Celebrations of the 50th Anniversary of Nuclear Engineering Program and Nuclear Reactor

We celebrated our success in building up our program and the reactor during the last 50 years at a ceremony on Sept. 17, 2010 when scientists, engineers and managers from the U.S. Department of Homeland Security, Department of Energy, Nuclear Regulatory Commission, Exelon Nuclear Corporation, and AmerenUE (Callaway Nuclear Plant) Corporation provided their perspective on the nuclear renaissance – opportunities and challenges. The luncheon speaker was Dr. Hans Mark, a former Secretary of the U.S. Air Force and a former Deputy Administrator of NASA.

Chancellor John F. Carney III, Provost W. Kent Wray, Ms. Allison Skare, Office of U.S. Senator Claire McCaskill, and Mr. Darren Lingle, Office of U.S. Congresswoman Jo Ann Emerson welcomed the alumni, students, faculty and staff to the celebrations.

Following the welcome, Dr. Arvind S. Kumar, NE Program Chair presented NE Program Highlights to the attendees. He showed the enrollment rise in NE during the last 5 years which currently stands at 170, including 24 graduate students and 51 freshman students. He also presented this year’s new grants and contracts totaling $1.4 million, obtained primarily from Department of Energy, Nuclear Regulatory Commission, Exelon Nuclear Corporation and National Academy for Nuclear Training. Keynote Speech was delivered by Dr. Starnes Walker, Director of Research, U.S. Department of Homeland Security on the Science and Technology of Combating Terrorism in the Current Threat Environment. Dr. John Gilligan, Director, Nuclear Energy University Programs, U.S. Department of Energy made a presentation on New Opportunities for Universities Based on US DOE Programs to Support the Nuclear Renaissance. Dr. John Gutteridge, Manager, Nuclear Education Programs, U.S. Nuclear Regulatory Commission presented the NRC’s Nuclear Education Grant Program in a Nuclear Renaissance. Following the educational grant overviews by Dr. Gilligan and Dr. Gutteridge, Dr. John C. Wagner, Group Leader & Technical Integrator, Nuclear Modeling, Design & Safety, Nuclear Science and Technology Division, Oak Ridge National Laboratory provided a very detailed picture of ORNL Activities in Support of the Nuclear Renaissance. The next two speakers were from the nuclear power industry. They included Mr. Tod Moser of Callaway Nuclear Plant and Mr. Doug Wise from Exelon. Mr. Tod Moser, Executive Director, STARS Alliance, Callaway Nuclear Power Plant discussed how STARS Alliance helps to ensure and improve safety and reliability at the seven nuclear plants in Missouri, Kansas, Arizona and California, thus promoting the Nuclear Renaissance we are hoping for. Mr. Doug Wise, Executive Assistant to the Senior Vice President - Engineering and Technical Services, Exelon Corporation presented a detailed picture of Exelon’s Contributions to the Nuclear Renaissance. Finally, Dr. Nick Tsoulfanidis, Editor, Nuclear Technology, and NE Professor Emeritus provided a Historical Perspective of the Nuclear Engineering Program at Missouri S&T. The most engaging seminar was presented by Dr. Hans Mark, a Former Secretary of U.S. Air Force, and a Former Deputy Administrator of NASA on the Proliferation of Nuclear Weapons. (cont. on page 9)
Greetings! I am delighted to share with you our achievements and challenges during the year. We succeeded in maintaining our enrollment and obtaining significant financial support from federal agencies for nuclear infrastructure upgrade, scholarships for juniors and seniors, curriculum development in Radiochemistry and Health Physics, and for supporting the teaching and research activities of our two junior faculty, Dr. Castano and Dr. Lee. In order to celebrate the successes of the last 50 years of the nuclear engineering program and the nuclear reactor facility, we had a great celebration on Friday, Sept. 17, 2010.

We continue to maintain our high enrollment using our recruiting efforts with NE summer camps and Introduction to Engineering camps. Last summer, NE summer camp brought 23 high school students from 9 states and 2 countries (Mexico & Canada) for a week-long NE summer camp. During the camp, the students took tours of our campus nuclear reactor (MSTR) and the Callaway Nuclear Plant. They also toured the nuclear medicine facilities of the Phelps County Regional Medical Center. Learning reactor operations, radiation detection and measurement, and nuclear forensics were the primary aspects of their learning experience during the camp. Introduction to Engineering is a campus-wide recruiting effort which brought in over 60 students last summer over a three week period for reactor tours and laboratory experience in radiation detection and measurement. Because of these recruiting efforts, our total enrollment stands at 170, including 51 freshman students and 24 graduate students.

We have been very successful this year in obtaining over $1.4 million in external support from NRC, DOE, Exelon, NANT, UM Research Board and a South Korean Company to support infrastructure upgrade, faculty development, research, curriculum development and scholarships for juniors and seniors. A significant portion of the funding ($500K) is from DOE for the purchase of a neutron generator, an x-ray generator and for improving the cooling system of our reactor so that it can be operated at its rated power of 200 kW for extended periods of time. However, the total grant of $1.4 million requires a cash matching contribution of $314,000 from the university, of which $56,000 has to come from the nuclear engineering program over a three year period. We must raise these matching funds using private and non-federal sources. We need your support to meet this challenge.

Included in the grants from NRC was a grant of $100,000 for scholarships for juniors and seniors over a two year period. In addition, $10,000 was included in the $50,000 grant from Exelon for students who are committed to nuclear power engineering. Both of these scholarship grants provide no support for freshman and sophomore students who we would like to recruit and retain in the nuclear engineering program. We need your financial support in meeting this need as well.

We celebrated our success in building up our program during the last 50 years at a ceremony on Sept. 17, 2010 when scientists and engineers and managers from the U.S. Department of Homeland Security, Department of Energy, Nuclear Regulatory Commission, Exelon Nuclear Corporation, and AmerenUE Corporation provided their perspective on the nuclear renaissance - opportunities and challenges. The most dynamic speaker was Dr. Hans Mark, a former Secretary of the U.S. Air Force and a former Deputy Administrator of NASA who spoke on the proliferation of nuclear weapons.

We are delighted with the success we continue to have in the growth of our program. We need your continued support in meeting our challenges which include providing scholarships for our freshman and sophomores students. We also need your support in meeting the cash matching requirements of our substantial federal grants. Thank you for your support. We look forward to hearing from you.

Best wishes,

Arvind S. Kumar
Program Chair & Reactor Director
Nuclear Engineering
Dr. Lee’s Activities

I am pleased to have a chance to introduce myself and my research activities to students, alumni, and board members of Missouri S&T Nuclear Engineering program. I joined the program as an assistant professor in September 2009. As I moved from South Korea to the U.S. last year, I am still in the stage of learning new and different systems (including campus and cultural differences). I was born and raised in South Korea. In 1990 I came to the U.S. to start my PhD program at the University of California at Berkeley. Right after I received my PhD degree in Nuclear Engineering from U. C. Berkeley in 1995, I returned to South Korea and started my career as a faculty member in the College of Medicine at the Catholic University of Korea. I had served this university for 14 years and in 2009 I had to come to the U.S. for family reasons. I am glad that I joined this program at S&T with wonderful and warm-hearted colleagues.

My research interests are in the area of radiation imaging including x-ray, gamma and neutron imaging, and applications of radiation imaging to non-destructive evaluation and inspection, homeland security and medical imaging. I am both interested and experienced in developing and improving radiation imaging systems and dosimetry systems with innovative ideas.

I have been working on radiation imaging since I joined the Lawrence Berkeley National Laboratory in 1990 as a graduate student research assistant. During my tenure at the LBNL, I investigated characteristics of amorphous silicon photodiodes as medical imaging x-ray and gamma ray detectors.

I have succeeded in developing radiation imaging sensors, algorithms, software, and imaging systems for radiation oncology and diagnostic radiology as well as for nuclear medicine. I particularly focused on developing technologies of large-area flat panel detectors, since replacement of x-ray films with these new digital image sensors was an innovation in the field of x-ray imaging a decade ago. With the maturing of digital radiography technology to a practical level, my research objectives in medical imaging currently dwell on the reduction of patient dose in x-ray and CT exams. Despite the superior image quality from the state-of-the-art digital image sensor technology, dose reduction has not been as successful as expected, and some digital radiography systems even require a higher patient dose than does a film system. I am interested in solving this important but complicated problem by innovatively revising the imaging chain from x-ray generation to detection. I am also interested in quantitative x-ray imaging or spectroscopic analysis using the quasi-monochromatic x-ray energy spectrum. In addition to medical imaging, I am interested in applying radiation detection and imaging technologies to nuclear engineering related fields such as non-destructive evaluation of TRISO nuclear fuel and graphite moderator, and detection of special nuclear materials.

I have won 19 grants (including 2 grants as the PI and 2 grants as a co-PI at Missouri S&T), successfully led many research projects, registered 10 patents, produced 80 peer-reviewed publications, and gave 100 presentations at international conferences. Some of the technologies I have developed are now being used by medical imaging companies.

Currently I am establishing a radiation imaging laboratory in the nuclear reactor building and there are four ongoing research projects with help from five graduated students: 1) I have devised a new type of flat-panel x-ray source which can be used both for medical imaging and non-destructive inspection (see the figure below). Together with a photon counting radiation detector this new x-ray source is expected to reduce patient dose considerably. This idea is supported by University of Missouri Research Board, and in close collaboration with Dr. Castano’s group Edwin Grant is working on Monte Carlo simulation studies of the x-ray generation. 2) Recently we received a grant from DOE to build a neutron and x-ray combined computed tomography system. By combining a neutron image with an x-ray image we expect to have better results in evaluation or inspection of subject materials such as TRISO nuclear fuel or biomaterials. Vaibhav Sinha and Frank Strantz are working on this project with a help from Gregg Crannick (undergraduate). 3) We are also conducting a research on quality assurance of digital mammography systems. A digital mammography is a medical imaging system for screening of breast cancers and must provide high resolution and high contrast images. We investigate the methods to evaluate the performance of digital mammography systems in terms of resolution, contrast, and signal to noise ratio, etc. The results from this research can be applied to other types of radiation imaging systems. Vaibhav Sinha and Courtney St. Peters (undergraduate) are participating in this research. 4) In order to produce high quality images and to analyze images with better accuracy, image processing are usually involved. In our group we develop image processing algorithms from pre-processing to post-processing of radiation images. Muhammad Abir and Aashiesh Avaachat are participating in development of algorithms for contrast enhancement of radiation images.

I want to thank my graduate students and participating undergraduate students for their help, hard work and enthusiasm toward successful researches.
The First Spoils of Battle...

Last year, I was telling the News-tron readers that my group was strongly pursuing research dollars. This year, I can report on our first successes and our future plans to consolidate our research initiatives. Last year we obtained the first internal grant for $30,000 from the Missouri Research Board. This internal funding source is part of the University of Missouri System whose mission is “to enhance the long-term quality and quantity of scholarship throughout the University by supporting meritorious research projects”. We received their money to study the hydrogen storage capability of a carbon nanotubes (CNT) material functionalized with gamma radiation, and currently we have functionalized CNTs by chemical means (functionalization = create active sites in the surface of the CNTs). My student Jessika Rojas is actively pursuing this research line.

The second piece of good news is that together with Dr. Lee we obtained a second Missouri Research Board grant for $33,000. This second grant’s objective is to conduct a simulation of a new type of x-ray radiation source. Current X-ray sources consist of a massive (usually W) cathode that is bombarded by electrons and cooled by water, the interaction of electrons with the heavy atom metals create x-rays that are then harnessed and used for imaging. In our research we intend to create the electrons by field emission, and these will be accelerated against a target a few microns in size. The amount of x-rays generated by such a small target is small, but millions of those micro-targets can be arranged together in the same way that any flat screen (TV, computer, cell phone, etc) produces a lot of light. The x-ray “light” coming out of such device has a flat profile that will allow imaging with higher resolutions while subjecting the patient to lower doses. This is a great idea, coming directly from Dr. Lee’s quiver. Chrystian Posada and Edwin Grant are both working on complementary parts of this proposal, by doing simulations with MCNP and OOPIC Pro.

The first grant that will directly benefit my group is a Faculty Development Grant. Starting in 2011 all STEM students in Missouri S&T will have the opportunity to learn about Radiochemistry and Nuclear Forensics. We have received $125,000 dollars to develop a theoretical course in radiochemistry, and by the time you read this piece will have sent a continuation proposal to fund a laboratory in Radiochemistry and Nuclear Forensics. The idea is to provide you with a extra tools in your inventory to make you more attractive to potential employers, including homeland security, national laboratories, and industries related to the nuclear fuel cycle at all levels. Matt Korte a new graduate student with the help of two undergraduate students is working in making our radiochemistry lab a reality. They are putting together lab practices in measuring tracers in water, alpha spectroscopy, and actinide separations. The radiochemistry lab will be located in Fulton 218.

The final grant that will directly benefit my group is a Faculty Development grant from NRC. This grant is 3 year continuing grant for a total of $639,444 that will be used to help Dr. Lee and myself. On my part, this grant will support initiatives in nuclear materials, hydrogen initiatives, and nuclear forensics and radiochemistry. The first of these projects that is starting soon is a fatigue study on a material highly resistant to radiation damage called Oxide Dispersion Strengthened (ODS) steel. ODS steels have yttrium and titanium oxide particles in the nanometer range dispersed uniformly throughout the matrix. Stainless steel can only take radiation damage of <20 displacements per atom (DPA) before failing by swelling, while ODS steels can take damage in excess of 300 DPA. ODS steels have been around for a long time, but problems with their manufacture and handling (welding, annealing, forging, etc) have not been successfully solved. Our plan is to obtain with a collaborator from Ames Laboratory, state of the art samples of the material and use our S&T labs (Dr. Van Aken) to cause high-cycle fatigue to the materials. Once this is accomplished we plan to take the samples to Argonne National Lab and conduct micro-beam synchrotron radiation studies to analyze the cause of fatigue (crack growth, redistribution of oxide particles, etc). A final initiative that is unfunded at the moment is the study of a special material with properties between cement and ceramic. We plan to develop this material as a suitable shielding material for spent nuclear fuel storage. The ceramic/cement material can be heavily doped with other substances to improve its nuclear properties. In the case of spent fuel, neutron and gamma shielding, as well as higher thermal conductivity. This job is being conducted with the help of a colleague from the “Universidad de Antioquia” currently at UCLA. Jason Pleitt my new graduate student is involved in this effort.
**Jessika Rojas**: One of the motivations in our research group has been hydrogen as an alternative source of energy. During this year, I have been involved in the project granted by the University of Missouri Research Board. Up until now, chemical treatments have been carried out in order to eliminate metallic catalyst particles. We observed the evolution of the nanostructure using different techniques. This project has also been for me a big gate to learn about different characterization techniques, so I received training in SEM, FIB, Raman spectroscopy and FTIR. Those techniques were used as a tool to analyze the changes in the structure. Our next step on this project is to evaluate the mechanism of functionalization by gamma rays based on the creation of reducing agents from water radiolysis. Aqueous solutions containing carbon nanotubes, palladium chloride and a secondary alcohol will be irradiated with a gamma source of Co-60 in the University of Illinois. Morphology, stability, and hydrogen storage capacity of this nanostructured material will be evaluated.

**Matt Korte**: I am a first year graduate student from Saint Joseph, MO who became interested in nuclear energy for its economic and strategic potential. This summer, I investigated the possibility of combining tritium and ultracapacitors to make high energy density batteries. I’m currently working with Blake Bohn and Rob Zedric to develop radiochemistry experiments.

**Jason Pleitt**: I’m a new graduate student from Warrenville, IL. I recently graduated from the nuclear program here at MS&T this past spring before entering the graduate program. I had met Dr. Castano as his first undergraduate advisee and I am currently working on measuring linear attenuation coefficients at different energies for a special ceramic/cement for shielding purposes. I’ve developed the basic design for the measurement and am working on making sure that the values can be accurately determined at several energies. I look forward to working more on this project in the coming year.

**Blake Bohn**: I’m from Jackson, Missouri, I transferred in form a small college to S&T for nuclear engineering. Normally, I spend most of my time in Rolla doing homework or research. It can get very busy but I like learning about nuclear technology so it’s very enjoyable. In my free time I like to shoot firearms, go caving, float down rivers, hiking, and collecting common radioactive materials/isotopes. My first nuclear class at Missouri S&T was NE105. That’s where I meet Dr. Castano. He was looking for research assistants for radiochemistry. I didn’t have much experience and knew I needed to learn more so I volunteered. I found out later that I would be helping set up a radiochemistry and nuclear forensics lab. Dr. Castano gave us a book outlining experiments that we then set up. Reviewing the experiment I found out that we would need an alpha spectrometer. Dr. Usman’s lab had an alpha spectrometer and I spent most of my time calibrating and setting up the equipment.

**Rob Zedric**: I’m a junior from Decatur, IL. Apart from classes, I keep myself busy on the Rolla Rural Fire Department, where I’m a firefighter and an EMT. In my free time, I enjoy shooting guns, snowboarding, and building electronics. Though I came to Rolla for mining, I switched to nuclear engineering when I realized I didn’t like rocks. I wanted something more energetic and challenging. Soon after I met Dr. Castano in his Intro to Nuclear class, he told me he was founding a nuclear laboratory on campus and wanted student workers to help. I thought it would be a great opportunity to get involved in research, so I signed up. Right away, he gave me experiments to work on and a laboratory to work in. I am currently evaluating a technique to measure radium concentrations in ground water, but will soon move on to bigger and better things.
Dr. Usman’s Success Update and New Initiatives

News-tron Transport provides me the opportunity to update the faculty, students, alumni, and the development board members on my research successes, new initiatives, and other education endeavors. We had a superb year!

First of all, I am delighted to report that I have been awarded tenure in the nuclear engineering program. That is probably the single biggest milestone in professional life of any faculty member. As you might remember, I was promoted to the rank of Associate Professor approximately two years ago, so this award of tenure completes the first level of promotion for me. Second, and the final step is the promotion to a full professor and I am looking forward to the next step!!

On the research front, we have had a wonderful year. The paper submitted by my graduate student Matt Dennis, “Feasibility of $^{106}$Ru peak measurement for MOX fuel burnup analysis” was not only accepted by Nuclear Engineering and Design but in fact it is very well received by the scientific community. In August, University Research Alliance announced that Matt has been awarded the 2010 U.S. Department of Energy’s Innovations in Fuel Cycle Research Award based on the results he presented in his paper. This award includes a cash prize of $1500 and significant recognition in form of a press release to university newspaper. Please join me in congratulating Matt on this achievement.

My other major achievement during the year is the graduation of my first Ph.D. student from Missouri S&T. Dr. Amol Patil successfully defended his dissertation on March 18, 2010. His presentation on detector deadtime measurement and modeling was well received by the general audience as well as his thesis committee members, particularly his application of Queueing theory for modeling detector deadtimes was considered to be truly innovation. He has accepted a post-doctoral fellowship at the Purdue University where he is continuing his research in the field of radiation detection and measurements.

Vaibhav Khane is the other student who graduated this year with a M.S. in nuclear engineering. His research on modeling natural convection was published in Nuclear Engineering and Design. Vaibhav is continuing his graduate studies at Missouri S&T in chemical engineering and is working with Dr. Muthanna Al-Dahhan. His new research is based on the basic principles of radiation attenuation and measurements, techniques that he learned during his M.S. program.

David Gallego has done a wonderful job of converting all but two radiation measurements labs into distance format. Using internet technology these labs can now be offered to our distance students. Students are able to perform these labs on real time basis, ask their instructor(s) questions and get their answer all in real time. David also produced a suite of active hand-outs. These hand-outs are augmented with rich text, pictures, video and audio files to enhance the learning experience of the distance students. The internet spectroscopy system is also implemented at the internet accessible hot-cell facility. David presented the new distance teaching capabilities at the Teaching and Learning Technology Conference 2010 in St. Louis. David also did very well in his research. He investigated the effect of thermal neutrons on the electrical properties of electronics, in particular the PNP junction. His results were presented at the annual ANS meeting. These results are now being further analyzed and compiled for publication in a journal article.

Vaibhav Khane

The other exciting activity during the summer was the two weeks visit of a Tuskegee University faculty member, Dr. Syed F. Ali. He is a close collaborator in developing nuclear engineering program at a minority institution, Tuskegee University. During his visit at Missouri S&T, Dr. Ali reviewed the teaching material for radiological engineering class that we had developed under NRC curriculum development grant. We collectively made changes to the material to make it better suited for a wider range of audience. He also learned the use of Lynx system and the internet accessible hot-cell which he intends to incorporate in his teaching at Tuskegee.

The other major event which just happened at Missouri S&T is the 50th anniversary celebration of our nuclear engineering program and the nuclear reactor. On this joyous occasion a number of alumni and friends visited the campus and the reactor. There was a poster session that I organized presenting research by nuclear engineering faculty and students. This event was a huge success in publicizing and promoting our work and our graduates. There were a total of over fifteen posters presented while several others could not be included due to the space limitation.
Dr. Usman’s Success Update and New Initiatives (Continued)

I am also very happy to report that two of our proposals got funded. First one is an infra-structure development proposal to acquire a neutron generator and an X-ray generator together with a tomography system to establish a state-of-the-art nuclear imaging laboratory. There are several projects already planned for the lab including imaging of spent fuel for safety and proliferation deter-
rence. The entire nuclear engineering faculty contributed in this proposal and is thrilled to receive the grant to acquire this very useful experimental capability. We thank Dr. Mueller for providing the first draft of the proposal. The other project is in collaboration with the Southern University and A&M College of Louisiana and the University of Tennessee-Knoxville on the development and promotion of Health Physics teaching material. Kyle Walton has joined us as a graduate student to work on the project.

During the year, our group published 2 journal articles, 3 conference papers and four poster presentations. In the end, I also welcome Lucas Tucker, Daniel Doenges, Kyle Walton, Susan Sipaun, Vaibhav Sinha and Ahmed Haidyrah to our nuclear engineering program and in particular to my research group. It is noteworthy to point out the Mr. Lucas Tucker is also the recipient of the prestig-
ious Chancellor Fellowship and is planning to pursue his Ph.D. in nuclear engineering. His dissertation topic involves NDA of spent nuclear fuel for proliferation deterrence.

Shoaib Usman, Ph.D.,
Associate Professor
Nuclear Engineering

Nuclear Engineering Summer Camp 2010

From July 11th through July 16th, 2010, the Nuclear Engineering Pro-
gram held its 11th annual nuclear engineering summer camp. The one-
week camp introduced 23 highly skilled and motivated high school students from across the U.S., Mexico, and Canada to the fundamentals of nuclear engineer-
ing.

Some highlights from the camp include cloud chamber, half-life and Neutron Activation Analysis (NAA) experiments at the S&T reactor and tours of the Phelps County Regional Medical Center’s Radiation Oncology depart-
mament and Callaway Nuclear Power Plant. This was the first year campers were asked to use NAA in a nuclear forensics type environment. Campers had to identify unknown samples by irradiating them in the S&T reactor and meas-
uring their half-lives and gamma spectrums. The camp was also visited by the St. Louis NBC Channel Five News who did several interviews for a news seg-
ment and shot video of the blue glow inside the Missouri Science and Technology Reactor (MSTR).

Thanks to AmerenUE who again was kind enough to allow campers to tour Callaway Nuclear Power Plant. Touring a commercial nuclear power facility allows campers to see firsthand that nuclear energy is clean, safe, and affordable.

The summer camp has proven to be our great recruitment tool. Work has already started to make next year’s camp even more exciting and educational. We would like to thank the faculty, staff, and students involved in making this year’s camp a success.
Women in Nuclear completed a successful full year as a chapter. Our outreach and education events comprised the bulk of our activities. We were honored to participate in Engineer’s Week at the St. Louis Science Center, an activity which allowed children and their parents to learn about the facts of radiation. We sponsored a showing of the movie China Syndrome on campus to spark discussion and commentary on the political climate and public perception of the nuclear industry. We also had a variety of professional speakers attend our regular meetings to help our members prepare for their future careers.

Several of our members were able to attend the US WIN Delegation in Washington, D.C. this past March. The delegation is an opportunity to speak with legislators about our opinions on the nuclear industry from a student perspective. Participation in this delegation was possible due to support from the Nuclear Engineering Department, other Women in Nuclear chapters, and various fundraising activities. Our president, Savannah Avgerinos, represented the chapter at the US WIN Conference in Seattle, WA this past July and presented on our chapter activities. As a part of our eager participation at the regional and national levels, we received two awards. As a chapter, we received the Excellence in Professional Development Award. Savannah Avgerinos was recognized for her Support of Region IV (of US WIN). The receipt of these awards is a strong encouragement for all members of our chapter.

Last April, our student chapter became a recognized student organization (RSO). Becoming an RSO will allow us use of campus resources such as rooms, the ability to advertise on campus, etc. Two perks to being an RSO include receiving an email address, win@mst.edu, and the opportunity to host a website http://win.mst.edu. Though our website is still under development, we would still like to encourage everyone to visit it. The best part of being an RSO is being able to spend more time this year to focus on our real goals: outreach, professional development, and networking!

With our new RSO status, we have even bigger plans for this year, starting with more active recruiting. Using our boosted numbers, we are planning a professional clothing drive for women in need. We are also seeking to interest girls in careers in science and technology through our involvement in hosting a Girl Scout Badge Day and participating in Expanding Your Horizons. In addition to having numerous speakers again this year, we will be hosting a Nuclear Career Fair on September 20th. This event, to be held the night before the career fair, will give recruiters more one-on-one time with nuclear students, as well as giving students another opportunity to be noticed. Along with our increased involvement in our local community, we are also seeking to become even more involved at the national level. We will be sending another delegation to Washington, D.C. in March 2011. Also, the 2011 US WIN conference will be held in St. Louis, MO, placing our chapter in the perfect position to help with planning, and to have near perfect attendance.

A Brief Note from the President of Women in Nuclear

I wanted to take a moment to extend my thanks to the Nuclear Engineering Department for their support of the Women in Nuclear chapter. As president during both the 2009-2010 and 2010-2011 years, I’ve had the opportunity for continued interaction with all of the faculty and staff on the behalf of WiN. Without their support, Women in Nuclear would not have had our previous successes. As we continue to grow and develop our organization, we are extremely grateful for the additional support of our alumni.

Thank you,
Savannah Avgerinos
President-Women in Nuclear
Last year was a good year for the Missouri S&T ANS chapter. Our chapter was honored nationally in receiving an honorable mention in the Glass-tongue award. Also, there were many fundraisers, guest speakers, and we participated in the Winter ANS National Conference as well as the ANS student conference in Michigan. This year promises to be even better. We plan to do more outreach to the community and better emulate the ANS goal, to increase public understanding on what nuclear power is. This year our officers are committed to do their best.

As we commit to this New Year, we commit you to reach out and give the public a better understanding about the nuclear industry and field.

Want some T-shirts?
by Lindsay Brandt
Want to help out the Missouri S&T American Nuclear Society? ANS students are selling T-shirts to help raise funding for their chapter. T-shirts are $12 for non-members and $10 for current members of ANS. Contact Lindsay Brandt at lnbgt2@mail.mst.edu for more information.

Celebrations of the 50th Anniversary (continued)

After the invited presentations, awards were presented by Dr. Robert Schwartz, Vice Provost of Academic Affairs on behalf of the Chancellor and the Provost to 30 individuals including 11 NE Development Board members for their sustained guidance to the NE program, 1 current Development Board Chair, Dr. Starnes Walker, for 25 years of service as Chair and during this time providing outstanding leadership to the board to steer the nuclear engineering program towards success; 5 faculty service awards for 25+ year of service awards to late Dr. Albert Bolon, Dr. D. Ray Edwards (emeritus), Dr. Nicholas Tsoulfanidis (emeritus), Dr. Gary Mueller and Dr. Arvind Kumar; 3 staff excellence awards to Sheila M Johnson, William Bonzer, & Daniel Estel (posthumous); 2 special friends of NE program, Harold “Skip” Garner and Exelon Nuclear Corporation, 8 distinguished alumni: Omar Aguilar, Dr. William Burchill, Dr. Phil Ferguson, Ms. Lisa Stiles, Ms. Alice Simpkins, Dr. Erik Shores, Dr. John Wagner, and Dr. Dennis Croessmann; an excellence in leadership award to Dr. Arvind Kumar; and an outstanding graduate student award to Edwin Grant. Tours of the Nuclear Reactor and Nuclear Engineering Laboratories followed the award ceremonies.
The Nuclear Engineering department would like to thank and acknowledge the following alumni, friends, and companies for their generous contributions between July 1, 2009 and June 30, 2010.

## GIFTS

### $1-$99
- **Mr. and Mrs. Jason Lee Boles** 1996
- Lorne Joseph Covington 1986
- William B. Bobnar
- Mark D. Carter 1980
- Mark Kevin Covey 1982
- Jane Theresa Diecker 2003
- Mr. and Mrs. Kevin B. Edwards 1989
- Charles M. Hart 1986
- Mr. and Mrs. Martin O. Hovland 1998
- Jonathan D. Huecker 1993
- Bren Andrew Phillips 2005
- Brian David Richardson 1996
- Donald Edward Rickard, Jr. 1985
- Jimmy D. Schottel 1970
- Jeffrey Dean Shelton
- David L. Smith 1980
- Russell Ray Thompson 1984
- Vincent C. Wahler, Jr. 1965
- Alliant Energy Foundation
- Progress Energy Inc
- James Alan Lawson 1989
- Jan R. Lojek 1969
- Leslie R. Conner 1968
- Dirk D. Holt 1980
- Craig Matthew Minarich 1998
- Thomas D. Radcliff 1980
- Dr. Bijaya Shrestha 1995
- Warren S. Vaz 2009
- Mr. and Mrs. Darrell R. Liles 1996

### $100-$499
- Charles R. Daily 1983
- Sheldon A. Easson 1975
- Scott P. Palmtag 1993
- Dr. and Mrs. Robert L. Phillips 1990
- Luminant
- Thomas W. Barkalow 1974
- Michael R. Eastburn 1967
- Frazier L. Bronson 1964
- Christopher D. Cragg 1985
- Mr. and Mrs. Curtis Eshelman 1986
- Mr. and Mrs. Jeremy W. Glenn 2001
- Dr. John P. Kuspa 1972
- Keith Alan Steinmetz 1994
- Kent Barnes II
- Donald James Buth 1985
- Mr. and Mrs. Albert Gharakhani 1977
- Dr. Peter Gyula Laky 1994
- Donald F. Schnell 1986
- Dale Alan Shelton 1985
- Brian Keith Taber 1991
- Scott Vrtiska 2001
- William C. Wolkenhauer 1962
- Bechtel Foundation
- General Electric
- Gregory Scott Kinn 1987
- Mr. and Mrs. Matthew K. McLaughlin 1992
- Dr. Smaeil M. Aceil 1984
- Michael Erin Alley 1996
- Dr. David E. Bantine 1966
- Bruce Loren Bartlett 1980
- Robert Lee Beck 1993
Annual Phonathon
November 8 to 11 & 14, 2010

Your generous contributions in the past have tremendously helped our students with the costs of attending Missouri S&T, greatly aid our recruitment efforts, and helped us upgrade our labs by providing matching funds for equipment purchases. This year’s Phonathon is scheduled for November 8, 9, 10, 11 & 14, 2010. Nuclear Engineering students will be contacting you during this five day period. Your generous support this year will be highly appreciated. We look forward to talking to you again!

$100-$499 (GIFTS continued)
John J. Blase 1974
C. Dennis Croessmann 1981
Orville W. Cypret 1974
Mr. Joe Dickerson and Ms. Rebecca L. Steinman 1996
Kelly Brian Evanoff 1982
Michael John R. Ford 1988
Bradley Alden Fulton 1988
Mr. and Mrs. Stanton W. Hadley 1979
Robert L. Hayward 1975
William K. Hinton, Jr. 1976
Timothy Edward Holland 1991
Mr. and Mrs. Jeffrey Paul Krause 1998
Richard N. Lilleston 1979
Donald L. Moffett 1974
Kevin D. Rackley 1980
Billy W. Reid 1977
Paul Michael Sakowicz 1993
Mark Thomas Sautman 1991
Gajendra M. Suwal 1976
American Electric Power

$500-$999
AmerenUE
Kenneth Thomas Erwin 1997
Paul Glenden Justis, Jr. 1985
Mr. and Mrs. Phillip J. Simpkins 1989

$1,000-$2,999
Omar Ivan Aguilar 1985
William E. Burchill 1964
Deloitte & Touche Foundation
Harold R. Garner 1976

$50,000
Exelon Corporation
What’s New?
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