  
**Steven Weiss:** Westinghouse

## August 2008

**Xiang Chen:** PhD program, NPRE at Illinois  
**Benben Li:** PhD program, Electrical & Computer Engineering at Illinois.

## December 2008

**Marin Racic**

## Doctor of Philosophy Degrees December 2007

**Giovanna Dangagolian (Selvaggi)**  
**Federico Teruel:** Mechanical and Computation Division of Bariloche Atomic Center, Argentina.  
**Linchun Wu:** HyperV Technologies Corp., Chantilly, Virginia.

## May 2008

**Maria Okuniewski:** Researcher, Idaho National Lab  
**Singh, Suneet:** Researcher, Idaho National Lab

## December 2008

**Xiao Pan**

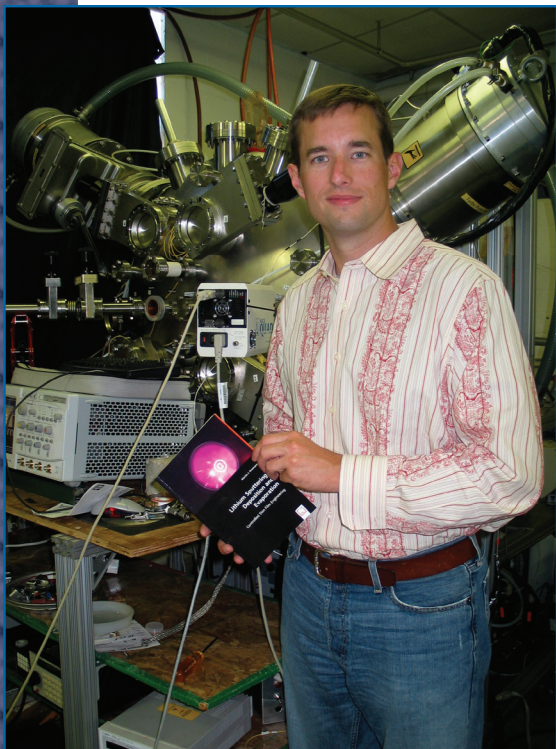
## May 2009

**Scott Ramsey:** Los Alamos National Laboratory, X-Division  
**Daniel Rock:** Westinghouse  
**Joshua Spencer:** Electric Boat



About 35 alumni and friends stopped by the NPRE at Washington, D.C. Reception, held March 10 at nearby Rockville, Maryland: 1) Walter San Horton, right, with guests including son, Erick, left; 2) Ann Satsangi and Rod Krich; 3) Shana Helton and her daughter, Sarah; 4) NPRE Department Head Jim Stubbins and Jay Collins; 5) Susan and Bill Burchill, middle, with Prof. Barclay Jones.





NPRE alumnus and new adjunct research assistant professor Martin Neumann with his book, *Lithium Sputtering, Deposition and Evaporation: Controlled Thin Film Engineering*.

## Dissertation results in book for Neumann

All PhD students conclude their studies by writing a dissertation, but it's rare when a dissertation becomes a book. NPRE graduate Martin Neumann's work is one of the rarities.

*Lithium Sputtering, Deposition and Evaporation: Controlled Thin Film Engineering*, published in June by VDM Verlag, evolved from Neumann's 2007 dissertation, "Lithium Debris Removal by Sputtering and Evaporation for EUV Optics and Applications."

"I hope it will be a reference book," said Neumann, BS 99, MS 04, PhD 07. "It will sit on a lot of shelves of libraries in major research universities here and around the world." He has donated a copy to the University of Illinois library system.

Interested in developing and integrating emerging technology with medicine, Neumann is pursuing a medical degree while working as an adjunct research assistant professor in the Center for Plasma Material Interactions.

A sponsor for the Center, VDM Verlag contacted Neumann about publishing the book. "I was shocked," Neumann recalled, although he believes the work is "a well laid-out, very methodical approach" on controlling lithium deposition and modeling lithography in computer chip technology.

According to the book's description, "The ability to selectively deposit thin films of lithium and remove them from surfaces is an emerging area of technology development in various fields including EUV lithography, lithium ion battery development, and in the fusion community."

Through Neumann's work, "A lithium magnetron source was developed for lithium deposition and characterized to yield a mapping of the temperature and density of the plasma, ionization fraction, and lithium deposition. From here, a secondary plasma source was developed and studied in the same manner to also provide information on the electron density, temperature, and ionization fraction so as to accurately model and measure the deposition flux of lithium and sputter flux on the sample surface. The simultaneous process of deposition, evaporation, and sputtering of lithium is modeled and corroborated with experimental observations to develop a predictive model for the precise thickness of lithium thin films that can be engineered in any setting for any application."

One review of the book called it "a great fundamental explanation of sputtering and magnetron sputtering. While focused on lithium, the physics discussed are relevant and adaptable for all sputtering systems. This text also develops a detailed model for magnetron sputtering in 3-D space. While relevant for EUV applications, this work is applicable to all applications involving thin film engineering."

Lithium deposition is used in the making of silicon wafers for computer chips, and ion batteries in products such as hybrid automobiles, cell phones and other mobile electronics. By better controlling the deposition, Neumann said, the chips and batteries can be made smaller, allowing for the products to be smaller. When a hybrid car's batteries are smaller, more batteries can be built into the vehicle, giving it longer-lasting power.

Neumann said his work has applications for medicine because lithography provides for a low-energy x-ray source that can image single cells. "If you can see how a cell grows, you can image cancer cells at an earlier state and with more detail," he said.

Neumann credits Ruzic and NPRE Profs. George Miley and Jim Stubbins for their assistance in the research. He also thanks Gary Eden, professor of Electrical and Computer Engineering at Illinois, and Mark Kushner, Director of the Michigan Institute of Plasma Science at the University of Michigan.



# Welcome New Students!

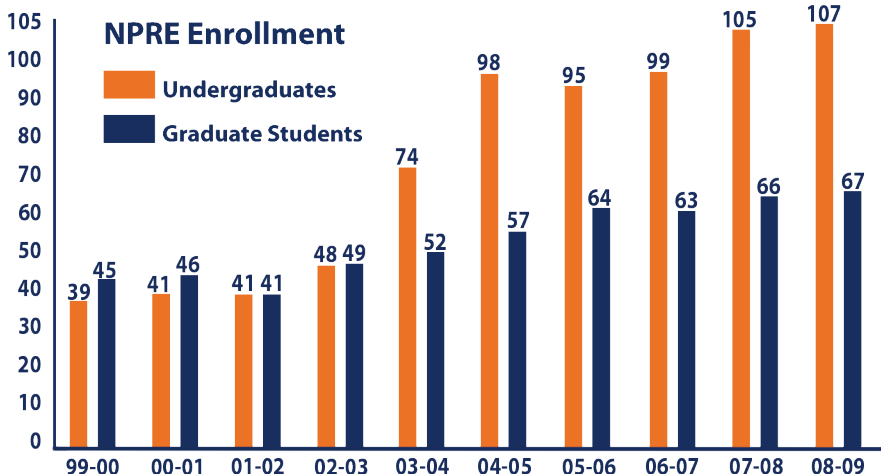
(NPRE welcomed classes of 40 new undergraduates and 18 new graduate students for the 08-09 academic year!)

## Undergraduate Students

- Carlos A. Altamirano, Davie, FL
- Harry W. Arnold, IV, McHenry, IL
- Ayesha Athar, Carol Stream, IL
- Valentyn Bykov, Prague, Czech Republic
- Lewis A. Conley, Palatine, IL
- Michael T. Cunningham, Chicago, IL
- Andrew R. Dodd, O'Fallon, IL
- Matthew S. Farrell, Arlington Heights, IL
- Peter R. Fifiis, Indian Head Park, IL
- John R. Frauenheim, Channahon, IL
- Michael J. Giganti, Romeoville, IL
- Nigel K. Grembowski, Woodstock, IL
- Andrew N. Groll, Harwood Heights, IL
- Jon B. Hansen, O'Fallon, IL
- George J. Isaac, Worcester, MA
- Matthew J. Jasica, Broomfield, CO
- Leigh A. Kesler, Rantoul, IL
- Kyle A. Lindquist, Lisle, IL
- Kevin Z. Luke, Chicago, IL
- Brooke L. McClure, Bourbonnais, IL
- Cody A. Morrow, Virden, IL
- Cameron K. Paulson, Loves Park, IL
- Matthew C. Peterson, Orland Park, IL
- Johnathan D. Roegge, Jacksonville, IL
- Jeff Sakurai, Vernon Hills, IL
- Kenneth A. Saunders, Princeton, IL
- Jeffrey M. Schappaugh, Petersburg, IL
- Daniel J. Sheehan, Chicago, IL
- Anastasia M. Shishkoff, Romeoville, IL
- Russell D. Smith, Washington, IL
- Ryan A. Switts, O'Fallon, IL
- Andrew C. Taylor, Champaign, IL
- Greg M. Thompson, Belleville, IL
- Niki S. Toloqi, Champaign, IL
- Cesar Vasquez, Moline IL
- Matthew J. Weberski, Spring Valley, IL
- Daniel R. Zeri, Yorkville, IL
- Daniel A. Nobbe, Champaign, IL
- Nikunj H. Raithatha, Kuwait
- Bruce R. Vahling, Stewardson, IL

## Graduate Students

- Rabie Abu Saleem, Jordan University of Science and Technology, Jordan
- Laith Al-Barakat, Jordan University of Science and Technology, Jordan
- Jill Anderson, University of Illinois at Urbana-Champaign (NPRE)



- James Bellinger, Ohio State University
- Liang Cai, University of Science and Technology, China
- Wei-Ying Chen, National Tsinghua University, Taiwan
- Neal Davis, Brigham Young University
- Mohamed ElBakhshwan, Alexandria University, Egypt
- Manas Gartia, Indian Institute of Technology, India
- Benjamin Holtzman, University of Illinois at Urbana-Champaign (NPRE)
- Robert Lofgren, University of Illinois at Urbana-Champaign (NPRE)

- Qiyue Lu, Tsinghua University, China
- Varunkumar Madhavan, University of Cincinnati
- Sabry Moustafa, Alexandria University, Egypt
- Zihao Ouyang, Peking University, China
- Harrison Pappas, University of Illinois at Urbana-Champaign (NPRE)
- Eric Reside, University of Illinois at Urbana-Champaign (NPRE)
- Wenyu Xu, University of Science and Technology, China

## Anderson took Washington, D.C., internship

NPRE graduate student Jill Anderson was chosen to spend nine weeks in Summer 2008 in Washington, D.C., participating in the public policy process and learning about the interrelation of engineering and policy issues.

The Washington Internships for Students of Engineering program is sponsored in part by the American Nuclear Society. Through it, interns meet with government agencies and non-governmental organizations, including the Nuclear Regulatory Commission, the Defense Nuclear Facilities Safety Board, and the National Institute of Standards and Technology, as well as individual experts from academia, industry and government.

Interns take information gained to address specific technology policy issues and present papers to an audience in the House Science Committee room. Anderson's paper, "Radiation: How to Address the Confusion," explained the need for educating the public about radiation. She outlined the process' benefits and applications in medicine, academia, food safety, security and power generation. She also emphasized the importance of informing the public about radiations risks in order to curb unnecessary fear. Anderson proposed specific steps to present the public with up-to-date information.



Jill Anderson





Doctoral student J'Tia Taylor with NPRE Department Head Jim Stubbins (middle) and Prof. Barclay Jones during a recent visit to Washington, D.C.

NPRE's Marvin E. Wyman and Felix T. Adler funds to help pay her costs for the Institute.

Affiliated with educational institutions in 30 nations, the WNU partnership has four Founding Supporters: the International Atomic Energy Agency, the Organization for Economic Cooperation and Development's Nuclear Energy Agency, the World Association of Nuclear Operators and the World Nuclear Association. WNU's mission is to enhance international education and leadership in the peaceful applications of nuclear science and technology.

## WNU Summer Institute selects Taylor as Fellow

NPRE graduate student J'Tia Taylor has been selected as a Fellow of the 2009 World Nuclear University Summer Institute, to be held July 5 through August 14 at the University of Oxford.

The Summer Institute is open to about 100 WNU Fellows from some 35 countries, selected from among young nuclear professionals who demonstrate strong leadership potential.

Fellows will participate in an intensive six-week program at Oxford's Christ Church College in the United Kingdom. World authorities on global environment and sustainable development, nuclear-related technology innovation, non-proliferation, and nuclear industry operations will present lectures and tutorials. The program will also include technical tours of nuclear and industrial facilities as well as cultural and social events.

Being chosen is an honor, Taylor said. "I learned about the World Nuclear University Summer Institute when two (NPRE) doctoral students, Maria Okuniewski and Federico Teruel, participated during the 2005 inaugural year," she said. "All former participants that I spoke with encouraged me to apply and touted the perspective gained. Our department has a very positive reputation and record of participation in this global event, and I am proud to represent our department, university and country."

NPRE Department Head Jim Stubbins previously had served as a mentor to the Institute's Fellows. Taylor will receive awards from



Lizette Sanchez

## Sanchez wins 2008 Schowalter Award

Undergraduate student Lizette Sanchez received the College of Engineering's 2008 William R. Schowalter Award.

Sanchez had served as Vice President of the Society of Hispanic Professional Engineers, and is a member of the American Nuclear Society student chapter. She was an undergraduate teaching assistant in Fall 2007, and

gained study abroad experience in Pisa, Italy, in Summer 2007. She served as a residential advisor for Illinois Connections in Engineering in Summer 2007, and worked as an intern for Exelon Corp. in Summer 2008.

The Schowalter Award recognizes outstanding scholastics, leadership abilities and extra-curricular activities. It is named for Bill Schowalter, Dean of the College of Engineering for a dozen years until his retirement in 2001.



## Masters: 2008 top CERL research assistant

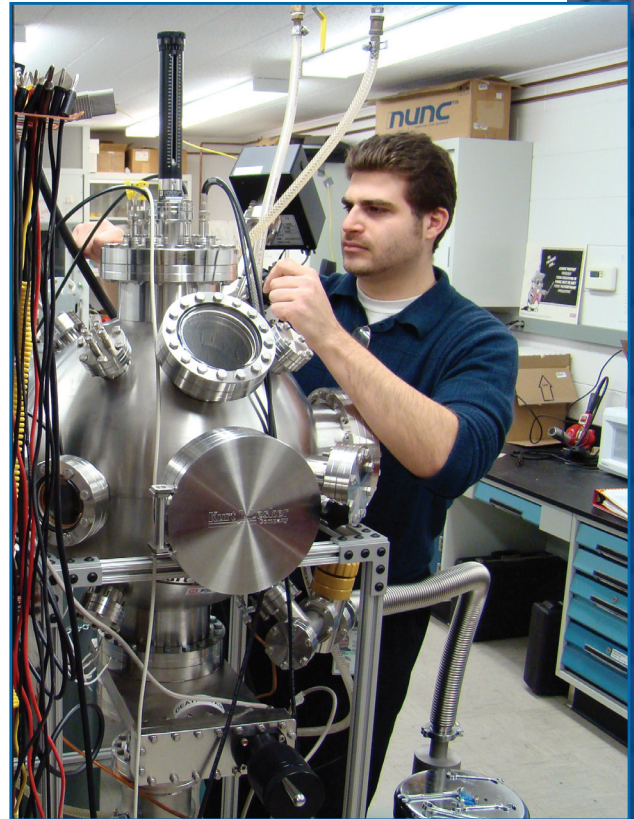
**N**PRE doctoral student Benjamin C. Masters has been chosen as the 2008 Research Assistant of the Year by the Construction Engineering Research Laboratory (CERL).

Working at CERL for the past year, Masters said his research involves ferroelectric plasma sources, materials that can autonomously maintain an electric polarization in the absence of an applied electric field. "They are analogous to ferromagnetic materials or 'permanent' magnets, e.g. refrigerator magnets, but with electric fields instead of magnetic fields," he explained.

Ferroelectrics, when used as a plasma source, are not particularly robust, and have a tendency to degrade quickly, Masters said. His research, then, has been to determine, characterize and understand these degradation methods during the materials' operation. He studies ways to make the sources stronger, more efficient and more reliable. Ferroelectric plasma sources have applications as cold-cathode electron/ion beam sources, pulsed plasma-based light sources, hazardous gas remediators and compact x-ray sources.

Masters' advisor is Dr. Charles P. Marsh, an NPPE adjunct professor, and a research scientist and program manager at CERL. Masters earned a master's degree in NPPE in 2007, and a bachelor's in Physics in 2003.

CERL is one of seven laboratories comprising the U.S. Army Engineer Research and Development Center, the research arm of the U.S. Army Corps of Engineers. The lab is co-located with the University of Illinois at Urbana-Champaign as an allied agency to share resources and collaborate on research and development for sustainable military installations.



*NPPE doctoral student Benjamin C. Masters at work at the Construction Engineering Research Laboratory (CERL).*

## Yun Recognized for Revamping Chinese Moon Festival GALA

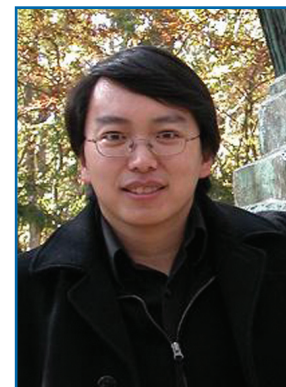
**T**he Vice Chancellor for Student Affairs awarded NPPE graduate student Di Yun the 2008 Joseph H. Smith student leadership award for contributions to the Chinese student community on the Urbana campus.

As Vice President of the Chinese Scholars and Students Association, Yun led in organizing Annual Moon Festival GALAs. Similar to Thanksgiving, the festival is a traditional holiday for the Chinese to celebrate the harvest with their families.

Yun introduced changes to the festival starting in 2006 to broaden across campus the cultural understanding and enjoyment of the celebra-

tion's entertainment.

New performances were added to the line-up, including Latin tango dances and hip-hop dances, as well as traditional Chinese programs. Yun also led in providing English captions of performed dialogues and transcripts so that viewers were aware of essential cultural backgrounds to add to their enjoyment of the shows. He also increased promotions with local media outlets, leading the 2006 and 2007 GALAs to drawing audiences of 1,400 each in Foellinger Auditorium.



*Di Yun*





*Ryan Craffey and Jim Stubbins*



*Robert Lofgren and Jim Stubbins*



*Drew Griffiths, Thomas Sowinski,  
Catherine Pritchard and Jim Stubbins*

## 2008 Award Winners, Student Recognitions

NPPE recognized about 70 students as well as several faculty members and alumni during the department's 2008 Honors Banquet. Following is a list of many of those honored and their awards:

- **Ryan J. Craffey of Spring Grove, Illinois:** NPPE Outstanding Academic Achievement Award, James Scholar, Dean's List, Nuclear Power Engineering Education Program (NPEEP) Scholarship; National Academy for Nuclear Training (NANT) Institute of Nuclear Power Operations Scholarship.
- **Robert E. Lofgren of Northbrook, Illinois:** NPPE Outstanding Undergraduate Research Award.
- **Joel M. Dixon of Glen Ellyn, Illinois:** NPPE Outstanding Undergraduate Research Award.
- **Drew G. Griffiths of Port Byron, Illinois:** NPPE Catherine Pritchard Undergraduate Scholarship; 2007-08 and 2008-09 Treasurer, American Nuclear Society (ANS), Student Chapter; NANT Scholarship.
- **Thomas E. Sowinski of Chicago, Illinois:** NPPE Catherine Pritchard Undergraduate Scholarship; NPEEP Scholarship; James Scholar; Dean's List; Spring 2008 Alpha Nu Sigma National Honor Society Initiate; 2008-09 Communications Officer, ANS Student Chapter.
- **Marshall O. Buroff of Palos Heights, Illinois:** NPPE Roy A. Axford Undergraduate Scholarship; James Scholar; Spring 2008 Alpha Nu Sigma National Honor Society Initiate; 2008-09 Website Committee Chair, ANS Student Chapter.
- **Joseph A. Lucido of Florissant, Missouri:** NPPE Roy A. Axford Undergraduate Scholarship.
- **David A. Burns of Urbana, Illinois:** NPPE George H. Miley LENR Undergraduate Scholarship; James Scholar; Dean's List; Chancellor's Scholar.
- **Jose E. Rivera of Berwyn, Illinois:** NPPE George H. Miley LENR Undergraduate Scholarship; NPEEP Scholarship; 2008-09 Social Committee Chair, ANS Student Chapter.
- **Benjamin A. Holtzman of Highland Park, Illinois:** ANS Student Chapter Undergraduate Outstanding Service Award; James Scholar; Dean's List; NPEEP Scholarship; NANT Scholarship; Alpha Nu Sigma National Honor Society Continuing Member; Retiring President, ANS Student Chapter.
- **Luke M. Gotszling of Huntington, New York:** ANS Student Chapter Graduate Student Outstanding Service Award; Dean's List; Alpha Nu Sigma National Honor Society Continuing Member.





- **Jonathan George of Bolingbrook, Illinois:** ANS National Sophomore Scholarship; Dean's List.
- **Stephen F. Kohlhase of Bloomington, Illinois:** Exelon Corporation Scholarship; NPEEP Scholarship; NANT Scholarship.
- **Lizette Sanchez of Chicago, Illinois:** Exelon Corporation Scholarship; College of Engineering William R. Schowalter Award; NPEEP Scholarship.
- **Eric J. Stein of Earlville, Illinois:** Exelon Corporation Scholarship; Dean's List; Spring 2008 Alpha Nu Sigma National Honor Society Initiate.
- **Scott D. Ramsey of Bloomington, Illinois:** U.S. Department of Energy Nuclear Engineering Fellowship; Alpha Nu Sigma National Honor Society Continuing Member.
- **Melissa A. Schear of Champaign, Illinois:** U.S. DOE Nuclear Engineering Fellowship; College of Engineering Support for Under-Represented Groups in Engineering (SURGE) Fellowship; Alpha Nu Sigma National Honor Society Continuing Member.
- **Carolyn A. Tomchik of Urbana, Illinois:** U.S. DOE Nuclear Engineering Fellowship; Alpha Nu Sigma National Honor Society Continuing Member.
- **J'Tia P. Taylor of Champaign, Illinois:** SURGE Fellowship; Alpha Nu Sigma National Honor Society Continuing Member; Retiring Communications Officer, ANS Student Chapter; 2008-2009 Vice President, ANS Student Chapter.
- **Marin Z. Racic of Bradenton, Florida:** National Science Foundation Graduate Research Fellowship.
- **Abdul-Qadim Alzalloum of Urbana, Illinois:** Sargent & Lundy Fellowship.
- **Richard A. Boettcher of Urbana, Illinois:** Chancellor's Scholar; James Scholar; NANT Scholarship; Alpha Nu Sigma National Honor Society Continuing Member; Retiring Webmaster, ANS Student Chapter.
- **Jennifer J. Ong of Glendale Heights, Illinois:** Chancellor's Scholar; Dean's List; Spring 2008 Alpha Nu Sigma National Honor Society Initiate,
- **Trifone F. Whitmer of Freeport, Illinois:** Chancellor's Scholar; James Scholar; Dean's List; NPEEP Scholarship.
- **Alalade O. Abayomi of Country Club Hills, Illinois:** NPEEP Scholarship.
- **Adam J. Bracke of Prophetstown, Illinois:** NPEEP Scholarship, 2008-2009 Outreach Committee Chair, ANS Student Chapter.
- **Kristin L. Chan of Naperville, Illinois:** NPEEP Scholarship, James Scholar.
- **Nada Y. Gohar of Naperville, Illinois:** NPEEP Scholarship.



Roy Axford, Marshall Buroff, Joseph Lucido and Jim Stubbins



David Burns, Jose Rivera, George Miley and Jim Stubbins



Benjamin Holtzman and Jim Stubbins





Luke Gotszling and Benjamin Holtzman



Abdul-Qadim Alzalloum and Dennis DeMoss of Sargent & Lundy<sup>LLC</sup>



Eric Stein, Lizette Sanchez,  
Bruce Rash of Exelon and Stephen Kohlhasse

## 2008 Award Winners

- **Rachael W. Jabusch of Mapleton, Illinois:** NPEEP Scholarship, NANT Scholarship; Dean's List; retiring Vice President, ANS Student Chapter.
- **Nathan P. Jurik of Orland Park, Illinois:** NPEEP Scholarship.
- **David K. Lartonoix:** NPEEP Scholarship; James Scholar. St. Lois MO
- **Cheuk Y. Lau of Des Plaines, Illinois:** NPEEP Scholarship; Dean's List; Spring 2008 Alpha Nu Sigma National Honor Society Initiate.
- **Jennifer M. Lilly of New Lenox, Illinois:** NPEEP Scholarship.
- **Jarred W. Meyers of Greenville, South Carolina:** NPEEP Scholarship.
- **Alexander W. Rehn of Flossmoor, Illinois:** NPEEP Scholarship; Dean's List; Spring 2008 Alpha Nu Sigma National Honor Society Initiate.
- **Jose R. Rico of East Moline, Illinois:** NPEEP Scholarship.
- **Stephanie E. Senjanin of Dundee, Illinois:** NPEEP Scholarship.
- **Trent W. Silver of Urbana, Illinois:** NPEEP Scholarship.
- **Justin K. Tanaka of Bloomington, Illinois:** NPEEP Scholarship; James Scholar.
- **Stephen W. Theis of Tinley Park, Illinois:** NPEEP Scholarship; James Scholar; Dean's List.
- **Piyum S. Zonooz of Carol Stream, Illinois:** NPEEP Scholarship; Dean's List.
- **Jennifer M. Gall of Naperville, Illinois:** NPEEP Scholarship; NANT Scholarship; Retiring Social Chair, ANS Student Chapter.
- **Alyssa L. Heydt of Champaign, Illinois:** NANT Scholarship.
- **Alex E. Prochaska of Rockford, Illinois:** NANT Scholarship; Dean's List.
- **David J. Gennardo of Woodridge, Illinois:** NANT Fellowship; Dean's List.
- **Jill P. Anderson of El Paso, Texas:** James Scholar; Alpha Nu Sigma National Honor Society Continuing Member.
- **Zachary J. Duncan of Bolingbrook, Illinois:** James Scholar.
- **Thomas V. Quinn of Orland Park, Illinois:** James Scholar; Spring 2008 Alpha Nu Sigma National Honor Society Initiate.
- **Lauren M. Coutant of Charleston, Illinois:** Dean's List.
- **Thomas Martino of Naperville, Illinois:** Dean's List.
- **Valerie L. Myers of Champaign, Illinois:** Dean's List.
- **Harrison K. Pappas of Los Alamos, New Mexico:** Dean's List.
- **Eric B. Reside of Bloomington, Illinois:** Dean's List.





- **Jason P. Ruzic of Tinley Park, Illinois:** Dean's List.
- **Frederick T. Manley of Stratham, New Hampshire:** Spring 2008 Alpha Nu Sigma National Honor Society Initiate.
- **Rebecca R. Romatoski of Woodbury, Minnesota:** Spring 2008 Alpha Nu Sigma National Honor Society Initiate.
- **Nicholas P. Szrama of Darien, Illinois:** Spring 2008 Alpha Nu Sigma National Honor Society Initiate.
- **Hitesh Bindra of Rohtak, India:** Alpha Nu Sigma National Honor Society Continuing Member.
- **Alan M. Bolind of Urbana, Illinois:** Alpha Nu Sigma National Honor Society Continuing Member.
- **Jianwei Hu of Champaign, Illinois:** Alpha Nu Sigma National Honor Society Continuing Member.
- **Prashant K. Jain of Mumbai, India:** Alpha Nu Sigma National Honor Society Continuing Member.
- **Wayne M. Lytle of Addison, Illinois:** Alpha Nu Sigma National Honor Society Continuing Member.
- **Stefano Markidis of Champaign, Illinois:** Alpha Nu Sigma National Honor Society Continuing Member.
- **Benjamin C. Masters of Northbrook, Illinois:** Alpha Nu Sigma National Honor Society Continuing Member.
- **Maria A. Okuniewski of Urbana, Illinois:** Alpha Nu Sigma National Honor Society Continuing Member.
- **Qinyang Rao:** Alpha Nu Sigma National Honor Society Continuing Member.
- **Michael P. Reilly of Oak Lawn, Illinois:** Alpha Nu Sigma National Honor Society Continuing Member.
- **Hyung Joo Shin of Champaign, Illinois:** Alpha Nu Sigma National Honor Society Continuing Member.
- **Michael A. Sorice of Elmhurst, Illinois:** Alpha Nu Sigma National Honor Society Continuing Member.
- **Steven A. Weiss of Downers Grove, Illinois:** Alpha Nu Sigma National Honor Society Continuing Member.
- **Bei Ye of Wuyi:** Alpha Nu Sigma National Honor Society Continuing Member.



2008 Alpha Nu Sigma Initiates



Paul Sefrane, local ANS, Drew Griffiths, Ryan Lenahan, J'Tia Taylor and Craig Pohlod, local ANS



ANS Student Chapter 08-09 officers: Ryan Lenahan, J'Tia Taylor, Drew Griffiths, Thomas Sowinski, Adam Bracke, Jose Rivera and Marshall Buroff





Marshall Buroff and Jim Stubbins



Eric Stein, Catherine Pritchard  
and Jim Stubbins



Jim Stubbins, Roy Axford, David  
Burns and Alexander Rehn

## 2009 Award Winners, Student Recognitions

NPRE recognized almost 90 students as well as several faculty members and alumni during the department's 2009 Honors Banquet. Following is a list of students honored and their awards:

- **Carlos A. Altamirano of Davie, Florida:** American Nuclear Society 2009-2010 Student Chapter Communications Officer; Nuclear Power Engineering Education Program (NPEEP) Scholarship
- **Jill P. Anderson of El Paso, Texas:** Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Harry W. Arnold IV of McHenry, Illinois:** NPEEP Scholarship; Fall 2008 Dean's List
- **Ayesha Athar of Carol Stream, Illinois:** Nuclear Regulatory Commission (NRC) Nuclear Engineering Education Scholarship; NPEEP Scholarship; James Scholar; College of Engineering W&E Ackerman Scholarship
- **Eric M. Becker of Downers Grove, Illinois:** ANS 2009-2010 Student Chapter Outreach Committee Chair
- **Joseph R. Bernhardt of Bloomington, Illinois:** NRC Nuclear Engineering Education Scholarship; Fall 2008 Dean's List
- **Hitesh Bindra of Rohtak, India:** Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Richard A. Boettcher of Urbana, Illinois:** ANS 2009-2010 Student Chapter Website Committee Chair; National Academy for Nuclear Training Institute of Nuclear Power Operations (NANT INPO) Scholarship; U.S. Department of Energy Nuclear Engineering and Health Physics Scholarship; James Scholar; Alpha Nu Sigma Society Spring 2009 Continuing Member; Chancellor's Scholar
- **Alan M. Bolind of Urbana, Illinois:** Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Adam J. Bracke of Prophetstown, Illinois:** NPEEP Scholarship; NANT INPO Scholarship
- **Dieter B. Brommer of Exeter, New Hampshire:** NRC Nuclear Engineering Education Scholarship; Fall 2008 Dean's List
- **Marshall O. Buroff of Palos Heights, Illinois:** NPPE Outstanding Academic Achievement Award to a Graduating Senior; James Scholar; Fall 2008 Dean's List; Alpha Nu Sigma Society Spring 2009 Continuing Member
- **David A. Burns of Urbana, Illinois:** Roy A. Axford Undergraduate Scholarship, George H. Miley LENR Undergraduate Scholarship; James Scholar; Fall 2008 Dean's List; Alpha Nu Sigma Society Spring 2009 Initiate; Chancellor's Scholar
- **Michael K. Collins of Orland Park, Illinois:** NPEEP Scholarship
- **Lewis A. Conley of Palatine, Illinois:** NPEEP Scholarship
- **Jacob Coutre of Colchester, Illinois:** Alpha Nu Sigma Society Spring 2009 Initiate



- **Michael T. Cunningham of Chicago, Illinois:** NPEEP Scholarship
- **Neal E. Davis of Provo, Utah:** NRC Nuclear Engineering Education Fellowship
- **Anastasios Deligiannis of Athens, Greece:** Alpha Nu Sigma Society Spring 2009 Initiate
- **Zachary J. Duncan of Bolingbrook, Illinois:** NPEEP Scholarship
- **Matthew S. Farrell of Arlington Heights, Illinois:** NPEEP Scholarship; James Scholar; Fall 2008 Dean's List; Chancellor's Scholar
- **Peter R. Fiflis of Indian Head Park, Illinois:** NRC Nuclear Engineering Education Scholarship; NPEEP Scholarship; James Scholar; Fall 2008 Dean's List; Chancellor's Scholar; College of Engineering W&E Ackerman Scholarship
- **Nicholas R. Florence of Chicago, Illinois:** Alpha Nu Sigma Society Spring 2009 Initiate
- **John R. Frauenheim of Channahon, Illinois:** NPEEP Scholarship; James Scholar; Fall 2008 Dean's List
- **Manas R. Gartia of Attabira, India:** Sargent & Lundy Fellowship
- **David J. Gennardo of Woodridge, Illinois:** Alpha Nu Sigma Society Spring 2009 Initiate
- **Jonathan George of Bolingbrook, Illinois:** ANS National 2009-2010 Undergraduate Scholarship, NRC Nuclear Engineering Education Scholarship; James Scholar; Fall 2008 Dean's List; Alpha Nu Sigma Society Spring 2009 Initiate
- **Michael J. Giganti of Romeoville, Illinois:** NPEEP Scholarship; James Scholar
- **David E. Ginsburg of Wausau, Wisconsin:** NPEEP Scholarship; Fall 2008 Dean's List
- **Nada Y. Gohar of Naperville, Illinois:** NPEEP Scholarship
- **Nigel K. Grenbowski of Woodstock, Illinois:** NPEEP Scholarship
- **Drew G. Griffiths of Port Byron, Illinois:** ANS Student Chapter Undergraduate Outstanding Service Award; NANT INPO Scholarship
- **Andrew N. Groll of Harwood Heights, Illinois:** NPEEP Scholarship; James Scholar; Fall 2008 Dean's List
- **Timothy P. Grunloh of Teutopolis, Illinois:** NRC Nuclear Engineering Education Scholarship; James Scholar; Fall 2008 Dean's List; Alpha Nu Sigma Society Spring 2009 Initiate
- **Jon B. Hansen of O'Fallon, Illinois:** NRC Nuclear Engineering Education Scholarship, NPEEP Scholarship; James Scholar; Chancellor's Scholar; College of Engineering W&E Ackerman Scholarship
- **Benjamin A. Holtzman of Highland Park, Illinois:** NRC Nuclear Engineering Education Fellowship; Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Jianwei Hu of Champaign, Illinois:** Alpha Nu Sigma Society Spring 2009 Continuing Member
- **George J. Isaac of Worcester, Massachusetts:** James Scholar; Fall 2008 Dean's List
- **Prashant Jain:** Alpha Nu Sigma Society Spring 2009 Continuing Member



*Jim Stubbins, George Miley and David Burns*



*Jim Stubbins, Drew Griffiths and Ryan Lenahan*



*Jim Stubbins, J'Tia Taylor and Ryan Lenahan*

Students





*Jim Stubbins, Andrea Medlock of Exelon, Ed McVey of Exelon, Bill Green of Exelon, Alexander Rehn and Brian Kleinfeldt*



*ANS Student Chapter Officers, back from left: Carlos Altamirano; Jose Rivera; Cody Morrow; front from left: Eric Stein, Eric Becker, Richard Boettcher*

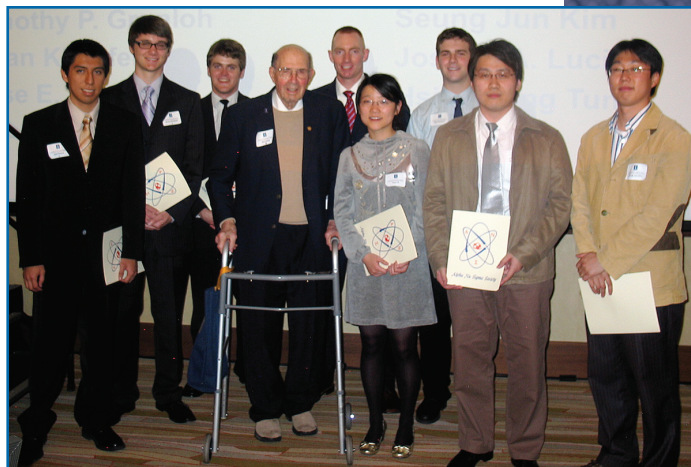
## 2009 Award Winners

- **Matthew J. Jasica of Broomfield, Colorado:** NRC Nuclear Engineering Education Scholarship, NPEEP Scholarship; James Scholar; Fall 2008 Dean's List; Chancellor's Scholar; College of Engineering E&I Hussemann Memorial Scholarship
- **Nathan P. Jurik of Orland Park, Illinois:** NPEEP Scholarship
- **Leigh A. Kesler of Rantoul, Illinois:** NRC Nuclear Engineering Education Scholarship; James Scholar; Fall 2008 Dean's List; Chancellor's Scholar; NPEEP Scholarship; College of Engineering W&E Ackerman Scholarship
- **Seung Jun Kim of Seoul, Korea:** Alpha Nu Sigma Society Spring 2009 Initiate
- **Brian Kleinfeldt of Flossmoor, Illinois:** NRC Nuclear Engineering Education Scholarship; Exelon Scholarship; Fall 2008 Dean's List; Alpha Nu Sigma Society Spring 2009 Initiate
- **Stephen F. Kohlase of Bloomington, Illinois:** NPEEP Scholarship; NANT INPO Scholarship; U.S. DOE Nuclear Engineering and Health Physics Scholarship; Fall 2008 Dean's List
- **Zachary D. Kriz of Eden Prairie, Minnesota:** NPEEP Scholarship
- **Kyle A. Lindquist of Lisle, Illinois:** NPEEP Scholarship; James Scholar
- **Joseph A. Lucido of Florissant, Missouri:** Fall 2008 Dean's List; Alpha Nu Sigma Society Spring 2009 Initiate
- **Wayne M. Lytle of Addison, Illinois:** Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Frederick T. Manley of Stratham, New Hampshire:** Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Stefano Markidis of Champaign, Illinois:** Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Benjamin C. Masters of Northbrook, Illinois:** Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Brooke L. McClure of Bourbonnais, Illinois:** NPEEP Scholarship; James Scholar; NRC Nuclear Engineering Education Scholarship; Fall 2008 Dean's List; Chancellor's Scholar; College of Engineering DeZwarte Endowed Scholarship
- **Jarred W. Meyers of Greenville, South Carolina:** NPEEP Scholarship
- **Cody A. Morrow of Virden, Illinois:** ANS 2009-2010 Student Chapter Treasurer; NPEEP Scholarship
- **Aaron J. Oaks of Brea, California:** NRC Nuclear Engineering Education Fellowship
- **Cameron K. Paulson of Loves Park, Illinois:** NPEEP Scholarship
- **Ian M. Percel of Chicago, Illinois:** Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Matthew C. Peterson of Orland Park, Illinois:** NPEEP Scholarship; James Scholar
- **Thomas V. Quinn:** Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Alexander W. Rehn of Flossmoor, Illinois:** Roy A. Axford Undergraduate Scholarship; Alpha Nu Sigma Society Spring 2009 Continuing Member, NRC Nuclear Engineering Education Scholarship; Exelon Scholarship; NPEEP Scholarship
- **Eric Reside of Bloomington, Illinois:** NANT INPO Fellowship
- **Michael P. Reilly of Oak Lawn, Illinois:** Alpha Nu Sigma Society Spring 2009 Continuing Member





- **Jose E. Rivera of Berwyn, Illinois:** ANS 2009-2010 Student Chapter President; NPEEP Scholarship; Alpha Nu Sigma Society Spring 2009 Initiate
- **Johnathan D. Roegge of Jacksonville, Illinois:** NPEEP Scholarship; James Scholar
- **Lizette Sanchez of Chicago, Illinois:** NPEEP Scholarship
- **Kenneth A. Saunders of Princeton, Illinois:** NPEEP Scholarship; Fall 2008 Dean's List
- **Jeffrey M. Schappaugh of Petersburg, Illinois:** NPEEP Scholarship; Fall 2008 Dean's List
- **Melissa A. Schear of Champaign, Illinois:** U.S. DOE Nuclear Engineering Continuing Fellowship; College of Engineering Support for Under-Represented Groups in Engineering (SURGE) Fellowship
- **Daniel J. Sheehan of Chicago, Illinois:** NPEEP Scholarship; James Scholar; Fall 2008 Dean's List
- **Hyung Joo Shin of Champaign, Illinois:** Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Anastasia M. Shishkoff of Romeoville, Illinois:** NPEEP Scholarship
- **Patrick E. Sloan of Alton, Illinois:** College of Medicine at Illinois Hazel I Craig Summer Fellowship
- **Michael A. Sorice of Elmhurst, Illinois:** Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Thomas E. Sowinski of Chicago, Illinois:** NPEEP Scholarship; NANT INPO Scholarship; U.S. DOE Nuclear Engineering and Health Physics Scholarship; James Scholar; Fall 2008 Dean's List; Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Eric J. Stein of Earlville, Illinois:** ANS 2009-2010 Student Chapter Vice-President; Catherine Pritchard Undergraduate Scholarship; ANS National Robert T. "Bob" Liner Scholarship; – Nuclear Regulatory Commission Nuclear Engineering Education Scholarship; NANT INPO Scholarship; Fall 2008 Dean's List; Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Ryan A. Switts of O'Fallon, Illinois:** NPEEP Scholarship; James Scholar; Fall 2008 Dean's List
- **Justin K. Tanaka of Bloomington, Illinois:** NPEEP Scholarship
- **Andrew C. Taylor of Champaign, Illinois:** NPEEP Scholarship; World Nuclear Association University Summer Institute Fellowship; James Scholar
- **J'Tia P. Taylor of Champaign, Illinois:** ANS Graduate Outstanding Service Award; – NRC Nuclear Engineering Education Fellowship; Alpha Nu Sigma Society Spring 2009 Continuing Member; SURGE Fellowship
- **Carolyn A. Tomchik of Urbana, Illinois:** U.S. DOE Nuclear Engineering Continuing Fellowship; Alpha Nu Sigma Society Spring 2009 Continuing Member
- **John R. Tramm of Wilmette, Illinois:** Fall 2008 Dean's List
- **Hsiao-Ming Tung of Taipei, Taiwan:** Alpha Nu Sigma Society Spring 2009 Initiate
- **Cesar Vasquez of Moline, Illinois:** NPEEP Scholarship
- **Chen Xi of Beijing, China:** Alpha Nu Sigma Society Spring 2009 Initiate
- **Bei Ye of Wuyi, China:** Alpha Nu Sigma Society Spring 2009 Continuing Member
- **Daniel R. Zeri of Yorkville, Illinois:** NPEEP Scholarship
- **Piyum S. Zonooz of Carol Stream, Illinois:** NPEEP Scholarship



*Alpha Nu Sigma Society Spring 2009 Initiates*

students



*Back from left, Paul Sefranek and Craig Pohlod of the local American Nuclear Society chapter; front, from left, Adam Bracke, Eric Becker, Jacob Coutre and Tom Sowinski*





## ANS students show fusion, nuclear power at EOH09

The American Nuclear Society student chapter earned 2nd place in the 2009 Engineering Open House "Technical Encore" category for the group's Fusion Technologies presentation. ANS also entered a nuclear power presentation.

The plasma fusion exhibit consisted of a power point presentation describing what plasmas are and how fusion works. It also explained ITER and other global fusion experiments, as well as experiments conducted on campus at the Nuclear Radiation Laboratory.

The presentation featured two demonstrations: the can crusher and the DC flow.

The can crusher worked by discharging a fully charged capacity into a ring of wire inducing a magnetic field and causing it to crush an ordinary pop can.

The DC glows consisted of two charged plates confined in a tube filled with argon gas. A stream of electrons passed between the plates causing the gas to glow, forming plasma.

The nuclear power exhibit also consisted of a power point presentation describing nuclear power and giving

*ANS student chapter members prepare the mousetrap box for a demonstration, then step back as a young visitor to Engineering Open House sets off a reaction.*

statistics about nuclear power worldwide. The presentation discussed radiation and its applications in the world x-rays and medical other medical uses, food irradiation, and common radioactive sources found anywhere from bananas to cosmic radiation.

Several demonstrations were performed during this exhibit.

The first was called a "mousetrap reactor". It featured a 2 foot by 4 foot by 2 foot plexiglass box containing 100 primed mousetraps. On each mousetrap was a ping pong ball. A chain reaction, mimicking that in a nuclear reactor core, would start when a ping pong ball would be dropped through a hole in the box's top, setting off the mousetraps.

The second demonstration for the power exhibit dealt with radiation. Students used a  $\text{Co}^{60}$  and a  $\text{Pb}^{210}$  source and a Geiger counter to show how effectively radiation can be shielded using lead, iron, and plexiglass. The students also used fiestaware and an ordinary smoke detector to show radiation emissions.

A third demonstration showed how heating salt causes it to emit gamma radiation.

*For more information on the ANS at Illinois student chapter, go to <http://groups.google.com/group/ANS-uiuc>.*



# DOE awards \$1.5 million support for Illinois Next Generation research

A group of University of Illinois' researchers led by Jim Stubbins, professor and head of the Department of Nuclear, Plasma, and Radiological Engineering, have been awarded nearly \$1.5 million from the U.S. Department of Energy for research in developing the next generation of nuclear plants.

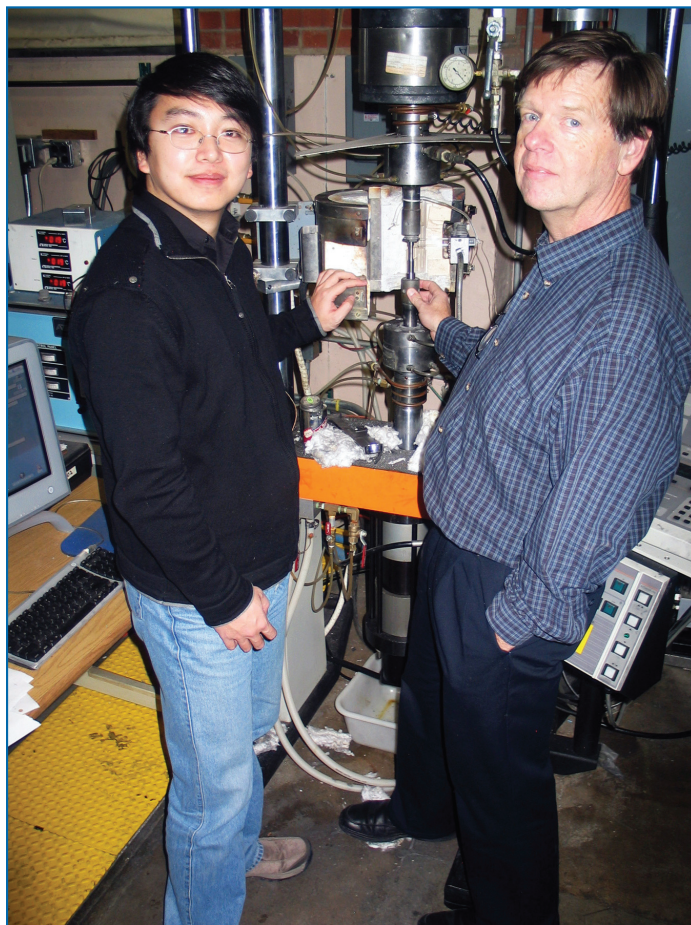
The new high-temperature, gas-cooled nuclear plants are designed to be efficient, "green" energy producers. The nuclear plants will be used to produce hydrogen very efficiently. When burned, the plants' hydrogen gas fuel will mix with the atmosphere to produce water vapor, a more ecologically-friendly byproduct than the carbon dioxide that fossil fuel plants produce.

The first of the next generation plants is scheduled to be operational by the year 2016. Before such plants can be built, however, researchers need to understand the damage the plants' high temperatures and corrosive environments will have on structural materials, such as piping and energy exchange equipment. The scientists can then develop models to define limits for the materials' applications.

Collaborating with Stubbins in the three-year project, "Understanding Fundamental Material Degradation Processes in High Temperature Aggressive Chemomechanical Environments," are Huseyin Sehitoglu and Petros Sofronis, mechanical science and engineering, Andrew Gewirth, chemistry, and Ian Robertson, materials science and engineering. The multidisciplinary proposal from Illinois received the highest level of funding among the recently announced DOE projects.

By helping to develop the next generation of advanced nuclear technologies, the DOE's Nuclear Energy University Program is expected to play a key role in addressing the global climate crisis and moving the nation toward greater use of nuclear energy.

"As a zero-carbon energy source, nuclear power must be part of our energy mix as we work towards energy independence and meeting the challenge of global warming," said DOE Secretary Steven Chu. "The next generation of nuclear power plants--with the highest standards of safety, efficiency and environmental protection--will require the latest advancements in nuclear science and technology."



NPRE graduate student Di Yun and Jim Stubbins in the lab.

James F. Stubbins' home page:

<http://www.ne.uiuc.edu/faculty/stubbins.php>





(ABOVE) If you're not careful, smoke can get in your eyes in David Ruzic's class, NPRE 101: Introduction to Energy Sources. Ruzic likes to give dramatic demonstrations in explaining that energy is the rearrangement of chemical or nuclear bonds into a more stable state. (BELOW) Ruzic prepares to "blow up" a balloon filled with hydrogen gas.



## NPRE 101: Having fun; blowing stuff up

### *Theatrics help teach students about energy*

**A**s the students settled into their seats and got ready for class to begin in the big lecture room in Mumford Hall, their professor, David N. Ruzic, did a puzzling thing: he exited the room.

Soon, teaching assistant David Burns demanded the class' attention: "Welcome," announced Burns, "to the Master of Molecules, the Sultan of Science, the Ringleader of Radiation — Professor Daaaaavid Ruuuuzic!" Then, with a pop and a bang and a puff of smoke, Ruzic re-entered, all smiles, all energy, to begin the class on energy.

So started the semester for the students of NPRE 101: Introduction to Energy Sources. Making a point that energy is the rearrangement of chemical or nuclear bonds into a more stable state, Ruzic amused the students by exploding balloons filled with hydrogen gas, and sending an electrical current climbing up a Jacob's Ladder.

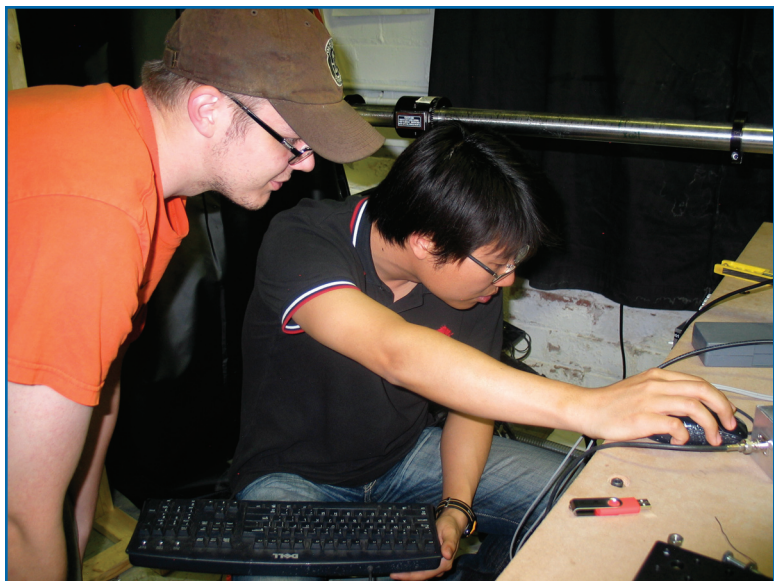
Saying of himself that he "really enjoys teaching and tries to blow something up during every lecture," Ruzic's flair for drama infects his students with his passion for the subject. The expert in experimental fusion research and plasma technology development frequently speaks to groups through programs such as Illini Days, World Youth in Science and Engineering, Scholars Day, and more.

At the beginning of the Spring 2009 semester, Ruzic and his class were being filmed for a "geek out" video. CBS News Production had requested the University of Illinois submit short video takes for a new weekly science news show the company plans to air on Friday nights on Discovery's Science Channel. The video of Ruzic and his class was offered to CBS.

This wasn't Ruzic's first venture into the world of filming. He was picked for the fall 2008 airing of the Discovery Channel's *Weird Connections* program, which featured his plasma research in a segment entitled, "Great Balls of Fire." Ruzic demonstrated plasma confined by magnetic fields and the energy loss and erosion caused when plasma balls hit the wall of a nuclear fusion experiment. That program ran late last fall.

David N. Ruzic's home page:  
[www.ne.uiuc.edu/faculty/ruzic.php](http://www.ne.uiuc.edu/faculty/ruzic.php)





*NPRE students J.R. Sporre, right, and Hyung Joo Shin work on a project in NPRE Prof. David Ruzic's Center for Plasma Material Interactions Laboratory. Sporre, now a graduate student, was one of the many undergraduates that Ruzic introduced to research work. He said of the experience, "I suddenly found myself fully committed to performing my best to meet and exceed expectations."*

## Ruzic Earns Undergraduate Research Award

In his two-dozen years as an NPRE faculty member, Prof. David N. Ruzic has recruited hundreds of undergraduates to work in his laboratories.

"I believe that an engineering undergraduate education isn't complete unless a student is immersed in the actual creation of engineering knowledge and immersed in applying that knowledge to real world problems," Ruzic said. "I do that immersion through hiring as many undergraduate research assistants as possible and integrating them into my teams. I also pay them – a critical part of engaging the student and encouraging responsibility."

This dedication to expanding research opportunities for undergrads is now being recognized campus-wide. Ruzic has been chosen to receive the 2009 Campus Award for Excellence in Guiding Undergraduate Research.

Ruzic has been chosen to receive the 2009 Campus Award for Excellence in Guiding Undergraduate Research.


Ruzic's peers selected him for the award, designed to foster and to reward excellence in involving and guiding undergraduate students in scholarly research. The award will be presented April 29 during the Celebration of Teaching Excellence at the Alice Campbell Alumni Center.

The Center for Plasma Materials Interactions, which Ruzic directs, provides plenty of opportunities for undergraduate research. The Center's group studies particle-surface interactions relevant to fusion power and materials processing systems through a combination of computational and experimental means.

Ruzic's purpose in employing undergrads in the labs is to give them an educational experience. "At first a new student may merely act as a 'gopher' or a spare set of hands on a variety of projects," he said. "After the student has a better understanding of the different labs, she or he is moved to a particular project where she or he starts taking on a specific set of responsibilities."

This was the case for J.R. Sporre, who earned his bachelor's in NPRE in 2007 and is now a graduate student in the department. Sporre said he moved quickly from his initial job of sorting nuts and bolts to more complicated tasks involving extreme ultraviolet light lithography. The earlier work prepared him for a more challenging experience: spearheading the construction and operation of an ion-measuring device to be shipped to and set up at the University College of Dublin in Ireland.

Said Sporre, "I performed admirably on my task, and over winter break Dr. Ruzic awarded me the opportunity to fly to Ireland under the guidance of a post-doc and successfully take ion-debris measurements of a laser-produced plasma. This experience capped the transformation of my work habits, as I suddenly found myself fully committed to performing my best to meet and exceed expectations."

Wayne Lytle, another NPRE undergrad turned graduate student, also appreciated the mentoring Ruzic provided. "Through his guidance and explanations, as well as his close ties with industry and national labs, which spurred other engineering internships for me, his advising and research guidance was of the utmost importance to me and one of the major reasons why I chose to become a graduate student at UIUC." 



# Singer wins Sheth Faculty Award for international work

Clifford E. Singer, an NPRE professor and expert on international security and energy issues, is the 2008 winner of the Madhuri and Jagdish N. Sheth Distinguished Faculty Award for International Achievement.

The honor recognizes Singer's prominence in the field of nuclear proliferation, eight-year appointment as Director of the Arms Control, Disarmament, and International Security (ACDIS) Program, and his service on the University of Illinois campus and abroad. International Programs and Studies presented the award at the Spring 2009 International Achievement Awards Banquet. Said Singer of the honor, "This emphasizes that the University of Illinois recognizes interdisciplinary work and public engagement."

Singer has devoted his career to issues of reducing nuclear weapons production, understanding the elements of global warming and providing alternatives, and encouraging negotiations to prevent wars over oil supplies. In doing so, he has traveled the world, engaging national and international scientists and political leaders in discussions to iron out their differences and work together for peaceful solutions.

Among his notable accomplishments was the 1997 article in *Washington Quarterly*, "Look Before You Leap: Practicable Steps Towards Nuclear Arms Reduction." Translated into Chinese, French, German, Japanese, and Russian, the article led to Singer's inclusion in the Committee on Nuclear Policy that the Carnegie Endowment for International Peace organized. Singer also supervised and conducted research on the use of enriched uranium for naval propulsion. His work resulted in a proposed solution for a broadened moratorium on new nuclear weapons construction involving India and Pakistan.

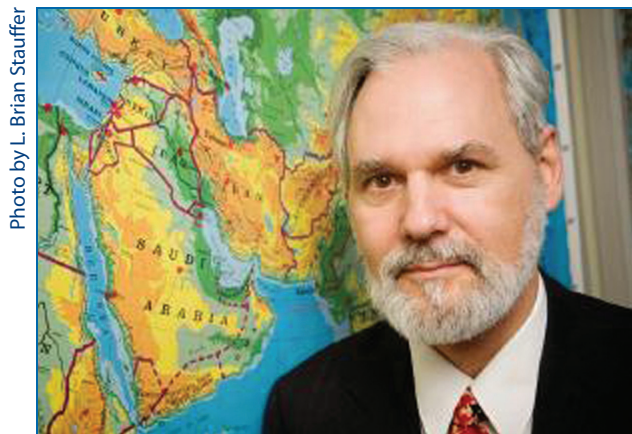
He was the lead author in 2008 on "Probability Distributions for Carbon Emissions and Atmospheric Response in Climatic Change." This work was the first data-calibrated probabilities analysis of future carbon fuel emissions.

One of his latest efforts has been the 2008 book, *Energy and International War: From Babylon to Baghdad and Beyond*. The book details how the world learned to avoid war over coal and iron and can learn similar lessons about oil and other natural resources.

Singer began his work for ACDIS in 1986 and was Director from 1998 to 2005.

His work involved collaborating with a dozen visiting scholars from India, Pakistan, Bangladesh, and China. Singer taught mid-career security professionals in three international summer schools in China and South Asia. He also supervised and extended a U.S. Air Force National Defense Fellows program, reviewing work on topics as disparate as social stability in Eastern Europe, military uses of outer space, and the ethics of the use of military force.

Earning his bachelor's in mathematics at the University of Illinois in 1966 when he was just 17 years old, Singer followed with PhD studies in biochemistry at the University of California-Berkeley. His work there and as a postdoc at the Massachusetts Institute of Technology led to Singer's lifelong interest in security implications of synthetic genomics. During the 2005-06 academic year, while working at the American Association for the Advancement of Science Center for Science, Technology, and Security Policy, Singer provided the first policy briefings in the center's efforts to reduce the chance of a global pandemic based on illicit gene synthesis.



Clifford E. Singer

Clifford E. Singer's home page:

[www.ne.uiuc.edu/faculty/singer.php](http://www.ne.uiuc.edu/faculty/singer.php)



## Singer claims military action ineffective in controlling oil

By Andrea Lynn, Humanities Editor, U of I News Bureau

There is another inconvenient truth about finite resources and human behavior on Planet Earth, an expert on international security and energy says. Trying to influence oil supply with military force in the Middle East is not only ineffective, but also counterproductive.

So says NPRE and political science Prof. Clifford Singer, who has done extensive work on energy systems for the U.S. Department of Energy.

Singer's latest analyses show that despite the deep-seated perception that oil-producing regions retain a special strategic importance, with strong effects on U.S. defense planning and strategy, "The time has already passed when oil was strategically important enough to require individual industrialized nations to be prepared to intervene militarily in oil-producing regions."

Singer explains his findings in a policy analysis brief he recently published for the Stanley Foundation, titled "Oil and Security." The brief was based on research Singer conducted for his book, *Energy and International War: From Babylon to Baghdad and Beyond*.

The works in question address the widespread belief that the U.S. needs to maintain military capability to intervene unilaterally in the Middle East, because the oil in that region makes it strategically important. "This idea persists even though the invasion of Iraq resulted in reduced oil production and higher oil prices for many years."

Oil prices also increased dramatically when the United States intervened to tip the balance in the 1973 Arab-Israeli War. Oil prices remained even higher while the United States helped Iraq prolong the Iran-Iraq War.

According to Singer, higher prices do not themselves cause overall problems in the global economy. "As increases in exporters' petrodollar earnings recycled through the global economy, the global sum of the local purchasing power of gross domestic products continued to grow at an annual average rate of 3 percent during the high oil prices years of 1973 to 1986."

By 2003, the U.S. ratio of use of oil to GDP was half of what it was in the 1970s, and the GDPs of the United States and other major oil importers "have continued to grow despite a recurrence of high oil prices."

Singer said that U.S. energy currently relies on a combination of subsidies and tax breaks, regulatory mandates, and petroleum end-product taxes aimed at reducing the fraction of oil that comes from imports. "This policy has three fundamental flaws," he said. "One: It is piecemeal, thus leaky. Two: Its most economically effective components are politically unpalatable. Three and most importantly: It ducks the need for effective international cooperation in dealing with OPEC (Organization of Petroleum Exporting Countries)."

Meanwhile, he said, U.S. subsidies and tax breaks for alternatives to oil imports increase energy use. "This applies to a variety of measures, like exempting ethanol from motor fuel taxes and domestic oil depletion allowances," he said.

"Regulatory mandates like corporate average fuel economy standards for automobiles and light trucks and minimum ethanol content in gasoline reduce oil use only in part of the economy. The net effect is to encourage the use of more petroleum for economic sectors that escape regulation, such as heavy trucking, aviation, heating and petrochemical feedstock. Taxing the petroleum industry end products like gasoline has a similar effect."

Singer suggests two major policy "opportunities" that have "profound implications for all developed and rapidly developing countries":

- U.S. defense and national security strategy should be reshaped so as to uniformly avoid unilateral military interventions in international or internal conflicts "solely or primarily for the purpose of influencing who has control over energy resources."
- Major importers of petroleum and petroleum products should impose import tariffs that "continue to rise until a mutually acceptable agreement on stabilizing petroleum prices is reached with OPEC." This agreement with OPEC should involve not only the United States, but also "a broad coalition of major energy users throughout the globe, ensuring truly consistent, systemic change in global financial and trade practices."

Singer said Congress should immediately pass a punitive tariff on crude and refined petroleum from members in good standing in OPEC, and any other exporting countries that "conspire to maintain prices several times higher than the cost of exploration and production."



## Playing the nuclear game

By Mary Timmins, BS '99,

It's the video box you play as though people's lives depended on it – because one day they may.

So, watch those radiation levels, and head for the containment chamber.

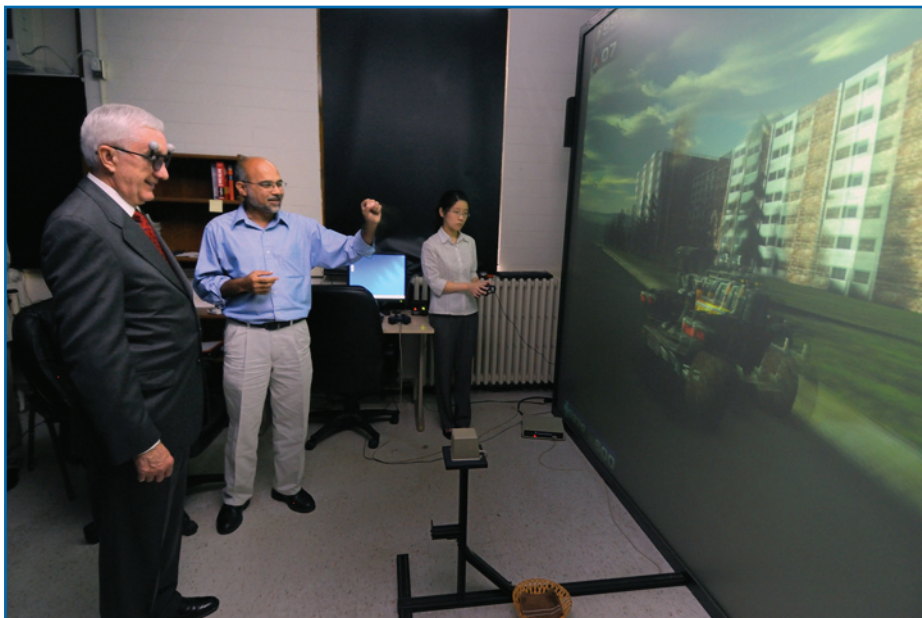
Virtual reality nuclear reactors being developed at the University of Illinois pose users with the potential threats and hazards of this real-world territory, using technology that will one day be invaluable in promoting nuclear emergency preparedness.

To create the simulations, Rizwan Uddin, MS '83 ENG, PHD '87 ENG, UI professor of nuclear, plasma and radiological engineering, deploys video-game technology and a high-resolution immersive environment like that in the vaunted CAVE at the University of Illinois' Beckman Institute on the Urbana-Champaign campus. Under way for the past two and a half years, the professor's research has been supported by the Nuclear Regulatory Commission and the U.S. Department of Energy, with input from Exelon, a large electric utility company based in Chicago. As well as the reactor environment, other simulations Uddin has developed with gaming technology include color-coded visualizations of nuclear processes at the atomic level.

Projected on a wall-sized screen in Uddin's lab, the virtual reactor goes 3-D when "players" don special glasses (a high-tech version of the flimsy spectacles – one lens red, the other blue – that got handed out at "Creature from the Black Lagoon" and other 3-D horror movies of the 1950s). Using joysticks, the players negotiate through a reactor building, moving from parking lot to outer offices and on to the pump room and the containment chamber.

One simulation is based on photographs and measurements taken from the former Nuclear Reactor Building and the now decommissioned TRIGA nuclear reactor on the Urbana campus. Another is modeled on a functioning nuclear facility. The simulations are interactive, allowing up to 24 players to engage online in teams, dealing with fires, radioactive spills and other hazards. One player will start a fire, Uddin explained, "and then we see how long it takes a second person to react." Finding and using the fire extinguisher is like finding and using a weapon in a regular video game. Colored areas show radiation hot spots. The avatar darting past, who looks like a video-game assassin, is a power company employee. There's even a "health meter" showing each player his or her radiation exposure level. The video-game aura of unreality and claustrophobia, of not knowing what's going to happen next, lends itself well to the imagined ordeal of entering a nuclear facility where emergency situations could occur.


Yes, it's about more than fun and games. Interest in nuclear energy is surging – inspired by its potential as a low-cost



Dale Klein, left, chairman of the U.S. Nuclear Regulatory Commission, views a computer simulation through 3-D glasses in the laboratory of UI nuclear engineering professor Rizwan Uddin, center. Graduate student Chen Xi is controlling the program. She and other graduate students work with Uddin to develop virtual reality programs, including training tools for dealing with nuclear reactor emergencies. The demonstration took place in September, during the 50th anniversary celebration of the UI Department of Nuclear, Plasma and Radiological Engineering.



alternative to fossil fuels. But caution is paramount, as became apparent from the near-disaster in 1979 at Pennsylvania's Three-Mile Island nuclear power station and the 1986 Chernobyl reactor cataclysm in the U.S.S.R. When ready to be used in training, Uddin's simulations will provide a small but critical safety edge – "virtual familiarity" for first responders, particularly personnel allied with the outside community, such as med-techs and fire fighters, who may be called in on an emergency without ever having previously entered the reactor.

Other training tools are much more time-consuming, and there's a steeper learning curve," Uddin said. "We can develop this model and give it to firemen. They can play with it, and then when they have to come into the reactor, they know exactly where things are." While the first generation of training simulations will likely be generic, Uddin's work holds the potential to provide a customized virtual training environment for every nuclear reactor in the country, allowing an extra margin of virtual safety in a real world ever hungrier for power. 

*This story originally appeared in the November/December 2008 issue of Illinois Alumni magazine.*

## Uddin named NCSA Faculty Fellow



*Rizwan Uddin*

Uddin was named a Faculty Fellow of the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign for the 2008-2009 academic year. Uddin was awarded the fellowship to help support his project, "Parallel, Modified Nodal Integral Method and Innovative Application Accelerators (such as FPGAs, GPUs) for Turbulence Modeling using LES and DNS." In collaboration with NCSA's Dr. Volodymyr Kindratenko, Uddin worked to combine progress his group made in developing improved numerical schemes for the Navier-Stokes equations and MPI-based parallelization for 3D, time-dependent turbulent flows with innovative application accelerators, including Field Programmable Gate Arrays (FPGAs), graphical processing units (GPUs) and Cell processor. The effort was to allow for the solution of a class

of turbulence problems that have not been attempted previously. Advances were aimed at better simulation capabilities for turbulent flows in nuclear as well as in other branches of engineering. NPRE graduate student Kai Huang worked with Uddin on the project.

This work was funded in part by the National Center for Supercomputing Applications and the University of Illinois, under the auspices of the NCSA/University of Illinois Faculty Fellows Program.

Uddin's research interests are advanced computational methods, theoretical and CFD, radiation transport and reactor physics, reactor engineering, multiphase flow, reliability and risk analysis, and virtual reactor simulation. He has been a member of NPRE's faculty since 1996.

Uddin earned both a master's (1983) and a PhD (1987) from NPRE, after earning a bachelor's in mechanical engineering in 1980 from the Middle East Technical University. He was on faculty in the University of Virginia Nuclear Engineering and Engineering Physics Department before coming to Illinois.

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*Rizwan Uddin's home page:*  
[www.ne.uiuc.edu/faculty/uddin.php](http://www.ne.uiuc.edu/faculty/uddin.php)



## Heuser, students build thin film lab device

**P**rof. Brent Heuser and his graduate students have constructed a magnetron sputtering system that will be used to investigate nuclear fuel matrices for advanced burner reactors.

Starting in 2008, the Department of Energy (DOE) has provided \$1 million annually for three years for this work, which involves a consortium of scientists that Heuser and NPRE Department Head Jim Stubbins lead. NPRE is using the funds to build within Talbot Laboratory a fabrication facility for thin films comprised of uranium and uranium surrogates.

The national initiative to develop advanced burner reactors has the goal of recycling spent nuclear fuel, thereby increasing efficiency and reducing wastes. The fuels to be used in these systems are a departure from current fuels in that they will include a number of transuranic isotopes. According to Heuser, the consortium's research will lead to less waste (minor actinides) by "burning" radioactive actinides contained within the fuel matrix. The goal of the research is to understand transport properties of the actinides within the fuel matrix.

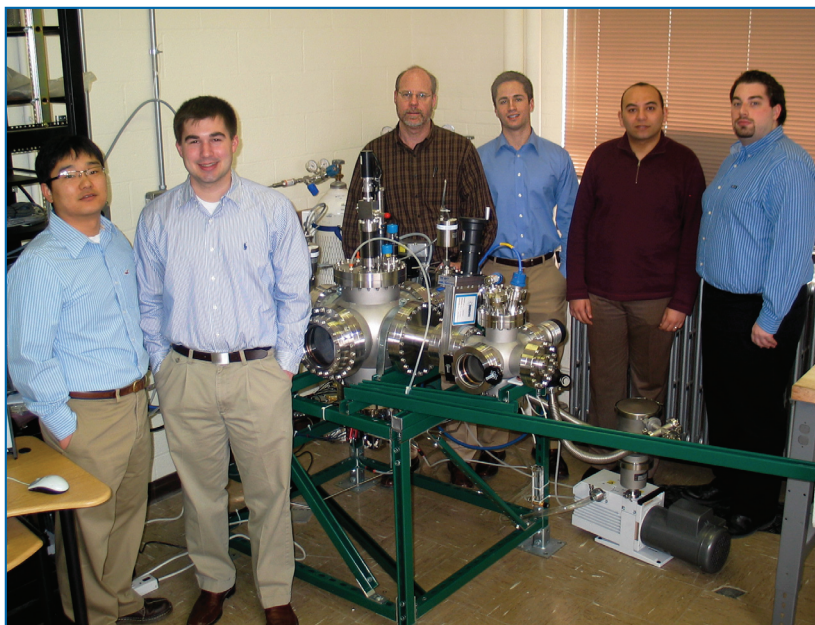
The new thin film growth facility will employ reactive gas sputtering to grow uranium dioxide films containing actinide surrogates. "The reason for growing thin films is that we can take advantage of a host of microanalytical techniques available on campus that work well with small amounts of sample. In addition, we will use x-ray based techniques such as EXAFS and SAXS at the APS," Heuser said.

The group spent six months designing the system and procuring the various components, then another four months building it. It became operations this spring. "We could have gotten a turn-key system but, this way, we got everything the way we want it," said Heuser, who added there was an important educational aspect to building the system themselves. Remodeling work has been going on this summer within Talbot Lab to increase the size of Heuser's lab, and accommodate the new equipment.

NPRE graduate students working with Heuser are David Gennardo, Eric Reside, Harrison Pappas, Hyunsu Ju and Mohamed Elbakhshwan. Heuser's and Stubbins' groups are joined in the consortium by researchers from Illinois' Physics and Materials Science and Engineering (MatSE) departments. Other scientists involved represent the Georgia Institute of Technology, the University of Michigan, and South Carolina State University, a Historically Black College. Included as unfunded partners in this interdisciplinary work are Argonne National Laboratory near Chicago, and General Electric Corp.



*Prof. Brent Heuser with the magnetron sputtering system.*



*Members of Brent Heuser's research group are graduate students Hyunsu Ju, Eric Reside, Heuser, Harrison Pappas, Mohamed Elbakhshwan and David Gennardo.*

Brent J. Heuser's home page:  
[www.ne.uiuc.edu/faculty/heuser.php](http://www.ne.uiuc.edu/faculty/heuser.php)



# Axford garners teaching awards

**N**PRE Prof. Roy A. Axford has received the 2009 and 2008 ANS Student Chapter Awards for Excellence in Undergraduate Teaching, and also the 2008 Rose Award for Teaching Excellence in the College of Engineering.

Axford has been with the Nuclear, Plasma, and Radiological Engineering Department since 1966. The first person to have earned a doctorate in nuclear engineering (1958, Massachusetts Institute of Technology), Axford has developed many courses within NPRE, and has been selected every semester for the Incomplete List of Teachers Ranked Excellent by Their Students. He previously won the 1985 Everitt Award for Teaching Excellence from the College and the 2004 Student Award for Excellence in Undergraduate Teaching. Axford has been a five-time winner of the American Nuclear Society student chapter Award for Excellence in Undergraduate Teaching, and twice has been a finalist for the Campus Award for Excellence in Undergraduate Teaching.

The Rose Award is given for achieving excellence in undergraduate teaching. It especially recognizes innovative teaching methods and instructional programs that motivate freshman and sophomore students to learn and appreciate engineering. The award is named for Scott Rose, who received a bachelor's in computer engineering in 1987. Rose manages wholesale market making of derivative products for Nation's Bank in Chicago.



*Prof. Roy Axford with a group of NPRE undergraduates.*



*Adjunct Prof. Thomas J. Dolan (bearded) taught courses on "Nuclear fusion experiments" and "Magnetic fusion technology" at the Chinese Academy of Sciences Institute of Plasma Physics, Hefei, China, from July to October. He also gave lectures on "Low energy nuclear reactions" on "How to give a good technical presentation" at the Chinese Academy of Science Center for High Magnetic Fields, Hefei.*

## NPRE adjunct prof's lecture aired on UI-7

**A** lecture by Adjunct Assistant Prof. Michael Aref was aired on UI-7, the cable TV service at the University of Illinois at Urbana-Champaign, in October.

Aref first delivered the lecture, "Mass Transport Modeling of Tumor Contrast Agent Enhancement," in February, 2008, as part of the NCSA Faculty Fellows Brown Bag Seminars.

Aref, who has worked extensively in magnetic resonance imaging (MRI), earned his master's and PhD from NPRE in 2000 and 2003, respectively, before earning his MD from the University of Illinois College of Medicine in 2006.



*Michael Aref*

*Home pages for Roy Axford, Michael Aref and Thomas J. Dolan:*

[www.ne.uiuc.edu/faculty/axford.php](http://www.ne.uiuc.edu/faculty/axford.php)  
[www.ne.uiuc.edu/faculty/aref.php](http://www.ne.uiuc.edu/faculty/aref.php)  
[www.ne.uiuc.edu/faculty/dolan.php](http://www.ne.uiuc.edu/faculty/dolan.php)



Daniel F. Hang's home page:  
[www.ne.uiuc.edu/faculty/hang.php](http://www.ne.uiuc.edu/faculty/hang.php)

## Happy Birthday Professor Hang!

NPRE celebrated a milestone in June 2008 — the 90th birthday of Prof. Emeritus Daniel F. Hang. Family, friends and colleagues celebrated during the Open House Professor Hang's family hosted at the Krannert Center for Performing Arts.



An emeritus professor of both NPRE and Electrical and Computer Engineering, Dan Hang was among the founders of the nuclear program at Illinois half a century ago. He retired in 1984, but continues to be active in the American Nuclear Society, and is famous among NPRE alumni for the “gatherings” he hosts at ANS Summer and Winter meetings. He’s also active on NPRE’s Constituent Alumni and Industry Advisory Board, and in the Illinois and National Societies of Professional Engineers, the Boy Scouts, and Tau Beta Pi Engineering Honorary. He also faithfully comes to his office in Talbot Laboratory.

Professor Hang has received many engineering awards, as well as the prestigious Constituent Leadership Award from the University of Illinois Alumni Association for his work with NPRE alumni activities.

He earned bachelor’s and master’s degrees in electrical engineering at the University of Illinois at Urbana-Champaign in 1941 and 1949, respectively. He began as an assistant professor in Electrical Engineering in 1947 and spent his entire academic career at Illinois.



Professor Hang’s research interests have focused on engineering economics. Since 1978, he has been the co-founder and President of SHTH Associates, Inc., providing for nuclear electric utility clientele computer software in nuclear fuel management and in engineering economic considerations for new fuel and reload bids. The company analyzes the economy of everyday reactor operations. About 25 percent of U.S. reactors use some version of the company’s service.

Professor Hang was born July 17, 1918, in Cleveland, Ohio. He and his late spouse, Ruth Ann Hang, were married September 14, 1941, in Schenectady, N.Y. She died Nov. 2, 2002. Professor Hang has two children: Dr. Kenneth W. Hang of Hillsborough, N.C.; and Dr. William M. Hang of Westlake Village, Calif. Professor Hang also has five grandchildren and five great-grandchildren.

ABOVE: Dan Hang, left, and NPRE Department Head Jim Stubbins. BELOW: Dan Hang with his sons, Kenneth and William, and their families.



## Grazie, il professor

Prof. Massimo De Sanctis from the Department of Chemical Engineering, Industrial Chemistry and Materials Science at the University of Pisa conducted a five week intensive course in Corrosion of Materials for a group of 15 graduate and senior undergraduate NPRE students in August and September 2008. The course included daily lectures and laboratory periods. This was the first in a series of courses taught by visiting faculty from other leading universities around the world.



## Good Luck, Kathy!

NPRE said good-bye to staff member **Kathy Ward** retired in November from her position as account technician. Ward had been working in NPRE's Business Office since August 2000, transferring here from the Department of Molecular and Cell Biology. Her career at the University of Illinois began in 1993.

Filling Ward's position is **Shelly DeAtley**, who began with the department in June. DeAtley came to NPRE from the Department of Educational Organization and Leadership.

Two other staff members recently earned promotions. **Idell Dollison**, who assists Department Head Jim Stubbins, was promoted from office manager to office administrator. **Gail Krueger** was promoted from office support associate to office support specialist.



Shelly DeAtley



Idell Dollison



Gail Krueger



Kathy Ward, celebrating her retirement

5M5WM

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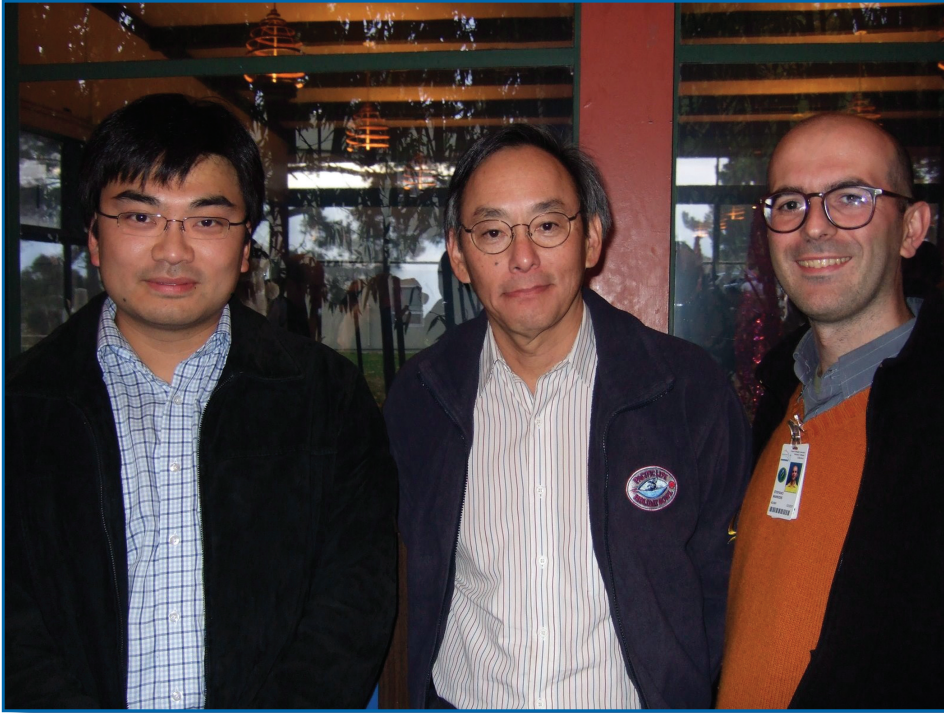
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### ***Research leads to chance meeting with DOE head***

While conducting research at national labs in California over the past year, NPRE graduate student Stefano Markidis (right) met and was photographed with newly appointed Secretary of Energy Steven Chu (middle). Pictured at left is Pavel Ni, a staff member at LBNL.



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