



new•generation

newsletter for alumni and friends

Nuclear, Plasma, and Radiological Engineering

University of Illinois at Urbana-Champaign

winter 07-08



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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
Carlos H. Castano
post-doc research associate
Thomas J. Dolan,
adjunct professor

Masab H. Garada
adjunct assistant professor
Brian E. Jurczyk
adjunct assistant professor
Mohammed Almad Khasawneh
visiting research assoc. professor
Kyu-Jung Kim
visiting scholar
Nie Luo,
visiting research asst. professor
Hiromu Momota,
visiting scholar
Richard F. Nelson
adjunct assistant professor
Ramasamy Raju
post-doc research associate
William K. Roy
adjunct professor
Shailendra Srivastara,
postdoctoral research associate

staff

Idelle D. Dollison,
head secretary
Richard L. Holm,
research engineer
Gail S. Krueger,
secretary
Becky J. Meline,
admissions and records representative
Susan K. Mumm,
alumni coordinator, newsletter editor
Rhonda R. Stebbins,
business manager
Stoyan A. Toshkov,
research scientist
Kathy J. Ward,
account technician



James F. Stubbins

Hello from NPRE (and Talbot Lab!)

We continue to have eventful times at NPRE. As you have noticed from the cover of our newsletter, we have started our move to Talbot Lab. Our departmental offices moved last summer and some of the faculty and students moved during the Fall 2007 semester. We even taught some of our courses in Talbot last semester, and more this semester. The timing of the move is dynamic, determined to a large degree by the efforts to relocate faculty, students and research labs that are still actively using Talbot Lab space. So, we still occupy a large section of the Nuclear Engineering Laboratory, NEL, and we will continue to occupy the Nuclear Radiation Laboratory, NRL-II.

This past year was eventful for several additional reasons. The most harrowing of these events was our ABET “visit” in late September. ABET, which formerly stood for the Accreditation Board for Engineering and Technology, visits and reviews undergraduate degree programs on a six-year cycle. An ABET review team visits all engineering degree programs at the same time. Our College of Engineering cycle came again last Fall. A “self evaluation” report that each department prepares precedes the ABET review. Both the report and the visit are designed to assess how well the program is doing in meeting its educational objectives. The visit can result in an assessment that finds no problems, or findings can be “concerns,” “weaknesses,” or “deficiencies,” in order of seriousness. Deficiencies lead to accreditation being withdrawn for a given degree program. The other assessments require actions to correct them quickly, to avoid a deficiency assessment. Fortunately, NPRE sailed through the accreditation visit this year in great health, with no concerns, weaknesses or deficiencies. This very positive outcome is, for the most part, due to the strength of our current and former students, who are the best evidence of the degree program’s strength. Many of you who graduated within the past six years (the time since the last ABET visit) were extremely helpful in supplying information for this year’s visit. Most of the BS alums who graduated over the last, critical six-year periods responded to our request assessment information. This was essential to support our program’s impact and value. In addition, several of our alumni advisory board members helped prepare information for the self-evaluation report, and interacted with our “visitor” when he was on campus. We thank you all, and look forward to another six years of continued educational excellence. The campus will start a similar review program, and we will be assessing our graduate degree and research programs in the coming year or two. We look forward to your help with that effort, too.

We have had another very strong year in student recruitment at both the undergraduate and graduate levels. Our incoming graduate student numbers were 21, the largest class in more than 10 years. Our undergraduate numbers again top one hundred, we are currently at 107, and we continue to grow. Of course, we have also had large classes of students graduating at all degree levels. The job market continues to be very strong and we have built many more contacts with growing sectors of industry over the past year. You will see the continuing build-up of enrollments later in the newsletter.

Looking forward, we are proud to announce that we are nearly a half-century old – NPRE will celebrate its 50th Anniversary September 11-13, 2008. More details will be available shortly, but please mark these dates on your calendar now so you can join us for this monumental event.

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 (see Always Illinois, page 21). 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



Student worker Drew Childs positions a chair as Department Head Jim Stubbins works in his new office in Talbot Laboratory.

NPRE moves to Talbot Laboratory

Moving, even when the long-term objective is to gain more room for a happily-expanding program, is never an easy proposition! NPRE began the arduous process this past summer, relocating administrative and some faculty offices in spaces vacated in Talbot Laboratory following the creation of the Mechanical Science and Engineering Department (merger of former Theoretical and Applied Mechanics and Mechanical and Industrial Engineering departments).

Months were spent packing, relocating and unpacking to move from the Nuclear Engineering Laboratory (NEL) at the corner of Springfield and Goodwin avenues, to Talbot Laboratory on the west side of the Engineering Quad.

As of the end of 2007, relocated to Talbot Lab have been all administrative offices, including those for students and alumni, the Department Head's office, and a few faculty and graduate student offices. Remaining for the time being in NEL are most of the laboratories and several faculty and student offices. Prof. David Ruzic's office and plasma laboratory will remain in the Nuclear Radiation Laboratory, south of NEL on Goodwin Avenue.

View from campus and beyond

Golden Anniversary NPRE plans for 50-year celebration

NPRE invites you to make plans now to return to campus for the department's 50th Anniversary celebration, set for Thursday through Saturday, September 11-13.

Events are still being finalized, but preliminary plans call for the following:

Thursday, September 11 — A panel of high-level leaders in the nuclear field, representing the US Department of Energy; the Nuclear Regulatory Commission; Exelon, the Chicago-based US leader in nuclear energy; the American Nuclear Society; the World Nuclear Association; and others, to present an international forum on nuclear energy and applications. A lecture by one of the panelists will be presented in the evening. Location: Alice Campbell Alumni Center.

Friday, September 12 — Morning and afternoon, several symposia on all ranges of nuclear engineering, touching aspects of each of NPRE's three concentrations: power, plasma and medical applications. Evening will include the dedication of an engraved paver outside the Alumni Center. The paver will commemorate 50 years of the nuclear engineering program at Illinois. A social hour will follow, and then a banquet in the Alumni Center ballroom. The first winner(s) of the NPRE Distinguished Alumni Award(s) will be recognized.

Saturday, September 13 — Tours will be provided of NPRE laboratories and new home in Talbot Laboratory, as well as College of Engineering buildings. A tent party is under consideration.

*Please refer to our website, www.ne.uiuc.edu, for more details and for registration information! You can also join the NPRE 50th Anniversary group on *Always Illinois*, a new and exclusive on-line community, at www.alwaysillinois.org.*



A group of about 25 NPRE alumni and students met for lunch at Argonne National Laboratory near Chicago in March for camaraderie and to hear an update from Department Head Jim Stubbins.

Nominations due March 28 for first NPRE Distinguished Alumni Awards

As part of NPRE's 50th anniversary celebration, we are planning to recognize winners of the first NPRE Distinguished Alumni Awards, and encourage nominations. Please write a letter explaining why your candidate's contributions to the disciplines of nuclear engineering and/or contributions to NPRE, the College and/or university make them worthy of this distinction. We ask that all nominations be submitted by March 28, so that they can be reviewed in April by NPRE Constituent Alumni and Industry Advisory Board members, who will select our winners. Nominations should be sent to NPRE Alumni Affairs Coordinator Susan Mumm:

By email: s-mumm@uiuc.edu

By FAX: (217) 333-2906

By U.S. mail: **Rm. 216 Talbot Lab
104 S. Wright St.
Urbana, IL 61801**

NPRE does well in ABET review

NPRE is happy to report that this fall's ABET accreditation review of the department's undergraduate program was very positive, and that the program will be fully accredited for the next six years.

Reporting verbally to an audience that included Richard Herman and Linda Katehi, Chancellor and Provost, respectively, of the Urbana-Champaign campus, and Ilesanmi Adesida, Dean of the College of Engineering, ABET reviewer Richard Cole highlighted the quality of the program, the strengths of the students, the involvement of the outside board, and the excellence of student-staff-faculty interac-

tions. NPRE had no deficiencies, weaknesses or concerns. Cole's only additional comments were that having a reactor for educational and other purposes, and a person to oversee the (teaching) laboratory equipment would be beneficial. The second comment is being resolved.

Under the direction of Department Head Jim Stubbins and Prof. Brent Heuser, NPRE faculty and staff contributing to the ABET review process spent months collecting and compiling into a report data on faculty, facilities, curriculum, current students and recent graduates.

Alumni also were very helpful in this effort. Last spring, NPRE alumni who earned bachelor's degrees since 2001 were surveyed about courses, the campus experience, and resulting jobs. A total of 63 percent of those graduates responded to the survey. Approximately 85 percent said they are satisfied or very satisfied with their career choices, and 94 percent were satisfied or very satisfied with their overall educational experience at NPRE.

Members of NPRE's Constituent Alumni and Industry Advisory Board, Rodney Krich, Senior Vice President of Constellation Energy in Baltimore; Dennis DeMoss, Senior Vice President of Sargent & Lundy in Chicago; and Robert Stubbers, co-founder of Starfire Industries in Champaign, Illinois, also provided a great service for NPRE during the ABET review. These board members spoke with the reviewer about their interactions with NPRE students and how highly those individuals are regarded.

Several departments in the college were reviewed in September along with NPRE. The final written report should be finalized by June 2008.

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View from campus

NPRE welcomes new undergrad, grad students

NPRE continues to attract new quality undergraduate and graduate students. This fall semester, 29 new undergrads and 21 new graduate students joined our programs. Graduating from the Department over the past year were 20 bachelors degree earners, 14 masters degree earners, and eight PhDs.

Welcome New Undergraduate Students

Adam J. Bracke, Prophetstown, IL
 Kristin L. Chan, Naperville, IL
 Michael B. Cornejo, Bensenville, IL
 Akshay J. Dave, Jakarta, Indonesia
 Ittinop Dumnernchanvanit, Bangkok, Thailand
 Zachary J. Duncan, Bolingbrook, IL
 Jonathan George, Bolingbrook, IL
 David E. Ginsburg, Wausau, WI
 Nada Y. Gohar, Naperville, IL
 Ye Seui Hwang, Langley, British Columbia, Canada
 Paul J. Jensen, Homer Glen, IL
 Nathan P. Jurik, Orland Park, IL
 Joseph R. Kessenich, Cottage Grove, WI
 Chi Gyun Kim, Westbury, NY
 Zachary D. Kriz, Eden Prairie, MN
 Jennifer M. Lilly, New Lenox, IL
 Shawn M. McNalley, Moline, IL
 Cesar I. Menchaca, Chicago, IL
 Dana C. Miranda, Wheaton, IL
 Valerie L. Myers, Champaign, IL
 Avel A. Patel, Hoffman Estates, IL
 Jose R. Rico, East Moline, IL
 Stephanie E. Senjanin, Dundee, IL
 Trent W. Silver, Urbana, IL
 Monish Singh, Grayslake, IL
 Bradley L. Swenson, Crystal Lake, IL
 Justin K. Tanaka, Bloomington, IL
 Trifone F. Whitmer, Freeport, IL
 Piyum S. Zonooz, Carol Stream, IL

Welcome New Graduate Students

Abdul-Qadim Alzalloum, University of Wisconsin at Milwaukee
 Anastasios Deligiannis, National Technical University of Athens, Greece
 David Gennardo, University of Illinois at Urbana-Champaign
 Luke Gotszling, University of Illinois at Urbana-Champaign
 Mengqi Huang, Tsinghua University, China
 Kenzo Ibano, Keio University, Japan



A group of 18 students from the University of Pisa in Italy visited NPRE and the University of Illinois at Urbana-Champaign for a five-week period at the start of the fall 07 semester. For the fourth consecutive year, NPRE Department Head Jim Stubbins and Prof. Rizwan Uddin have taught summertime classes at the University of Pisa. For two years in a row, NPRE has hosted the Italian students here.

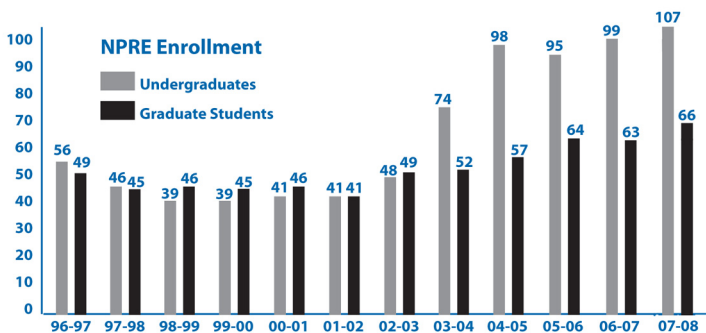
David Johns, Southwest Missouri State University at Springfield
 Seung Jun Kim, Hanyang University, Korea,
 Korea Advanced Institute of Science and Technology, Korea
 Liang Meng, University of Science and Technology, China
 Ayman Noureldin, University of Alexandria, Egypt
 Aaron Oaks, University of California at Berkeley
 Rahul Samala, Indian Institute of Technology at Kanpur, India
 John Sporre, University of Illinois at Urbana-Champaign
 Corey Struck, University of Illinois at Urbana-Champaign
 Hsiao-Ming Tung, Tsinghua University, Taiwan
 Benjamin Ulmen, Michigan Technology University
 Steven Weiss, University of Illinois at Urbana-Champaign
 Hsingtzu Wu, National Tsinghua University, Taiwan
 Chen Xi, Tsinghua University, China
 Galina Yakubova, Polytechnic Institute at Leningrad, Russia
 Xiaoxu Zhou, University of Science and Technology, China

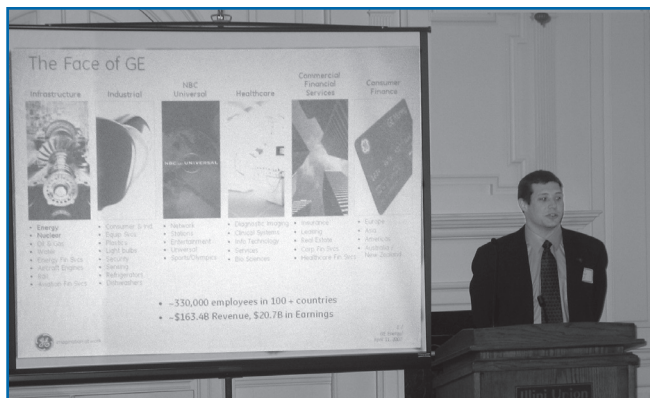
Internships abundant for NPRE students

Internships through which students gain real-life experience as nuclear engineers continue to be abundant and beneficial for NPRE students. Two of the Department's undergraduates who had internships at Exelon Corporation's nuclear power plants over summer 2007 were interviewed by the company newsletter, *Inside Nuclear*, and had this to say about their experiences:

Senior Rachael Jabusch, internship at Dresden, Illinois.

—“Although I am going into my final year in Nuclear Engineering, this summer I was asked to work with Design Engineering – Mechanical. I have learned quite a bit from working at Exelon. I worked with my mentor to complete flow calculations, modifications and evaluations. A few of my projects included dead heading pipe flow calculations, orifice sizing calculations, issuing component replacement recommendations, and updating the Margin Management





Jeffery Boaz of GE Energy was one of several speakers during a hearing NPRE hosted on campus for General Electric Corp., concerning the company's plant in Morris, Illinois.

database. All of the work that I have done this summer has given me a better understanding of mechanical engineering problems, which I can apply to my classes this (fall 07) semester. I am also very excited that I was given a higher level of responsibility this summer. Working at Exelon the past two summers has prepared me for life after college."

Senior Alyssa Heydt, internship at Oyster Creek, New Jersey — "It has been two months since I started my internship here at Oyster Creek, and I have already applied everything I have learned in class to projects that arise in Reactor Engineering. I began my internship by working on the NRC (Nuclear Regulatory Commission) audit for special nuclear materials, where I learned about neutron monitoring detectors and how they function in a core's cycle. I also played a role in the control rod drive system trending and weekly testing and learned various mechanics and purpose that control rods provide for the core. My most important experience has been my involvement with the reactor's return to full power following an unexpected scram, which also holds the most relevance to my Nuclear Engineering degree. I estimated the path to criticality during the reactor's initial startup and I made control rod pattern predictions using the Power-Plex computer program. Witnessing first-hand the reactor's start-up to critical and run modes was an incredible learning experience. This internship has demonstrated the many exciting prospects I can exercise as a Nuclear Engineering major and I look forward to working in the industry."

Other companies that provided internships to NPRE graduate and undergraduate students during summer 2007 include:

- Argonne, Brookhaven, Idaho and Los Alamos national laboratories
- Fermi National Accelerator Laboratory
- Intel Corp.

- the Radiology Division of Cincinnati Children's Hospital Medical Center
- Lockheed Martin Corp.
- Exelon's corporate headquarters and plants in Clinton, Dresden, LaSalle, Oyster Creek, and Byron
- Princeton Plasma Physics Laboratory
- Sargent & Lundy^{LLC}.

NPRE hosts GE hearing on Morris plant

NPRE hosted a meeting on campus in April 2007 for the General Electric Corp. concerning GE's proposal to develop new capabilities at their spent nuclear fuel storage facility in Morris, Illinois.

GE hopes to work within the US Department of Energy's Global Nuclear Energy Partnership (GNEP) program to begin reprocessing nuclear fuel and re-burning the recycled material in a fast reactor. GNEP aims to safely and securely expand nuclear power worldwide while responsibly managing nuclear waste and reducing proliferation risks.

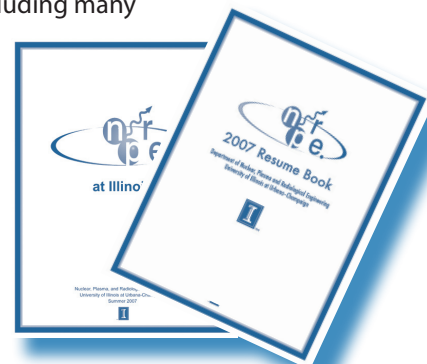
GE had opened the plant in Morris, about an hour and a half southwest of Chicago, in the 1970s. The company's plans then were to reprocess fuel there, but difficulties with spent fuel processing and a major shift in government policy away from reprocessing halted activities at Morris. Since then, GE has used the plant to temporarily store used nuclear fuel until the federal government can select a permanent repository. The Morris facility has an NRC license that permits spent fuel storage at the plant through May 2022.

GE hopes to expand the uses of the Morris plant. It now is among six sites in the running as a DOE-approved reprocessing/fast reactor facility. The DOE is on schedule to select a site and approve the beginning of construction by June or July.

While the DOE has convened hearings on potential sites, several organizations seeking approval to open such a facility, including GE, have held their own hearings, as well, including the one that NPRE hosted. About 150 people attended the April hearing, including many NPRE faculty members and students.

Resume Book CD available

Employers are encouraged to request a compact disc containing the Department's 2007 Resume Book, providing



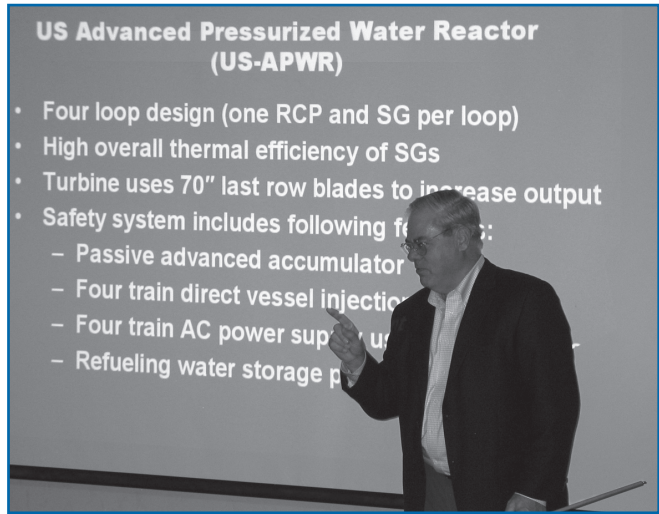
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View from campus

resumes for about 40 undergraduates and 15 graduate students. The students are interested in pursuing internships and/or permanent positions. For a copy, please contact Becky Meline, at bmeline@uiuc.edu or by telephone at 217-333-3598.

Employers visit NPRE

Representatives of Westinghouse, General Electric, Exelon, Sargent & Lundy^{LP} and the Nuclear Regulatory Commission recently visited the Department to present overviews of career opportunities. If your organization would like to make a similar visit, please contact Becky Meline, at bmeline@uiuc.edu or by telephone at 217-333-3598.



Don Schopfer, Executive Vice-President and Director of the New Nuclear Generation and Nuclear Power Technologies Business Group of Sargent & Lundy^{LLC} in Chicago, gave a seminar, "New Nuclear Generation Overview and Discussion," in NPRE on October 16. Schopf and S&L Vice President Dennis DeMoss, an NPRE alumni board member, visited campus to meet with students and Department Head Jim Stubbins.

Faculty News



Michael Aref

MICHAEL AREF, an NPRE graduate, has received a fellowship from the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign to seek to improve diagnostic imaging of tumors. He will work with Volodymyr Kindratenko, a researcher in NCSA's Innovative Systems Laboratory, to explore the hardware and software that will provide the rapid computation needed in a clinical setting. NPRE student Nick Szrama is also working on the project. Aref, a resident physician and adjunct assistant professor in NPRE, was first author on the article, "Spatial and temporal resolution effects on dynamic contrast-enhanced magnetic resonance mammography," published in the *Magnetic Resonance Imaging* 25 (2007) journal.

BRIAN E. JURCZYK, president



Brian E. Jurczyk

and co-owner of Starfire Industries^{LLC} in Champaign, Illinois, and an NPRE graduate, has been appointed adjunct assistant research professor in the Department. Starfire Industries is a research and development firm specializing in plasma innovations for aerospace, defense, industrial, instrumentation, medical, and semiconductor applications.

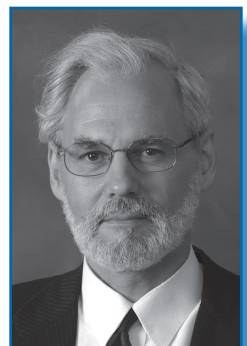
GEORGE H. MILEY organized the U.S.-Japan Workshop on Small Plasma and Accelerator Neutron Sources in May 2007 at Argonne National Laboratory.

CLIFFORD E. SINGER consulted for six weeks during the summer for Argonne National Laboratory near Chicago on nuclear energy economics. Singer's research interests are plasma transport near material boundaries, plasma-wall interaction; advanced propulsion systems, nuclear proliferation, and South Asian nuclear programs.

JAMES F. STUBBINS, NPRE Department Head, has been selected as a Fellow of the American Nuclear Society.



George H. Miley



Clifford E. Singer

Stubbins was cited for the contributions he has made to the advancement of nuclear science and technology. His research interests are nuclear materials, irradiation damage and effects, mechanical properties, high-temperature corrosion, stress corrosion cracking and electron microscopy. ANS Fellow is the Society's highest honor. The prestigious designation acknowledges extraordinary nuclear professionals in different disciplines relating to research, invention, engineering, safety, technical leadership and teaching.

Stubbins was recognized in April for 20 years of membership in the ANS national organization. Stubbins has held leadership positions in the organization including chair of the Fusion Energy Division and the Materials Science and Technology Division. He also is a member of the American Society of Engineering Education. Stubbins has served as NPRE department head since 1999 and has been a member of the faculty since 1980. He earned a master's degree in nuclear engineering in 1972 and a PhD in materials science in 1975, both from the University of Cincinnati. He holds a bachelor's degree in nuclear engineering from the University of Michigan. In addition to his work at Illinois, Stubbins has done consulting for the U.S. Department of Energy, Los Alamos National Laboratory, Battelle's Pacific Northwest Laboratory, Argonne National Laboratory, the International Atomic Energy Agency, and the Ohio State University.

RIZWAN UDDIN was presented the American Nuclear Society student chapter Award for Excellence in Undergraduate Teaching for 2007.

Uddin has been an NPRE faculty member since 1996. His

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. Uddin earned a bachelor's degree in mechanical engineering in 1980 at the Middle East Technical University, and a master's degree and doctoral degree in nuclear engineering at the University of Illinois in 1983 and 1987, respectively.



Paul Sefranek, of the American Nuclear Society, at the 2007 NPRE Honors Banquet, recognizes Department Head Jim Stubbins (left) for 20 years of ANS membership. Below, Prof. Rizwan Uddin, middle, is presented the ANS student



chapter Award for Excellence in Undergraduate Teaching for 2007. At right is former ANS student chapter President Steven Weiss.

NPRE Faculty Ranked as Excellent by Their Students

The following NPRE faculty members were among those on the University's Incomplete List of Teachers Ranked as Excellent by Their Students. Results are based on Instructor and Course Evaluation (ICES) questionnaire forms maintained by Measurement and Evaluation, Center for Teaching Excellence.

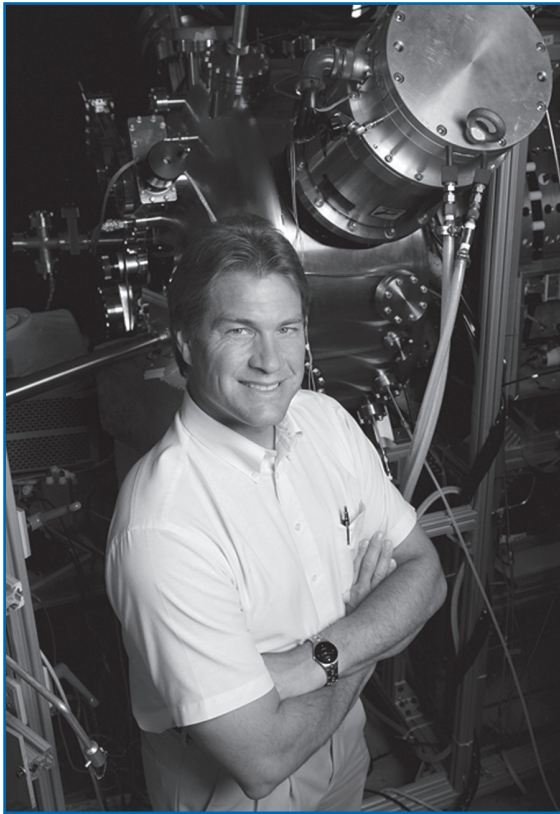
Spring 2006: Roy Axford, Brent Heuser, David Ruzic, Jim Stubbins, Rizwan Uddin.

Fall 2006: Roy Axford, Jim Stubbins, Rizwan Uddin.

Spring 2007: Roy Axford, Brent Heuser, David Ruzic.



NPRE Prof. Emeritus Dan Hang at the 2007 Honors Banquet with Paul Sefranek and Craig Pohlod of the local American Nuclear Society chapter. Pohlod had been an operator of the now-decommissioned NPRE reactor.



David N. Ruzic

Lighter gas reduces optics damage in lithography

By James E. Kloeppel, Physical Sciences Editor,
University of Illinois News Bureau

Researchers at the University of Illinois have discovered a way to generate light and reduce damage in a leading candidate for next-generation microelectronics lithography. The technique could help pack more power into smaller computer chips.

In the quest for creating computer chips with ever-smaller feature sizes, chip manufacturers are exploring extreme ultraviolet lithography as the next chip-printing technology. For a light source at the necessary wavelength, scientists have turned to a hot, ionized gas called a plasma, generated within a Z-pinch device. But, energetic ions produced in the plasma can damage the mirror responsible for collecting the light.

"By adding a lighter gas to the plasma, we can significantly reduce the damage and extend the lifetime of the collector optics," said NPRE Prof. David Ruzic, lead author of a paper that describes the technique in the June issue of the journal, *IEEE Transactions on Plasma Science*.

In a Z-pinch device, xenon is fed into a chamber where it collides with a stream of electrons, producing a low-temperature and low-density plasma. This plasma then flows between two cylindrical electrodes, one positioned inside the other. (The "Z" in Z-pinch refers to the direction of current flow along the cylindrical electrodes.)

Next, a large current pulse heats the plasma, while a magnetic field generated by the pulse compresses and confines the plasma. The plasma becomes hotter and denser until it "pinches," creating the flash of light needed by the chip industry.

As the pulse passes, internal plasma pressure overcomes magnetic confinement, and the hot, dense plasma flies apart. The resulting fast and energetic ions can damage the delicate collector optics.

However, adding a small amount of a lighter gas, such as hydrogen, "significantly reduces both the number and the energy of xenon ions reaching the collector surface, thereby extending the collector's lifetime while having a negligible effect on the extreme ultraviolet light production," Ruzic said.

The reduction in xenon energy occurs because the hydrogen ions shield the xenon ions from the high electric field created by the plasma.

"When the plasma flies apart, the less-massive electrons move faster than the hydrogen and xenon ions," Ruzic said. "The electric field induced by the moving electrons then pulls on the ions and accelerates them. Being much lighter than xenon ions, the hydrogen ions accelerate faster, and shield the xenon ions from some of the electric field."

By absorbing some of the plasma's energy, the hydrogen ions prevent the xenon ions from accelerating to the point where they damage the collector surface, thus prolonging the collector's lifetime.

Xenon is actually the second-best radiator for light at the desired wavelength, Ruzic said. "We can get three times as much light from tin, but tin is a condensable metal and makes quite a mess on the mirrors. We are now looking at ways to clean the mirrors during chip production."

With Ruzic, co-authors of the paper are graduate students Keith Thompson and Josh Spencer, NPRE Adjunct Assistant Prof. Brian Jurczyk, postdoctoral research associate Shailendra Srivastava, and former postdoctoral researcher associate Erik Antonsen.

David N. Ruzic's home page:

<http://www.ne.uiuc.edu/ruzic.html>



David Ruzic is filmed in his lab for the Discovery Channel series, "Weird Connections."

Discovery program to highlight Ruzic plasma research; lab attracts industry visitors

Nuclear engineering Prof. David Ruzic's research will be included in a five-part television series that demonstrates plasma's evolution from ball lightning experiments to a planned international fusion facility some scientists believe could solve the world's clean, sustainable energy needs.

Outline Productions, a British filming crew, was on campus on November 8 to work with Ruzic for the program, expected to air in February or March 2008. Outline's 26-part series for *Discovery Science* intends to reveal the impact certain pioneering experiments have on the fundamental questions of science and, ultimately, on our everyday lives. Each program is intended to plot the unexpected conditions leading

from an unusual and seemingly crazy experiment to serious hard science with real world applications.

In the case of plasma science, the programs will begin with a hobby scientist who became obsessed with ball lightning in the 1960s and eventually tried to create his own. Another program will show how the first individual worked with a partner to construct a 6-foot-tall vacuum tube and create large glowing plasma discharges. Next will come Ruzic's work with plasma confined by magnetic fields and his investigation into energy loss and erosion caused when plasma balls hit the wall of a nuclear fusion experiment. The program ends with a look at JET, the largest world's largest nuclear fusion facility located in Oxfordshire, England, and with the International Thermonuclear Experimental Reactor (ITER) a \$12-billion fusion facility scientists propose building in France. Scientists believe the type of energy ITER would produce could solve the world's energy problems.

Research projects underway in Prof. David Ruzic's laboratory also are of great interest to a number of industries and their officers. Recent visitors to the lab have included:

From **Intel Corp.**, Santa Clara, California: **William M. Holt**, Senior Vice President and General Manager of Technology and Manufacturing Group, on September 14.

From **Novellus Systems, Inc.**, San Jose, California: **Richard S. Hill**, Chief Executive Officer, Chairman of the Board of Directors on September 27.

From **Micron Technology**, Boise, Idaho: **Michael Chaine**, Fellow Technical Member, Micron Technology, Inc., Boise, Idaho; **Janine Rush-Byers**, University Relations Manager; and **Dianna Santos**, University Relations, Scholarship Coordinator, on October 10.



It Seems So Real

Realistic video game teaches nuclear reactor operations

Gaming architect Joel Dixon, a senior, walks a viewer around the virtual nuclear reactor.

What's a creative method of getting a generation raised on video games — with all those realistic graphics and movements and interactions — to learn about running a nuclear power plant? You make it a video game.

Students working in NPRE with Prof. Rizwan Uddin have done just that over the past several months, using the programs *Unreal Tournament* and *Unreal Editor* to set up a simulation of the University of Illinois' non-operational nuclear reactor. In the simulation, the reactor is operational.

Unreal Tournament is marketed as "a multiplayer first-person shooter that combines the kill-or-be-killed experience of gladiatorial combat with cutting-edge technology." *Unreal Editor* is advertised to be "a pure 'What You See Is What You Get' content creation tool filling the void between XSI, 3D Studio Max and Maya, and shippable game content." For the \$50 cost of purchasing the programs, Uddin's group has used them to create virtual models and then customize them for NPRE's purposes (sans guns, of course!).

The student architects used *Unreal Editor* to create the simulated setting, in this case a one-block area starting at the corners of Springfield and Goodwin avenues on campus and including the Nuclear Reactor Building. *Unreal Tournament*, the actual game itself, was used to construct moving people and objects, and create situations in which players must respond. The latter can include simple indicators that prompt players to run the plant, or they can be emergency situations such as leaks and/or fires.

The game mirrors the real-life setting. For some of the details, the creators took from the actual nuclear reactor building digital photographs of various objects, such as control panels and bulletin boards, and then placed them in the exact location in the simulation. The details were so precise that one simulated bulletin board included a map on which the writing could be read, and even a yellowed newspaper comic clipping. The designers' intents were to develop the scene so that one would experience the sights that would appear if one were walking through the actual building. Still to come in the project is a conversion of the game from a flat screen to the VisBox, a state-of-the-art 3-D visualization system, to create another layer of reality. Said Joel Dixon, an NPRE senior who has been working on the project since summer, "The

more you think it's real, the more you'll learn from it."

Some parts of the game are not so real. For example, when a warning flashes that there's a leak, water starts flowing from a sizeable hole in the reactor. Although that adds to the drama and visual stimulation, it wouldn't actually happen. "We've put all kinds of crazy things in there," Dixon said, smiling. More importantly, the visual impact does let the player/operator know that there's a problem that needs fixing. To remedy the problem, the player has to learn the control boards and know what actions to take. For example, one part of the game allows players to raise and lower control rods out of a pool of water, to power down the reactor.

One of the interesting aspects of the simulation is that the game shows radiation exposure on a virtual person walking through the virtual building. Said Dixon, "In the (*Unreal Tournament*) game, you can keep track of a person's injuries from being shot at until that person dies. We tweaked the injury that the player had from the game and made it the ill effects of radiation." The designers did this by programming each square foot of the game's map to have its own radiation setting. The architects also added color-coding to indicate levels of radiation, changing from red at the highest level to yellow then blue then green at the safest.


Dixon said Uddin's group has designed the game so that it can accommodate multiple players/operators. This allows a team of employees in different locations to participate in the simulation at the same time. The designers will continue to work on making the game more detailed, including modeling police, firefighters and emergency response personnel that would be called to the scene should an incident occur.

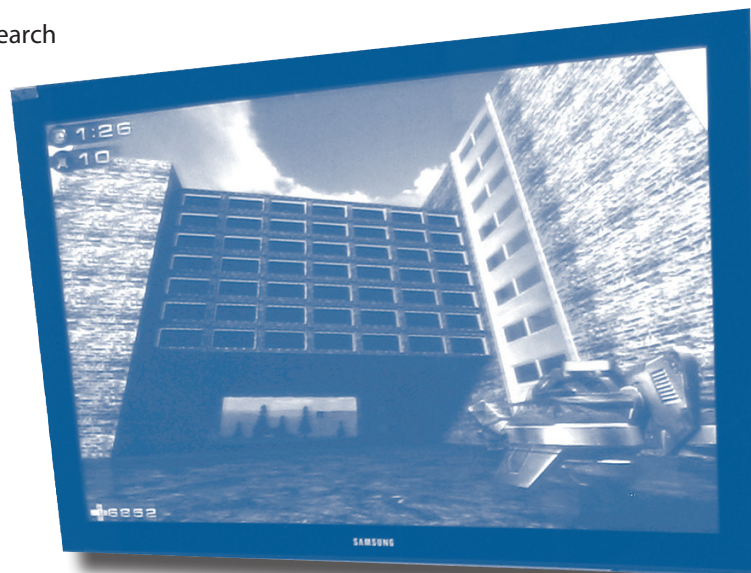
In addition to training operators how to run a nuclear plant, the simulation can be a tool to teach college-age, high school and even junior high students, said Dixon. For the younger students, he said, "It could be a simple game, where players have to collect coins (throughout the building) but have to be mindful of the areas with the most radiation. Through that, they could learn how radiation spreads and what to avoid."

College level students can be introduced to varying methods of radiation measurement. The designers intend to include a scale showing how health levels are affected depending upon exposure. They are confident the game will make complicated data much easier to understand. "It's like using a road map," Dixon said. "You learn more if you actually drive it rather than just look at the map."

The Nuclear Regulatory Commission provided the grant that has funded the simulation's development. Dixon and others in Uddin's group, including University High School student Cheng Luo, presented a paper on their work at the winter American Nuclear Society conference held in November in Washington, D.C. Other students involved in the project are undergraduate Jared Reynolds and graduate students Stefanos Markidis, and Jianwei Hu.

Uddin said the NRC's intention is to encourage and fund research activities that can improve safety, security and environment at nuclear power plants. The grant program specifically asked for projects that identify innovative instructional approaches or techniques to enhance student learning, including distance educational and experiential learning.

In the future, nuclear utility personnel will test the students' models for training purposes, Uddin believes. He said the project can be extended in several ways, including establishing a coupling between real world data and that in the model, allowing the model to display real time data such as radiation levels. 



Rizwan Uddin's home page:

<http://www.ne.uiuc.edu/uddin.html>

NERI grants fund reactor fuel study

The Department of Energy will provide \$1 million per year for the next three years to support the work of a consortium that NPRE scientists will lead in investigating nuclear fuel matrixes for advanced burner reactors.

Joining NPRE Prof. Brent Heuser, principal investigator, and Department Head Jim Stubbins in this work for the Nuclear Energy Research Initiative-Consortium program will be colleagues from the Physics and Materials Science and Engineering departments at the University of Illinois at Urbana-Champaign. The consortium also will include researchers from the Georgia Institute of Technology, the University of Michigan, and South Carolina State University, a Historically Black College. Involved as unfunded partners in this interdisciplinary work will be Argonne National Laboratory near Chicago, and General Electric Corp.

In NPRE, funding will be used to construct within Talbot Laboratory a Nuclear Fuels Fabrication facility for thin films. Heuser maintains the laboratory will be unique within the United States, and, perhaps, throughout the world.

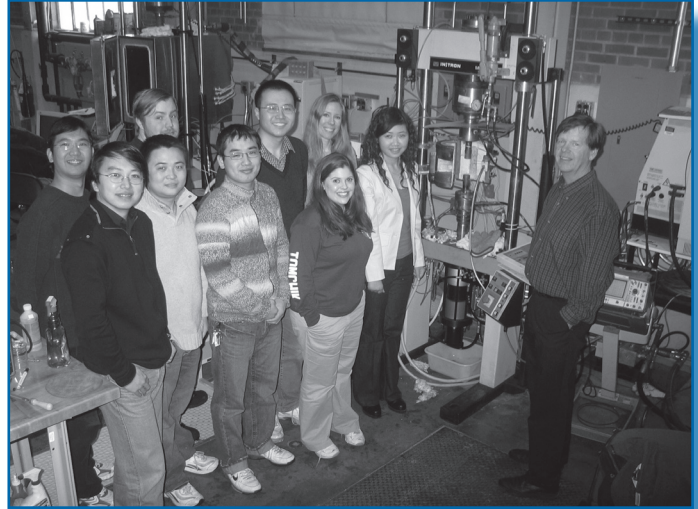
Through advanced burner reactors, scientists' goals are ultimately to recycle spent nuclear fuel, thereby increasing efficiency and reducing wastes. Heuser said the consortium's research will focus on extracting more energy content (Uranium-238) from the spent fuel, and producing less waste (actenide) that needs to be contained.

Illinois will be responsible for most of the experiments required for the program. Georgia Tech will handle the computational work, while the University of Michigan will work on electron microscopy.

The NPRE-led consortium's proposal was one of 11 the DOE funded; a total of 65 proposals were submitted. The work is in support of DOE's Global Nuclear Energy Partnership and the Generation IV International Forum's initiatives, and indicates how much nuclear energy issues are emerging in national and international importance.

"The NERI program is a positive reflection of a very bright horizon for nuclear energy in the United States and beyond," Heuser said.

NPRE recently has gained other funding from the NERI

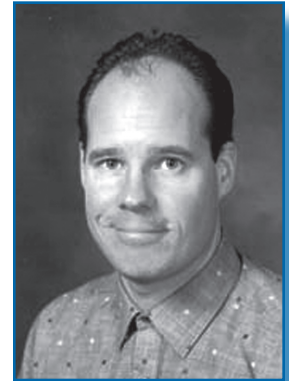


NPRE Department Head Jim Stubbins (right) in his lab with his research group.

programs.

- Heuser and Prof. Rizwan Uddin secured a \$100,000 grant for one year to buy equipment to grow uranium dioxide and uranium zirconium thin film. Their work supports nuclear fuel research for commercial power reactors.

- Stubbins holds four grants, worth about \$250,000 each, from the NERI program. In addition to working on the waste issue, Stubbins' group is involved in testing materials for very high temperature gas-cooled reactors, a design the Generation IV International Forum is considering. His group experiments with and constructs models of reactors whose materials will not corrode or compromise mechanical and structural stability. Also, Stubbins' graduate students are examining radiation effects in certain types of steel and looking at corrosion in liquid metals.



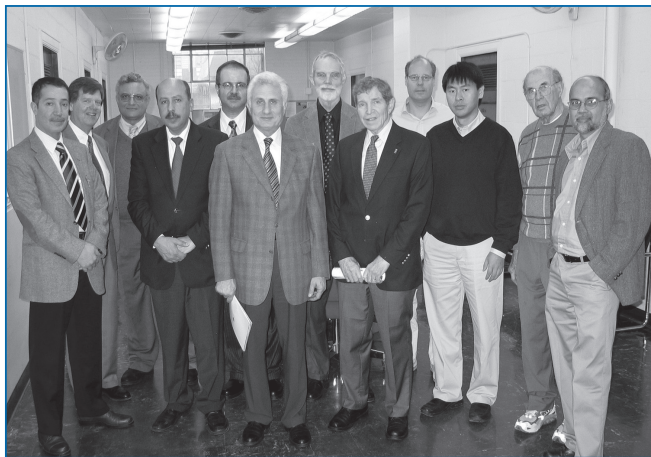
Brent J. Heuser

Brent J. Heuser's home page:

<http://www.ne.uiuc.edu/heuser.html>

James F. Stubbins' home page:

<http://www.ne.uiuc.edu/stubbins.html>



From left, Mohammad Malkawi (JUST), NPRE Department Head Jim Stubbins, NPRE Prof. Magdi Ragheb, Abdallah I. Hussein Malkawi (JUST), NPRE Visiting Prof. Mohammed Ahmad Khasawneh, Wajih Owais (JUST), and NPRE faculty members Tom Dolan, Barclay Jones, Brent Heuser, Ling Jian Meng, Dan Hang and Rizwan Uddin.

Jordan scientists visit NPRE

A scientific and educational delegation from the Jordan University of Science and Technology (JUST), including Prof. Wajih Owais, the university's President, visited NPRE February 4 and 5, 2008, in a continued effort to establish a nuclear engineering program at JUST.

Joining Owais from Amman, Jordan, were Prof. Abdallah I. Hussein, university Vice President, and Dr. Mohammad Malkawi, coordinator of JUST's International Collaborations. The group met with NPRE Department Head Jim Stubbins and other members of the NPRE faculty. Chancellor Richard Herman and College of Engineering Dean Ilesanmi Adesida also greeted the delegates, who visited the Coordinated Science Laboratory (CSL), hosted by Director Ravishankar K. Iyer, and the Micro and Nanotechnology Laboratory (MNTL), hosted by Rashid Bashir and Irfan S. Ahmad, director and associate director, respectively. The guests also met with faculty from the College of Agricultural, Consumer and Environmental Sciences, the International Programs & Studies Office, as well as University of Illinois students who are natives of Jordan.

Officials of JUST have signed a Memorandum of Agreement with the University of Illinois to establish a collaborative framework. NPRE Profs. Magdi Ragheb and Rizwan Uddin have been serving on an advisory council to help JUST pursue a nuclear engineering program there. Ragheb and Uddin traveled to Jordan last March to make recommendations on curriculum and provide advice on procedures.

Uddin said the Jordanian university this year began accepting students for the new program, and that courses particular to a nuclear engineering degree should begin within two years.

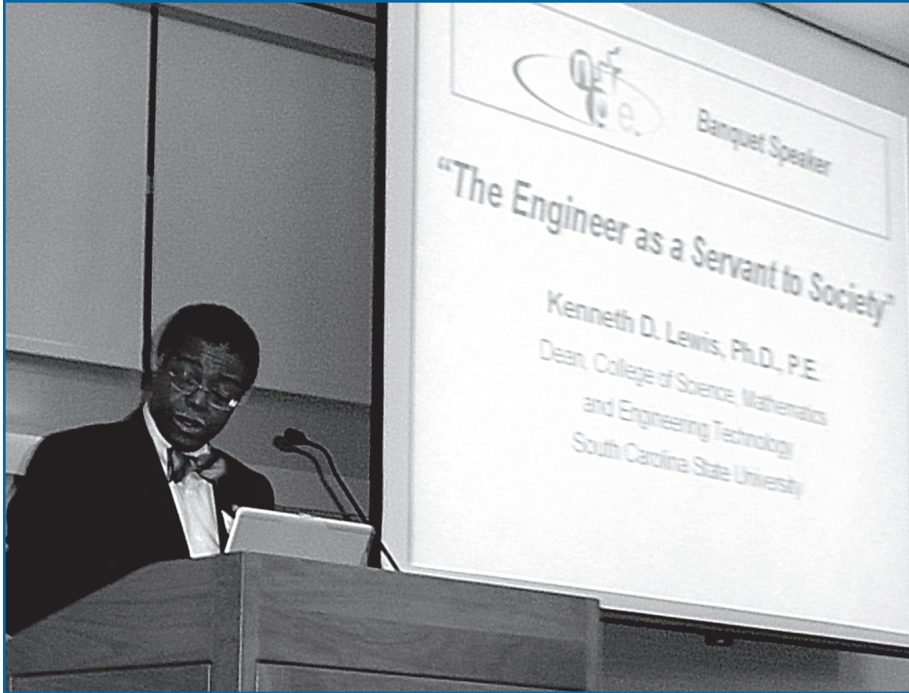
NPRE has role in nuclear renaissance

All around us, nationwide and worldwide, we are in the midst of a "nuclear renaissance."

Increasingly, the mainstream media is taking note of the trend, as a recent edition of *Newsweek* magazine shows. (See <http://www.newsweek.com/id/91622/output/print>.) At the same time many countries are considering and acting upon a return to nuclear power, there is a shortage of nuclear engineers. Many in the current workforce are reaching retirement age, and as their numbers have not been replaced with equal numbers of students from the 1980s and 1990s, a definite lack of trained professionals has resulted.

As educational institutions, industries and government agencies grapple with these issues, we believe our alumni, friends and students should consider some facts about nuclear energy's importance, and how we are affected locally:

- 1) The Department of Energy is invested deeply in the Global Nuclear Energy Partnership, the voluntary program aimed at expanding nuclear power worldwide while managing nuclear waste and reducing proliferation risks. Beyond our borders, countries such as China and India are making significant investments in nuclear power. Here at home, our federal government is considering granting power industries licenses for construction and operation of 28 new nuclear power plants. There is talk of re-commissioning plants that were shut down previously.
- 2) The State of Illinois' investment in the science, technology and applications of nuclear energy is considerable. Illinois is the largest nuclear generation State in the Union, and, by itself, ranks ninth in the world (the United States is Number One). Nuclear power produces half of the electricity that Illinois consumers use. Here, in the country's heartland, are located the well-respected Argonne National Laboratory, which continues to contribute to nuclear systems development for the entire world, and Exelon Corp., the Chicago-based US leader in providing nuclear energy.
- 3) NPRE is the only academic unit anywhere in Illinois that deals with nuclear science and technology research and education. Our role as a contributor to the State's major nuclear resources thus is critical. Our plans for this program match very well with the Campus and University strategic initiatives for *sustainable energy and the environment*. We are pleased the University has recognized energy as a crucial area, and are committed to playing our unique part in moving the nation forward on that front.



Act of Heroism:

Lewis serves his country in Sapphire Project

Kenneth D. Lewis, a true American hero, delivers the 2007 NPRE Honors Banquet address.

Packed with secrets and danger, Kenneth D. Lewis's tale told like a spy novel. Best of all, it was true.

Lewis, PhD 82, speaker for the 2007 NPRE Honors Banquet, has made a career of serving and safeguarding the public through his work as an educator and nuclear engineer. He has dedicated his life to providing timely, expert nuclear engineering support to Department of Energy projects that directly impact national and world security and the public health.

Lewis currently is Dean of the College of Science, Mathematics, and Engineering Technology and BWXT Professor of Nuclear Engineering at South Carolina State University. But his story of feared espionage and unselfish patriotism dates back to 1994, when he was working as an engineering specialist at Lockheed Martin Energy Systems, Inc., in Tennessee. That is when he played his role in the "Sapphire Project."

"Sapphire" was a secret U.S. mission to retrieve about 600 kilograms of highly enriched weapons-grade uranium (sufficient to construct several Hiroshima-size atomic bombs) from the former Soviet republic of Kazakhstan before the materials could fall into terrorists' hands. Lewis and a team of other scientists volunteered for the mission to carefully plan the handling and packaging of the material so it could be airlifted to Y-12's secure vaults in Oak Ridge, Tennessee. Not even Lewis' family members were allowed to know where he was or what he was doing for this dangerous mission.

Under adverse conditions, he and the team worked for about a month while, outside their facility, armed guards kept watch to deter terrorists threats. As nuclear criticality specialist, Lewis distinguished himself in the project by:

(1) Recognizing and urging that certain calculations be performed because of the uniqueness of the uranium alloys involved. These calculations proved warranted, and resulted in the setting of specific safety limits during the recovery operations. In early 1997, following declassification of the Sapphire project, the civilian Nuclear Regulatory Commission revised its regulations to include such specifications.

(2) Developing and deploying a technique for rapid, in-situ determination of uranium mass in containers while operations were ongoing in Kazakhstan.

(3) Performing radiation-shielding calculations to ensure worker safety during the project.

The successful mission earned Lewis President Bill Clinton's personal letter of appreciation, as well as the thanks of U.S. ambassadors, the secretaries of Energy, Defense, and State, and of Lockheed corporation and company presidents.

When he returned home and resumed work for Lockheed Martin Energy Systems, Lewis continued his careful review of safety procedures. In winter 1997, a major project of the company was the fissile material deposit removal program at the decommissioned Oak Ridge K-25 gaseous diffusion plant. During this project, Lewis served as the senior reviewer of nuclear safety documents produced. In his reviews, he discovered and corrected several oversights that could have adversely and profoundly impacted the project. For this effort, he was named Lockheed Martin Energy Systems "Engineer of the Year for 1998." In view of his sustained technical excellence in performing his duties, he received from the company the 1998 Nova Award for Technical Excellence, the 161,000-employee corporation's highest honor. Also that year, the 1998 Black Engineer of the Year Awards Selection Committee chose Lewis from among several hundred nominees for the President's Award. In 1999 Lewis was named Fellow of the American Nuclear Society, a distinction held by fewer than 5 percent of that society's 11,000 members. In 2000, Lewis was among 20 people from the nation's four DOE national security technology centers and Los Alamos and Sandia national laboratories to be appointed a member of the Network of Senior Scientists and Engineers inaugural class. He was re-appointed to that group in 2003. The Department of Energy presented him with an Award of Excellence in 2001 for heading a team that developed a new class of borated materials used to safely store uranium materials.

In addition to safeguarding the public through his work as a nuclear engineer, Lewis has been dedicated to advancing educational opportunities for minorities, particularly African Americans.

Lewis' current position is in service to South Carolina State University, designated among the country's Historically Black Colleges and Universities. The academic post evolved in 2005 from a mentor-protégé agreement reached a year earlier between Lewis' employer, BWXT Y-12^{LLC}, and the university.

Lewis continues to faithfully support the Minority Education Program at the University of Illinois at Urbana-Champaign. He has been recognized with certificates of appreciation from members of the Historically Black Colleges and Universities, where he has served as a motivational speaker to undergraduate students. Among them have been the Lincoln University of the Commonwealth System of Higher Education, Lincoln University, Pennsylvania; Alabama State University, Montgomery, Alabama; Central State University College of Business and Industry, Wilberforce, Ohio; and the Bethune-Cookman College, Daytona Beach, Florida. Lewis also has taught mathematics and science at several colleges and universities, including Shawnee State College, Portsmouth, Ohio; the University of the Pacific, Stockton, California; and Knoxville College, Knoxville, Tennessee. For this work and his professional achievements, he received the University of Illinois Black Alumni Achievement Award in 1992.

Engineering College recognizes Lewis with Alumni Honor Award

The College of Engineering has selected Kenneth D. Lewis to receive the 2008 Alumni Honor Award for Distinguished Service in Engineering. Lewis is the first NPRE alumnus to have achieved this honor.

The College's alumni award is based on professional distinction through outstanding leadership in planning and direction of engineering, or contributions to knowledge in the field of engineering. Lewis will be presented with the award at the College's 44th Annual Awards Convocation set for Friday, April 25, 2008.



NPRE Adjunct Prof. Tom Dolan (middle) and his daughter, Meg, chat with speaker Ken Lewis at the 2007 NPRE Honors Banquet.

Living their dreams



NPRE alumnus Martin Neumann with last year's fourth graders from Anne Fox Grade School in Hanover Park, Illinois.

NPRE alum helps bring underprivileged kids to U of I campus

“Life’s most urgent question is: What are you doing for others?” — Martin Luther King, Jr.

Martin Neumann, a medical student and new graduate of NPRE’s PhD program, took that question to heart, and, as a result, has experienced great satisfaction from doing for others. In 2007, he helped a group of underprivileged fourth graders from a Chicago area school live a dream by arranging for them to travel to Urbana-Champaign for a first-hand look at the University of Illinois.

It all began one and a half years ago, when Neumann’s friend, Amanda Smith, a teacher at Anne Fox Elementary School in Hanover Park, asked Neumann to send her some trinkets from campus. The school was starting the “No Excuses University” program, an approach meant to battle high poverty rates and low academic achievement. Through it, each class in the school chose a university to study. The premise is that, by getting the young students excited about the universities’ campus life, traditions, buildings, etc., more of the students would be encouraged to attend college themselves.

Smith’s request came at a hectic time in Neumann’s life. “I was busy, stressed, in grad school,” he said. But he talked to his friend, Richard Stockton, BS ’97 Electrical & Computer Engineering, JD ’00 Law, and together they got to work. “We talked with Folletts (Book Store) and got some overstock notebooks, pens, pencils and banners,” then sent the items up to the students. The students responded with a thick stack of orange and blue thank-you notes. Neumann and Stockton then sent each of Smith’s pupils an Illinois T-shirt. Both the Chancellor’s Office and the University of Illinois Alumni Association sent packages of Illinois items to the class.

The good feeling Neumann got from helping out Smith’s class infected him, and he had to do more. His epiphany was to bring the kids to the university. “Amanda’s class had had the most participation (in No Excuses University). I wanted to give them that experience,” Neumann said.

All he needed was \$1,500 to charter a bus. He was able to raise \$800 from several of his closest friends. Then he talked with Bernie Freeman of the University of Illinois Foundation, who put Neumann in contact with Bill Turner, Associate Director of Development at the College of Education, which paid the other \$700. “They said, ‘We’ll make it happen. Tell us what you need.’”

On a bright day in May, 27 students, eight parents — some of who could not speak English — and two teachers, all proudly wearing their orange and blue Illinois shirts, arrived on campus. “The best thing was their first reaction when they stepped off the bus — that wide-eyed wonderment,” Neumann recalled. “We inside the university don’t always realize how great it is. Sometimes, we have a better reputation outside the state and country than we do right here.”

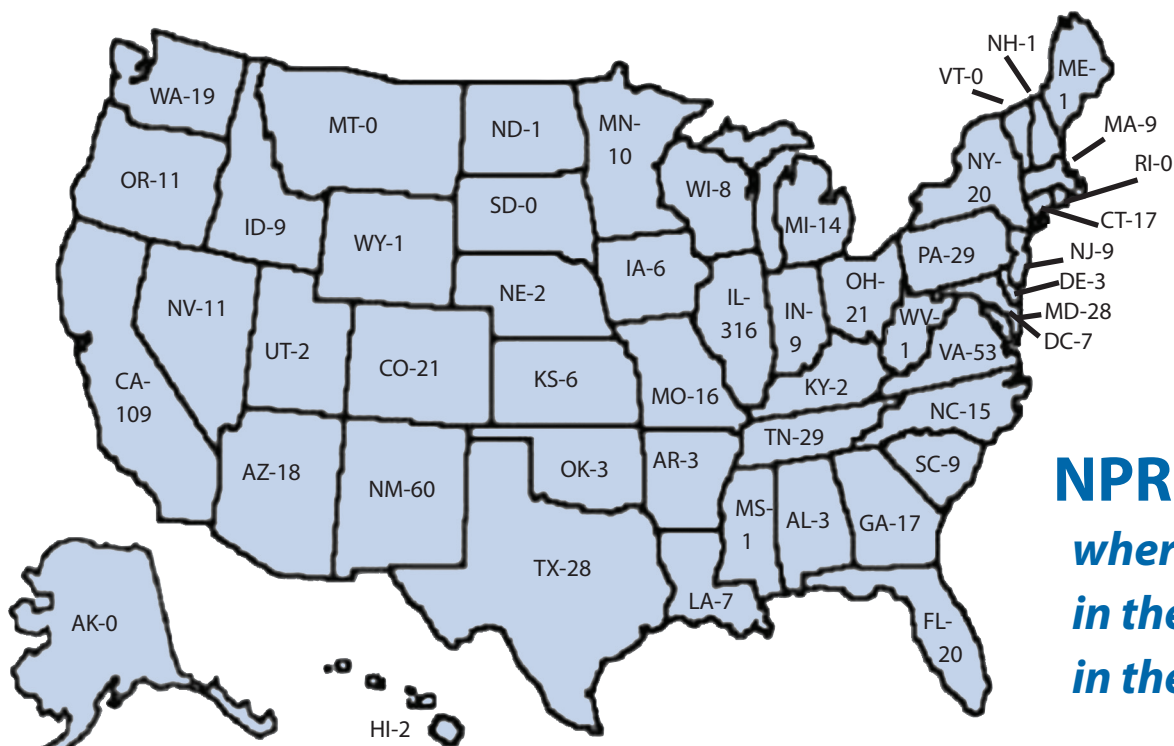
The tour began at Beckman Institute, where Provost Linda Katehi and Chancellor Richard Herman greeted the group. Local TV stations WCIA and WILL were there, covering the story. The entourage walked from Beckman across campus to the College of Education. “I was surprised about how much the kids already knew about the campus,” Neumann said. “They had studied Illinois on the web and recognized buildings; they knew the Bell Tower and the Union.”

The tour ended at the College of Veterinary Medicine. Said Neumann, “We heard a cow moo and a kid said, ‘What’s that?’ He’d never seen a cow before.” As a finale the group went through a mock graduation in which the students were given certificates held in official Illinois diploma covers.

Now a new crop of fourth graders at Anne Fox are taking on the University of Illinois. The students that took the trip in May are fifth graders and are studying a different university. But Neumann will forever hold a special affection for them. “We promised to keep in touch.”

He downplays his own generosity. “Like anything in life, if you make a personal connection, it can mean a lot. It takes very little on our part to make a huge, positive difference on a kid’s life.”

“Even if one more of these kids go to college, it will be a success,” he said. 



NPRE alumni:
*where you are
 in the USA and
 in the world*

- Armed forces in the Pacific
- Egypt
- Libya
- India
- Iran
- Israel
- Japan
- Republic of Korea
- Pakistan
- Taiwan, R.O.C.

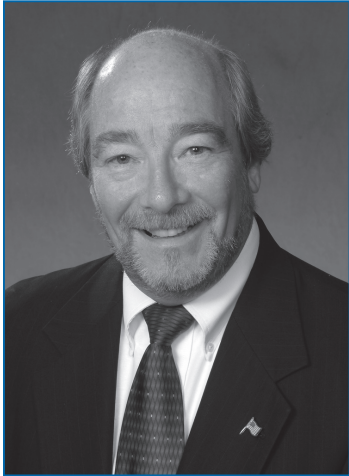
- 1 Turkey
- 2
- 3 Belgium
- 1
- 1 France
- 3
- 4 Greece
- 1
- 1 Italy
- 1
- 1 Scotland
- 1
- 2 Canada
- 4
- 2 Brazil
- 2
- 3 USA
- 988
- 3



Burchill is ANS President-elect

William E. Burchill, MS 65, PhD 70, is the American Nuclear Society's new vice president/president elect.

Burchill recently retired as Head of Texas A&M University's Nuclear Engineering Department, and said his primary objective will be "to strengthen ANS' role as the preeminent



William E. Burchill

technical and professional representation of the U.S. nuclear community."

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

Giacobbe earns Loyalty Award

The University of Illinois Alumni Association has chosen NPRE alumnus Michael J. Giacobbe III, BS 91, MS 95, PhD 99, to receive the 2008 Loyalty Award.

Established in 1957, this award honors alumni who have made significant, notable and meritorious contributions, and who have consistently demonstrated exceptional loyalty, commitment, dedication and service to the University of Illinois Alumni Association.

Giacobbe, a lead analyst for Aon Risk Services, a Chicago consulting firm, will be recognized during the NPRE 2008 Honors Banquet, Thursday, April 24, in the Alice Campbell Alumni Center Ballroom on campus.



Michael J. Giacobbe III

Even as a young alumnus, Giacobbe felt a desire to give back to his alma mater. Soon after earning his PhD, Giacobbe helped organize a network of fellow alumni to create the Catherine Pritchard Scholarship Fund, the first undergraduate award within NPRE. The first Pritchard Scholarship was awarded in 2000, just two years after Giacobbe had earned his degree, and nine scholarships have been awarded to date.

Giacobbe continues his involvement. He is working with the department and College of Engineering to encourage alumni to endow the Barclay G. Jones Fund as a fellowship within NPRE. He acts as an advocate, contacting other alumni to encourage their support. Giacobbe also has served on the department's Constituent Alumni and Industry Advisor Board for about seven years.

By establishing these student support funds, Giacobbe helps the department recognize and reward the outstanding work of its students. Perhaps even more important, Giacobbe serves as an example and inspiration to these students, who, it is hoped, will return the investment in future generations of students.



Patricia L. Eng

Eng to deliver Honors Banquet talk

Patricia L. Eng, P.E., BS 76, a member of NPRE's first bachelors degree class, will speak at the 2008 Honors Banquet, Thursday, April 24 in the Alice Campbell Alumni Center.

Eng is a Senior Project Manager and Knowledge Management Staff Lead in the Office of Federal and State Materials and Environmental Management Programs at the Nuclear Regulatory Commission. She oversees the development and implementation of regulations and related guidance for the safe commercial use of radioactive materials in the United States. Eng has held positions of increasing responsibility in nuclear technology policy, reactor inspection and licensing, human factors analysis and event investigation, as well as oversight of spent fuel storage and transportation activities. She has served as Technical Assistant to NRC executives and the Office of the Executive Director for Operations. Now in Washington, D.C., Eng had served as the NRC Resident Inspector at the Zion Nuclear Power Plant, and was the first woman to receive the NRC Meritorious Service Award for outstanding resident inspector effort.

She recently returned to NRC after a two-and-a-half year detail to the headquarters of the National Aeronautics and Space Administration, where she managed safety and environmental review aspects for developing a nuclear-powered propulsion system, and established a knowledge management system for NASA's Office of Education.

Eng has been active in efforts to recruit and retain women and minorities into the Science, Technology, Engineering and Mathematics (STEM) Education Institute related fields, and has conducted a National Survey of male and female Engineers for the Society of Women Engineers. As a member of the Women in Engineering Committee of the Institute of Electrical and Electronics Engineers, she conducted an international member survey and developed an international "Introduce a Girl to Engineering" Day. She also served on a National Academy of Engineering committee which investigated the career challenges facing women engineers. Eng

has testified before a Congressional Subcommittee as an expert witness on women engineers, has delivered a briefing on the IEEE activities at a United Nations-sponsored meeting of NGOs, and has presented her observations on the status of women and Asians in the engineering workforce at the 12 International Conference of Women Engineers and Scientists.

NPRE Constituent Alumni and Industry Advisory Board

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 Blair P. Bromley, MS 98 AE, PhD 01
 Bernard "Bud" H. Cherry, BS 62 Chemistry, MS 63
 Stephen V. Coggeshall, MS 82, MS 84 Music, PhD 84
 Dennis DeMoss, MS 81 MatSE
 Patricia L. Eng, BS 76
 Michael J. Giacobbe, III, BS 91, MS 95, PhD 99
 Daniel F. Hang, BS 41 EE, MS 49 EE
 Bryan Hanson
 Robert L. Hirsch, BS 58 ME, PhD 64
 Barclay G. Jones, MS 60, PhD 66
 Brian E. Jurczyk, BS 95 AE, MS 97, PhD 01
 John F. Kotek, BS 89
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 Deborah A. Laughton, BS 95, JD 02
 Kenneth D. Lewis, PhD 82
 Kenneth L. "Lee" Peddicord, MS 67, PhD 72
 H. Peter Planchon, Jr., MS 72, PhD 74
 Timothy J. Polich, BS 81, MS 83
 Bruce J. Rash, BS 82 EE
 Robert A. Stubbers, MS 98, PhD 02
 Allen J. Toreja, BS 96, MS 98, PhD 02
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 David P. Weber, MS 70, PhD 74
 Bernard W. Wehring, MS 61 Physics, PhD 66

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James F. Stubbins
 Susan K. Mumm, MS 92 Journalism

Classes

Sixties

BERNARD H. CHERRY, BS 62 Chemistry, MS 63, is chairman and a member of the Board of Directors of Distributed Energy Systems Corp. The Connecticut-based company creates and delivers products and solutions to the emerging decentralized energy marketplace that give users greater control over their energy cost, quality and reliability. Previously, Cherry was president and chief executive officer of the Foster Wheeler Global Power Group. Foster Wheeler provides design, engineering, construction, manufacturing, management, plant operations and environmental services for the power and process sectors worldwide. Cherry has diverse experience with energy-related companies, including serving as president and chief operating officer of The Oxbow Energy and Minerals Group, an affiliate of Oxbow Corporation, an industry-leading source of solid fuel supply, bulk material logistics and clean electric power generation.

HENRY T. SAMPSON, MS 65, PhD 67, was featured in the January/February 2008 issue of *Illinois Alumni* (pages 32-34) as an authority on the history of blacks in film and television. Sampson also was among inventors named in Edison

International's special 2007 publication, *African American Inventors – Celebrating Innovation*. According to the booklet, "Edison International celebrates Black History month with 'Connecting the Evolution of Electricity to Black History,' an annual event that honors African American inventors and their contributions to our industry." The booklet went on to say about Sampson, "Born in Mississippi in 1934, Henry Sampson earned his Ph.D. in nuclear engineering from the University of Illinois in 1967. He has worked for the Atomic Energy Commission, and as director of mission development and operations for the Space Test Program at the Aerospace Corporation.

"His two patents in the area of solid-fuel rocket motors are for a 'binder system for propellants and explosives' and a 'case bonding system for cast composite propellants.' But he is best known, along with co-inventor, NPRE Prof. George Miley, for the invention of the gamma-electric cell, a device that produces high voltage in the presence of nuclear radiation, which is valuable as both a radiation detector and as a means of generating electric power from nuclear energy. "Sampson's books on blacks in film and television have become primary references for anyone researching the history of blacks in those entertainment areas. Titles include *Blacks in Black and White* (1978); *That's Enough Folks* (1998); and *Swingin' on the Ether Waves* (2005), which, at more than 2,500 pages, sells for close to \$400."

In Memorium

BRUCE L. CAIN, MS 87, PhD 89, Associate Professor in the Mechanical Engineering Department at Mississippi State University, died August 27, 2007, of a brain aneurysm. He was 51 years old. Cain's research interests were materials engineering, coatings and thin-film processes, plasma processing and electromagnetic shielding. Like many early fusion researchers, he was fascinated by the Pons/Fleischmann announcement. Cain was advising alumni groups on development of fusion fuel and furnaces at the time of his death. As a leader in Mississippi State University research he worked closely with The University of Alabama, MSU alumni groups, and University-sponsored research. Cain was a member of the American Society of Mechanical Engineers, the Institute of Electrical and Electronics Engineers, Tau Beta Pi, Pi Tau Sigma, and Omicron Delta Kappa. He is survived by his wife, Diane, his son, Johnathan (19), and his daughter, Jennifer (15).

HERMAN "LYNN" STALKER, 75, of Champaign, Illinois, died February 2, 2007, at his home. Stalker was an instru-

ment maker in NPRE and retired with 35 years of service. He was a master machinist, in charge of NPRE's machine shop. He did precision machining on experimental devices for NPRE research, and was in charge of repairs for the reactor. This included duties such as fixing broken parts on control rods, etc. He was valuable to much of NPRE's experimental effort in the period when the reactor was operational.

Stalker was a Navy veteran of the Korean conflict. He was a member of Faith United Methodist Church in Champaign; a life member and past master of the Farmer City, Illinois, Masonic Lodge No. 710; a member of Goodbrake Chapter No. 59 of Clinton, Illinois; a member of the Clinton Council No. 74; and a member of DeMolay Commandery No. 24 of Bloomington, Illinois. He was initiated into Masonry in 1955 at Lebonan Lodge, Langdon, North Dakota. Stalker is survived by his wife, Eula; daughter, Connie Jo Gunther of Ashburn, Virginia; son, Michael Wayne Stalker of Farmington, Minnesota; six grandchildren, three great-grandchildren; and his sister, Helen Vance of Loda.

Seventies

BEN J. SLIWINSKI, BS 74 GE, MS 83, is Technical Director of the Smart Energy Design Assistance Center at the University of Illinois at Urbana-Champaign. Sliwinski has thirty years experience as a project manager and principal investigator completing interdisciplinary research projects involving energy systems simulation and analysis, design optimization of energy systems, software development, data collection, statistical data analysis, and utility program evaluation. He has provided consulting services to utilities, government agencies, and private research organizations in the areas of building energy efficiency, energy system modeling, and energy data analysis.

Eighties

ROBERT PENN, BS 77, works for Areva NP in Lynchburg, Virginia.

YOUSRY AZMY, MS 82, PhD 85, has been selected as the new head of the Nuclear Engineering Department at North Carolina State University. Azmy previously had been on faculty at The Pennsylvania State University. His research interests are methods and applications in nuclear computational science, including numerical methods, interactive acceleration schemes, multiprocessing algorithms for deterministic particles transport equations.

Nineties

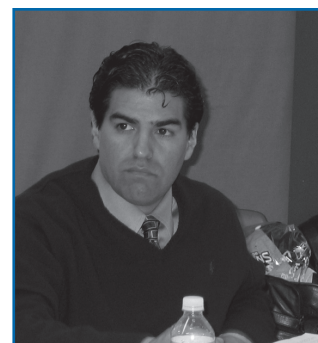
MICHAEL A. GARDNER, BS 97, MS 99 ME, was on campus in the fall, recruiting for his company, Northrop Grumman Corp. Gardner is a opto-mechanical engineer in Rolling Meadows, Illinois.

2000s

SHANA HELTON, BS 00, has been elected the vice chair of the American Nuclear Society Young Members Group, a new division that works to encourage and enable young professional members to be actively involved in the society as they transition from roles as students to professionals. Helton works as a nuclear engineer/dose assessment specialist in the Spent Fuel Storage and Transportation Division of the Nuclear Regulatory Commission's Office of Nuclear Material Safety and Safeguards. Her duties include technical safety



NPRE alumni board members Dennis DeMoss and Robert Stubbers, attending the April 2007 meeting on campus, ask questions and listen while Department Head Jim Stubbins explains challenges facing NPRE.



Board members Debbie Laughton and J.P. Allain.

reviews and security assessments of spent fuel storage cask designs and radioactive material transportation packages. Helton also has given birth to a daughter, Sarah Estelle, born March 22, 2007.

MASAB H. GARADA, MS 01, PhD 06, is a Regional Medical Physicist for the cancer center in the Provena Covenant Medical Center in Urbana, Illinois.

NICK KARANCEVIC, BS 03, MS 05, is a nuclear engineer for Fauske & Associates^{LLC} in Burr Ridge, Illinois.

STEVEN WANG, PhD 03, is Chief Physicist/Manager, Medical Physics, in the Cancer Institute at St. John's Hospital in Springfield, Illinois.

SALMAAN AKHTAR, BS 05, is Generator Design Engineer at ALSTOM Power, Inc., in Midlothian, Virginia.

MIRKO ASCIC, BS 05 EE, BS 05, MS 06, is working for Sargent & Lundy^{LTD} in Chicago, Illinois.

NPRE PhD student **MARIA OKUNIEWSKI** and **JASON HARRIS, MS 02**, are bound for Idaho. Maria will start a position in the Idaho National Laboratory, while Jason is on faculty at Idaho State University.

Welcome New Alums! – Graduates from December 2006-October 2007

Doctor of Philosophy Degrees

CARLOS H. CASTANO (December 2006) "Study of Break-down/Arcing for High Power RF Antennas on Fusion Applications" (David N. Ruzic, Advisor).

PEIPEI CHEN (May 2007) "An Experimental Investigation of Critical Heat Flux Performance of Hypervapotron in Sub-cooled Boiling" (Barclay G. Jones, Advisor). Chen is a senior thermal engineer in the Advanced Technology and Lab Division of Goodman Global in Houston.

MATTHEW D. COVENTRY (May 2007) "Temperature-Enhanced Low-Energy Ion Sputtering of Liquid Sn: Measurements and Modeling" (David N. Ruzic, Advisor). Coventry is working for Starfire Inc. in Champaign, Illinois.

HYUNG J. KIM (December 2006) "Instability Studies on a Spherical Inertial Electrostatic Confinement" (George H. Miley, Advisor). Kim is a research associate in the Accelerator Division of the Fermilab National Accelerator Laboratory in Batavia, Illinois.

MARTIN J. NEUMANN (October 2006) "Lithium Debris Removal By Sputtering and Evaporation for EUV Optics and Applications" (David N. Ruzic, Advisor). Neumann is continuing in the Medical Scholars Program at the University of Illinois at Urbana-Champaign.

HUATAN QIU (May 2007) "Gibbsian Segregating Alloys Driven by Thermal and Concentration Gradients - A Potential Grazing Collector Optics Used in EUV Lithography" (David N. Ruzic, Advisor). Qiu is working in the IG Application Group as a process engineer for Novellus Systems, Inc., in San Jose, California.

WEN WU (May 2007) "Combined Modeling and Experimental Validation of Boiling Curve and Critical Heat Flux" (Barclay G. Jones, Advisor). Wu is working for General Atomics in San Diego, California.

XIANGLIN WU (May 2007) "Embrittlement and Flow Localization of Reactor Structural Materials" (James F. Stubbins, Advisor). Wu is attending law school at the University of Texas in Austin.

Masters of Science Degrees

MIRKO ASCIC (December 2006) "Neptunium-237 Production in Generation IV Reactor Spectra" (Magdi Ragheb, Advisor). Ascic is working for Sargent & Lundy^{LLC}.

HITESH BINDRA (October 2007) "Experimental Analysis of Particulate Deposition Process in Boiling Medium" (Barclay G. Jones, Advisor). Bindra is working toward a PhD in NPRE.

YUN DI (May 2007) "A Thermohydraulic Mechanism Incorporated Modeling of Self-Cleaning Modular Helium Reactor" (James F. Stubbins, Advisor). Di is working toward a PhD in NPRE.

LIFENG GU (December 2006) "Cathode Electrocatalyst Selection and Catalyst Deposition for a Direct Borohydride/Hydrogen Peroxide Fuel Cell" (George H. Miley, Advisor). Gu is working toward a PhD in finance at Illinois.

HYUNSU JU (August 2007) "Improved Performance of Multilayer Neutron Monochromator by Addition of Hydrogen in Titanium Layer" (Brent J. Heuser, Advisor). Ju is working toward a PhD in NPRE.

GRANT KOPEC (October 2007) "Modeling, Analysis and Design of a Regenerative Direct Sodium Borohydride Fuel Cell System" (George H. Miley, Advisor). Kopec is working toward a masters in philosophy at the University of Cambridge.

JIN LEE (May 2007) "MEMS Radioisotopic Battery Cell with High Vacuum Insulation" (George H. Miley, Advisor). Lee is working for Accenture, a Chicago-based consulting firm.

BENJAMIN MASTERS (August 2007) "Development and Characterization of Conventional and Inverted Helicon Plasma Sources" (David N. Ruzic, Advisor). Masters is working toward a PhD in NPRE.

MUQUEEM A. QAYYUM (December 2006) "Dosimetric Properties of Clinac Electron Beam Depth Doses: An Investigation of Electron Beam 'Golden' Data Set" (Richard F. Nelson, Advisor). Qayyum is working toward a PhD in NPRE.

SCOTT D. RAMSEY (May 2007) "Application of Lie Groups and Approximate Coordinate Functions in Nuclear Engineering" (Roy A. Axford, Advisor). Ramsey is working toward a PhD in NPRE.

BENJAMIN J. SCHULTZ (May 2007) "Design and Characterization of a Plasma Source for Ion Bombardment" (David N. Ruzic, Advisor). Schultz is a nuclear fuel engineer for General Electric Corp. in Wilmington, North Carolina.

MELISSA SIEMENS SCHEAR (October 2007) "Monte Carlo Study of Replacing Californium in a Shuffler With a Neutron Generator" (Brent J. Heuser, Advisor). Schear is working toward a PhD in NPRE.

JOSHUA SPENCER (August 2007) "Ion Energy Characterization Study for Next Generation Semiconductor Lithography Based on Gas Discharge Produced Plasma Technology" (David N. Ruzic, Advisor). Spencer is working toward a PhD in NPRE.

BEI YEI (May 2007) "Effects of Thermal-Hydraulic Feedback on Burnup Modeling of the Deep Burn Modular High Temperature Reactor (DB-MHR)" (James F. Stubbins, Advisor). Yei is working toward a PhD in NPRE.

Bachelors of Science Degree

PATRICK BROWN is working as an energy engineer for the Smart Energy Design Assistance Center in Champaign-Urbana, Illinois.

GABRIEL CHAVEZ is working for Exelon Corp.

LAUREN COUTANT will be pursuing a nuclear engineering master's degree at the University of Wisconsin.

JASON DRAPER is working for the Nuclear Regulatory Commission.

ANIL D'SOUZA is a business information specialist for ZS Associates, an energy consulting firm in Chicago, Illinois.

DAVID GENNARDO is attending graduate school in NPRE at Illinois.

LUKE GOTSZLING is attending graduate school in NPRE at Illinois.

GREGORY GUGLE is working for Exelon Corp.

MICHAEL HULL is teaching English for a year in Japan, then plans to apply to graduate programs to earn a masters degree in physics.

STEFAN JANUSZ is working for Sargent & Lundy^{LTD}.

PATRICK MANGAN is working for Starfire Inc. in Champaign, Illinois.

JOHN (JACK) MCMILLIN is attending medical school at the University of Nevada.

DAVID PAPKE plans to attend medical school.

STEVEN SCHLEPPHORST is doing Christian international outreach work.

JOHN SPORRE is attending graduate school in NPRE at Illinois.

COREY STRUCK is attending graduate school in NPRE at Illinois.

STEVEN A. WEISS is attending graduate school in NPRE at Illinois.

Students, faculty recognized at Honors Banquet

NPRE recognized 87 students and several faculty members during the department's 2007 Honors Banquet held April 26 in the Alice Campbell Alumni Center on the University of Illinois Urbana-Champaign campus.

NPRE Department Awardees

STEVEN A. WEISS of Downers Grove, Illinois, was presented with a number of honors this spring, including the **Outstanding Academic Achievement Award to a Graduating Senior** and the American Nuclear Society student chapter **Undergraduate Outstanding Service Award**.

The first award is made to the NPRE graduating senior with the highest cumulative grade point average. Weiss, son of Mark and Marsha Weiss, was recognized this spring as a **Bronze Tablet member**. Only the top 3 percent of undergraduate students across campus receive this highly coveted award. The names of this select group of undergraduate students are inscribed on bronze tablets that are displayed on the first floor of the University of Illinois Main Library. Weiss also has been on the College of Engineering's Dean List every semester.

The ANS award is presented to the undergraduate student

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Steven A. Weiss, left, with Department Head Jim Stubbins.

Honors Banquet

who has most actively supported the student organization branch and its program throughout the academic year. Weiss served as ANS president in 2006-07, and as vice president in 2005-06. He is a member of the ANS national honor society, Alpha Nu Sigma.

Continuing as a graduate student in NPPE, Weiss also was listed last spring among the **Senior 100 Honorary** students. This list annually recognizes the top 100 graduating seniors for their academic success and achievement on campus and in the community. The program is sponsored by the Student Alumni Ambassadors of the University of Illinois Alumni Association. Selection is based on academic standing and involvement, initiative, and leadership in both campus and community activities.

Weiss has been a recipient of the **Nuclear Power Engineering Education Program (NPEEP) Scholarships**, based on strong academic records. Utility industry Exelon Corp. contributes to this scholarship program.

JOHN R. SPORRE of Fort Wayne, Ind., has been presented the **Outstanding Undergraduate Research Award**. Sporre, son of Roger and Jeanne Sporre, has worked in Prof. David N. Ruzic's laboratory in plasma and fusion sciences the past three years and has continued his work in graduate school. Sporre said the research work has presented him "with opportunities ranging from hands-on experimentation to traveling abroad setting up a project in Ireland. It's an opportunity to apply one's textbook knowledge to real life."

BENJAMIN A. HOLTZMAN of Highland Park, Illinois, and **DAVID K. LARTONOIX** of St. Louis, Missouri, were presented the **Catherine Pritchard Undergraduate Scholarships**.

The son of Arthur and Naomi Holtzman, Benjamin Holtzman also received scholarships from the national **American Nuclear Society** national chapter and the **U.S. Department of Energy**, and was recognized as a College of Engineering **Accenture Outstanding Junior**. After a year as vice president of the student branch of the American Nuclear Society, Holtzman is serving as the 2007-08 president. He is a Spring 2007 initiate of Alpha Nu Sigma, the ANS national honor society. He was included on the Dean's List this past academic year. Holtzman interned at Sargent & Lundy^{LLC} this summer as he prepares for a career in the power industry.

Holtzman previously has been the recipient of scholarships from the **National Academy for Nuclear Training Institute of Nuclear Power Operations (NANT INPO)** and **NPEEP**. In 1980, INPO recognized the need to plan for the future by helping provide an ongoing supply of entry-level engineers for the nuclear industry. With utilities providing the funding, NANT was established to award scholarships and fellowships to engineering students demonstrating outstanding academic achievement and interest in careers in the nuclear power industry.

The son of Peter and Sally Lartonoix, David Lartonoix plans to work in the power industry. He is a continuing member of the ANS Alpha Nu Sigma Society, is a James Scholar, and has been on the Dean's List this past academic year. He



John Sporre with Prof. David Ruzic.



Left to right, David K. Lartonoix, Catherine Pritchard and Benjamin Holtzman.

served as secretary of the student ANS chapter this past year. Lartonoix previously received a **NPEEP** scholarship. The Pritchard Award is presented to an incoming senior who has demonstrated academic ability and leadership. Catherine Pritchard was a long-time, valued university employee who worked in the NPRE Department from 1979 until her retirement in 1996. She helped many students through the admissions and records office. A group of NPRE alumni established this scholarship in her honor as a thank-you.

RYAN J. CRAFFEY of Spring Grove, Illinois, was presented the **Roy A. Axford Undergraduate Scholarship**.

Craffey is the son of Jack and JoAnn Craffey, and is preparing for a career in the power industry. He has been included on the Dean's List this past academic year and is a James Scholar.

The Axford award is presented to continuing students of high academic ability and achievement. Professor Axford has been a valued, respected member of the Department since 1960. The scholarship was established by some of Axford's 50 Ph.D. advisees to honor this gifted educator, mentor and scholar.

Craffey previously received a NPEEP scholarship.

IAN M. PERCEL of Chicago, Illinois, and **JEFFREY N. CARDONI** of Normal, Illinois, were presented the **George H. Miley LENR Undergraduate Scholarship**.

Percel has won this award two years in a row. The son of Stanley and JoAnn Percel, Percel interned recently at Los Alamos National Lab in New Mexico. He is a continuing member of Alpha Nu Sigma, the American Nuclear Soci-

ety student chapter's honor society. Percel also is a James Scholar, and has been included on the Dean's List this past academic year.

Cardoni also has consistently made the Dean's List and is a member of Alpha Nu Sigma.

The Miley LENR Scholarship is awarded to a highly motivated, continuing undergraduate. Professor Miley is director of the Fusions Studies Laboratory, as well as is a professor in NPRE and Electrical and Computer Engineering. Among his research interests are low energy nuclear reactions (LENR), involving nuclear reactions that take place at low energies in solid materials where the solid lattice structure plays an important role in the reaction. Miley established the scholarship because he believes this research will provide important new directions for nuclear research and applications.

HITESH BINDRA was presented the **Sargent & Lundy^{LLC} Fellowship** and the **Bruce W. Spencer Graduate Award**.

Bindra, a native of Rohtak, India, joined NPRE in Fall 2005 to pursue a master's degree. He has served as reactor engineer/commissioning engineer with Nuclear Power Corporation of India Ltd. He received his bachelor's degree in Chemical Engineering from Panjab University in 2002 with the undergraduate thesis, "Development of V-trough solar concentrator." During his stay at NPCIL, he worked the undergraduate thesis, "Development of V-trough solar concentrator." During his stay at NPCIL, he worked in the commissioning of Primary Heat Transport System for CANDU reactors. Bindra currently is working on Crud-Induced

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Prof. Roy Axford, left, and Ryan Craffey.



From left, Ian Percel, Jeffery Cardoni and Prof. George Miley.

Honors Banquet

Power Shift in PWRs Particulate Deposition under Sub-Cooled Nucleate Boiling, with his advisor, Prof. Barclay G. Jones, and is working with Prof. Rizwan Uddin on BWR stability analysis to find out the stable domain for BWR operation. During the summer of 2006, Bindra interned with FAI-Chicago (Westinghouse Electric Co.), where he worked on Reactor Accident Analysis Code (MAAP4) and used it for the safety analysis for Wolf Creek Generating Station and Zion Nuclear Power Station.

Bindra is a Spring 2007 Initiate of Alpha Nu Sigma, the American Nuclear Society student chapter's honor society. The Sargent & Lundy competitive fellowship is awarded to a graduate student who shows promise of making substantial research contributions in the power design areas and who has demonstrated a strong academic performance. The Chicago-based company is a worldwide leader in services for the electric power industry. The firm provides consulting and project services for fossil-fuel and nuclear power plants and power delivery systems. The Spencer award was established in memory of alumnus Bruce W. Spencer, who earned a master's degree in 1965 and a doctoral degree in 1970 in nuclear engineering. Spencer built his career in experimental reactor safety research until his death in 2001. The award is made to a doctoral candidate of high academic standing whose research promises to advance the state of nuclear engineering, specifically as it relates to reactor safety.

JOSE M. CARO of Bloomington, Illinois, was presented the **American Nuclear Society student chapter Graduate Student Outstanding Service Award**.

This award is presented to the graduate student who has most actively supported the ANS branch and its program throughout the academic year.

Caro, who served as 2006-07 ANS treasurer, has been active in the organization since his freshman year when he was webmaster. His junior and senior years, he was highly involved in coordinating the ANS Engineering Open House presentations. Caro was instrumental in advising freshmen through his NPRE 100 teaching assistantship. He also served as an ANS officer as Secretary his senior year. He is a continuing member of Alpha Nu Sigma. Caro also holds a **Support for Under-Represented Groups in Engineering (SURGE) Fellowship**.

Prof. Rizwan Uddin advises Caro in his graduate studies.

RICHARD A. BOETTCHER of Woodstock, Illinois, received several honors this spring from nuclear engineering organizations and the U.S. Department of Energy. Boettcher received the American Nuclear Society national organization's **John and Muriel Landis Scholarship** and a **National Academy for Nuclear Training Institute of Nuclear Power Operations (INPO) Scholarship**.

The Landis Scholarship, named for John Landis, a Fellow, founding member, and past ANS president, is awarded to undergraduate and graduate students planning a career in nuclear science, nuclear engineering, or a nuclear-related field. INPO created its scholarships to provide an ongoing



From left, Prof. Barclay Jones, Hitesh Bindra and Department Head Jim Stubbins.



Jose Caro, left, and Steven Weiss.

supply of entry-level engineers to fill the nuclear industry's future employment needs.

Boettcher is a Spring 2007 initiate of Alpha Nu Sigma, the ANS honor society. He was recognized by the College of Engineering as an **Accenture Outstanding Junior**. He is a James Scholar, was on the Dean's List this past academic year, and has served as the webmaster for the ANS student chapter.

Boettcher, **JENNIFER J. ONG** of Glendale Heights, Illinois, and **MICHAEL M. HULL** of Champaign, Illinois, have all been named **Chancellor's Scholars**.

These students participate in social, intellectual, and cultural activities, and maintain a minimum cumulative grade point average of 3.25.

Ong was on the Dean's List this past academic year. She interned at Brookhaven National Laboratory in Upton, New York, this summer.

Hull is a James Scholar, and is a continuing member of Alpha Nu Sigma, the American Nuclear Society student chapter's honor society. He previously received a **NPEEP** scholarship.

Boettcher, Hull, **STEPHEN F. KOHLHASE** of Bloomington, Illinois, and **THOMAS E. SOWINSKI** of Chicago, Illinois, all were selected for **U.S. Department of Energy scholarships**. The DOE scholarships were created to encourage talented students to continue education in a nuclear energy-related field.

Kohlhase has previously received a scholarship from **NANT INPO**, and both Kohlhase and Sowinski have received **NPEEP** scholarships. Sowinski is a James Scholar

and was on the Dean's List this past academic year.

DREW G. GRIFFITHS of Port Byron, Illinois, was the winner of the 2006-07 **Exelon Corporation Scholarship**.

Exelon, recognized as the "Top Utility in the World" by Platt's Publication, "the nation's leading utility and energy services company" by Business Week, and as "Best of Breed" by Forbes, established the scholarship program to encourage talented students interested in a career with the company.

The son of Greg and Lea Griffiths, Drew Griffiths worked this summer as an intern for Exelon Nuclear in the Reactor Engineering Division at the LaSalle Generating Station. He also interned for Exelon in the summer of 2006.

Griffiths also has received a **NANT INPO** scholarship. He is 2007-08 treasurer of the American Nuclear Society student chapter.

XIANGLIN WU received the national **American Nuclear Society Student Literary Award**.

The award recognizes the student that has presented at the Annual or Winter ANS Meeting the best full-length materials-oriented paper contributing to the development of nuclear energy, and subsequently submitted a full paper for publication in *Nuclear Technology* or other ANS journal. Wu's paper was entitled, "Modeling Tensile Response and Flow Localization Effects in 316SS after Exposure to Spallation and Fission Irradiation Environments," and was published in the *Journal of Nuclear Materials*.

Wu earned a bachelor's degree in engineering physics in 2001 from Tsinghua University in the People's Republic of China, and a master's degree in 2004 in nuclear engineer-

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Richard Boettcher, middle, with his parents.



Drew Griffiths, left) with Brian D. Bunte, middle, and Bill Green of Exelon Corp.

ing from NPRE.

Wu earned his degree in May 2007. His research focus was nuclear materials and his advisor was Department Head James F. Stubbins.

PATRICK E. SLOAN of Alton, Illinois, received the **2006 ANS-PHYSOR Conference Best Poster Award** from the American Nuclear Society national organization. Sloan presented his poster on "Computational and Experimental Physics Performance Characterization of the Neutron Capture Therapy Research Facility at Washington State University," at the September 2006 conference. Department Head James F. Stubbins and Assistant Adjunct Prof. Michael Aref advise Sloan on his research.

LAUREN M. COUTANT of Charleston, Illinois, and **LUKE M. GOTSZLING OF HUNTINGTON** Station, New York, were named to the list of the university's **Senior 100 Honorary**.

This list annually recognizes the top 100 graduating seniors for their academic success and achievement on

campus and in the community. The program is sponsored by the Student Alumni Ambassadors of the University of Illinois Alumni Association. Selection is based on academic standing and involvement, initiative, and leadership in both campus and community activities.

Coutant earned her bachelor's in May and interned this summer in the Accelerator Division at Fermi National Laboratory. She is a James Scholar and was on the Dean's List this past academic year. She also is a continuing member of Alpha Nu Sigma.

Gotszling also was honored this spring with the **Tau Beta Pi Senior Medallion**, bestowed by the Engineering Honor Society. Gotszling is a James Scholar, and was on the Dean's List this past academic year. He also is a continuing member of Alpha Nu Sigma. Gotszling earned his bachelor's in May, and is continuing in NPRE as a graduate student.

Graduate student **REBECCA R. ROMATOSKI** of Woodbury, Minnesota, received a **NANT INPO fellowship**. 



Ben Holtzman, new president of the student chapter of the American Nuclear Society, announces his fellow ANS officers.

New ANS officers, Alpha Nu Sigma members named

2007-08 American Nuclear Society student chapter officers

President, Benjamin A. Holtzman, Highland Park, Illinois
Vice President, Rachael W. Jabusch, Mapleton, Illinois
Secretary, Rajat Saksena, Champaign, Illinois.
Treasurer, Drew G. Griffiths, Port Byron, Illinois.
Engineering Council Rep, J'Tia P. Taylor, Miami, Florida .
EOH Rep, Ryan S. Lenahan, Bloomington, Illinois.
Social Chair, Jennifer M. Gall, Naperville, Illinois.
Webmaster, Richard A. Boettcher, Woodstock, Illinois.

Spring 2007 Alpha Nu Sigma honorary society initiates

Jill P. Anderson, El Paso, Texas.
Hitesh Bindra, Rohtak, India.
Richard A. Boettcher, Woodstock, Illinois
Benjamin A. Holtzman, Highland Park, Illinois
Jessica T. Kubo, Aiea, Hawaii.
Stefano Markidis, Champaign, Illinois
Alex E. Prochaska, Rockford, Illinois
Jared S. Reynolds, Urbana, Illinois
Michael A. Sorice, Elmhurst, Illinois
Jianwei Hu, Champaign, Illinois

University programs provide alumni with connections, library services

Always Illinois: The Virtual Community for the Illinois Family

Connect or re-connect with members of the Illinois family with Always Illinois — a new, free online community only for alumni, students, faculty and staff.

Now it's easy to maintain lifelong friendships, network, and stay current with happenings on campus, in colleges and departments, as well as in student and alumni organizations — all through one secure online source.

Unlike online social networks that are open to the general public, Always Illinois is a private community where Illinois family members can build and maintain personal and professional connections. Because Always Illinois requires identity verification to join, users can trust its security and reliability. Unique, one-time Always Illinois identification numbers are available at the time of online registration. Once registered, users create a password for all future logins.

On the network, participants can join customized groups according to class year and degree-granting unit, geographic location, student organizations, professional organizations — the possibilities are nearly limitless. Always Illinois facilitates expanded career networking opportunities for Illinois alumni and students, plus offers online forums to request and offer advice, find a place to live, announce upcoming events, or post a job exclusively to the Illinois family.

Visit www.alwaysillinois.org and follow the appropriate links for alumni, faculty, students and staff to join.

Always Illinois is a service provided by the Office of the Chancellor in partnership with the University of Illinois Alumni Association, the Office of Institutional Advancement, the Office of Public Affairs, and CITES.

UI Alumni Association and UI Libraries partner to offer superior service for alumni

Thanks to a partnership between the University of Illinois Alumni Association and the world-class University of Illinois Libraries, alumni now have an easy option when it comes to doing research for work, class or just general-interest entertainment purposes. ABI/INFORM Complete® by online provider ProQuest is an innovative online database that contains more than 4,000 publications including *Newsweek*, *Sports*

Illustrated, *Business Week*, *Parenting*, *Health*, *The New Yorker* and many more. For the price of a tax-deductible Alumni Association membership, an Illinois graduate can access thousands of national and international newspapers, magazines, professional and scientific journals and trade publications. UIAA members can take advantage of this service free of charge wherever they have Internet access by logging on to www.uiaa.org/proquest.

In many ways, this is an educator's dream. The UIAA and UI Libraries have given University of Illinois graduates an easy-to-use tool that helps them stay current in their fields throughout their lives. The search capabilities of the ProQuest database allow alumni to scan current and archived issues by topic, name or keyword – without having to pay hundreds of dollars in subscription fees or devote lots of time to reading tons of magazines.

The popular online database does not always offer full-text articles, and in some cases, the most recent issue(s) may be temporarily embargoed, but appear in full-text format after the embargo period. Also, titles are subject to change without prior notice.

To see a full list of publications available in the ProQuest/ABI-INFORM Complete® (alumni version) and its companion index, Research Library, visit www.library.uiuc.edu/rex/alumni.htm.

Other library services for Urbana-Champaign alumni

U of I alumni in Urbana-Champaign have a wealth of other library resources on campus. You can check out circulating materials with a courtesy card, a "local-use-only" card that may be obtained in person when you present your U of I Alumni Association membership card, photo identification and proof of current address.

Also, all alumni can ask a reference question remotely. The "Ask-A-Librarian" service at www.library.uiuc.edu/askus offers real-time interactive reference help through Instant Messaging and Chat services, and provides e-mail and telephone contacts. UI librarians serve alumni worldwide, answering approximately 250,000 reference questions each year.

Direct your questions to the Library Information Desk at 217/333-2290 or reflib@library.uiuc.edu.

Miley/LENR Fund honors pioneer in nuclear research

Prof. George H. Miley, who began his career at the University of Illinois just three years after the nuclear engineering program was established in 1958, has dedicated his life's work to revealing and developing secrets of nuclear science for the benefit of society.

The George H. Miley-LENR Endowed Undergraduate Scholarship Fund honors the contributions of its namesake, while recognizing the outstanding academic performance of NPRE undergraduates. It is intended to encourage interest in innovative research in nuclear science.

This past year NPRE named two Miley-LENR scholarship recipients: Jeffrey N. Cardoni of Normal, Illinois, and Ian M. Percel of Chicago, Illinois (see *Honors Banquet award winners, page 27*). Ian was also the 2006 winner, while Luke M. Gotszling of Huntington Station, New York, was awarded the 2005 Scholarship, and Wayne M. Lytle of Addison, Illinois, the 2004 honor.

Professor Miley is among the most prolific researchers in the University of Illinois College of Engineering. His published works include six books, over 230 articles in journals, and another 550 articles in conference proceedings. Director of NPRE's Fusion Studies Laboratory, Professor Miley's interests have ranged from fusion science and technology to direct radiation energy conversion. He is considered a pioneer in nuclear-pumped laser research and is widely recognized for innovative research in fusion. Professor Miley holds 19 patents.

Among his accomplishments have been:

- A pioneering book, *Direct Conversion of Nuclear Radiation Energy*, a work that initiated the field of nuclear batteries.
- The first electron beam diode pumped laser (1969).
- The first visible Nuclear Pumped Laser (1976).
- A Seminole book, *Fusion Energy Conversion* (1976), that initiated serious research on advanced fuel fusion.
- The first comprehensive theory for solid-state gamma battery (1980).
- Development of the concept and detailed physics for a spark ignited inertial confinement fusion target using burn propagation into deuterium (1990).
- Discovery of Star Mode operation for inertial electrostatic confinement devices, opening the way to small lab scale neu-

tron sources and industrial applications (1994).

- Theory and experiments in low energy nuclear reactions created in multi-layer thin-film electrodes (1997).
- Theory and experiments on a unique phonon-driven solid state x-ray laser (2002).
- Concept of an inertial electrostatic confinement neutron source driven sub-critical fission reactor for use in student laboratories (2003).
- Co-inventor of a regenerative fuel cell that employs hydrogen peroxide and offers major advantages for applications (2004) space power.

His work has earned him several honors and awards, including fellow status in four leading professional societies and,

- The 1992 Outstanding Achievement Award from the Fusion Energy Division of the American Nuclear Society.
- The 1995 Edward Teller Medal for his contributions to inertial confinement fusion and lasers.
- The 2003 IEEE Nuclear and Plasma Sciences Award for research achievements in fusion energy.
- The 2004 Radiation Science and Technology Award from the American Nuclear Society (ANS) in recognition of achievements in research on nuclear pumped lasers, radiation energy conversion, and IEC neutron sources.
- The 2006 "Integrity in Research Award" from the Second International Conference on Future Energy (COFE-2).
- The 2006-2007 Giuliano Preparata Silver Medal.

A generous donation from Lattice LLC in recognition of Professor Miley's consulting contributions established the Miley-LENR Scholarship. Professor Miley's firm, NPL Associates, Inc., made subsequent substantial donations. Interest from the principal is used for the scholarships. The goal is to reach \$200,000 to allow \$10,000 or more in scholarships yearly. The gifts of alumni and friends are sought to reach this goal.

Professor Miley has dedicated his life to research in nuclear science and engineering to serve all of us. A gift to the fund in his name ensures his keen quest for knowledge and spirit of discovery will continue in NPRE far into the future.



George H. Miley

Department of Nuclear, Plasma, and Radiological Engineering Gift and Pledge Form

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FY07 NPRE Donors

The alumni and friends listed below contributed to the Nuclear Engineering Unrestricted Fund, the Roy A. Axford Fund, the Bruce W. Spencer Fund, the Catherine Pritchard Fund, the Barclay G. Jones Fund, and the George Miley/LENR Fund during Fiscal Year 07 (between July 1, 2006 and June 30, 2007). Thank you for your gifts! (All degrees are in NPRE unless otherwise indicated.)

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Thanks to our donors!

NPPE wishes to thank all of you who have so generously given to the Barclay G. Jones Fund since its inception in 2006. About \$50,000 has been raised so far from over 50 donors, and we have pledges for many more gifts!

We encourage your continued donations, as we still have a ways to go to reach our goal of building this fund to support a full fellowship.

What a tribute this is to Professor Jones! It is definitely befitting of this dedicated educator who started as a student with the program in its beginnings in 1958, and, has been here ever since as a faculty member, teaching and guiding the careers of hundreds of students. To many alumni, stalwarts such as Professor Jones and his colleagues, Roy Axford, George Miley and Dan Hang, are NPPE. Help us carry their legacies far into the future by giving now!



Barclay G. Jones

Welcome Dawn Sandone!

Dawn Sandone, major gifts officer in the College of Engineering Development Office since February 2000, is the new development officer for NPPE.

She replaces Rita Bates, who is now working as an ITIL Implementation Specialist in the Administrative Information Technology Services Office on campus. Sandone is responsible for raising funds, assisting the department in identifying support needs, and keeping alumni connected with the latest NPPE accomplishments and developments. She also serves as the major gifts officer for the Aerospace Engineering, Industrial & Enterprise Systems Engineering, Materials Science & Engineering, and Physics departments.

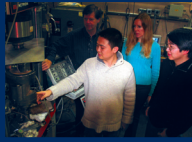
Born in Orlando, Florida, Sandone earned a bachelor's degree in business administration from Stetson University in DeLand, Florida. She is in the process of pursuing a master's degree in the College of Education at the University of Illinois. You can contact Sandone at **(217) 244-2364** or by email at sandone@uiuc.edu.



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NPRE faculty and students prepare for the continued and extended use of nuclear energy as a clean, safe, and abundant power source. We refine plasma technology to produce the next generation of computer chips and to harness an additional, alternative energy source. We strive for major improvements in human health through our work with nuclear medical imagery and therapy technologies.

We are NPRE at Illinois. We provide energy to build Brilliant Futures.



Brilliant Futures, the Campaign for the University of Illinois, is an ambitious undertaking to raise \$1.5 billion for Illinois students, researchers, faculty and facilities. Through the resources raised in this Campaign, Illinois will prepare students for leadership in the 21st century; preserve and enhance academic excellence; pursue knowledge and breakthrough innovations; foster a transformative learning environment; and ensure greater access to the Illinois experience. If you would like to help NPRE play its part in this effort, please contact College of Engineering Development Director Dawn Sandone at (217) 244-2364 or make your gift online at http://www.engr.uiuc.edu/alumni/gift/give_online.php and specify Nuclear, Plasma, and Radiological Engineering.



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