Nuclear Engineering Summer Camp 2012

From July 15th through July 20th, 2012, the Nuclear Engineering Program held its 13th annual nuclear engineering summer camp. The week-long camp introduces highly skilled and motivated high school juniors, seniors, and college freshman (as of Fall 2012) students to the fundamentals of nuclear engineering. The camp this year included students from 14 different U.S. states with a majority of students 16 out of 33 coming from Missouri.

Some highlights from the camp include cloud chamber experiments, half-life and Neutron Activation Analysis (NAA) laboratories at the S&T reactor, tours of the Phelps County Regional Medical Center’s Radiation Oncology department and Callaway Nuclear Power Plant, and making liquid nitrogen ice cream at Lions Club Park. A major component of the camp involved the campers learning the basics of NAA in a nuclear forensics type environment. They had to identify previously irradiated samples by measuring their half-lives and gamma spectra. Each team was able to indentify all of their unknown elements which could have included 3 of the following: Cobalt, Copper, Europium, Gold, Iron, Magnesium, Nickel, Silver, Vanadium and Zinc.

The summer camp has proven to be a great recruitment tool. Thank you to Ameren who again was kind enough to allow campers and staff 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. We would like to thank the faculty, staff, and students involved in making this year’s camp a success.
Greetings! I am delighted to share with you our achievements and challenges during the last year. We succeeded in maintaining our high student enrollments and obtaining significant financial support from federal agencies for scholarships, fellowships, curriculum development and for supporting the teaching and research activities of our newest faculty member, Dr. Xin Liu. Dr. Liu is our 7th tenure-track faculty member. Last year was the first year ever to have 7 tenure-track faculty positions in our nuclear engineering program.

We were successful last year in obtaining $1,905,806 in external support from NRC, DOE, DARPA, Exelon, and NANT. It is noteworthy that DARPA funding (see Dr. Lee’s write-up) is a prestigious Young Faculty Award from Department of Defense, a first for a faculty member at Missouri S&T.

Last year, we spent DOE funds to provide active cooling to the pool water of our research reactor (MSTR). The pool water chillers have been installed and work very well. This provides us with the ability to operate MSTR at the rated power of 200kW for long hours to perform neutron and x-ray tomography experiments. With DOE funds, we also purchased and installed a D-D neutron generator in Room 217 Fulton Hall which has lead-lined walls for radiation shielding. Next year, with $300,000 in DOE funds and an additional $50,000 in university matching funds Dr. Lee and his co-PIs will be upgrading the Radiation Measurements Laboratory.

There is another very exciting news in Missouri which will benefit Missouri S&T and our nuclear engineering program. Ameren Missouri and Westinghouse have announced a joint venture that could transform the state's economy, according to Gov. Jay Nixon. Ameren and Westinghouse have applied for $462 million in federal funding to develop small modular nuclear reactors (~225 MWe). If the project goes forward Missouri S&T and our department will be heavily involved in providing research support to Ameren and Westinghouse in developing the modular reactors in Fulton, Missouri. To take a first-hand look, Gov. Nixon and his staff visited Missouri S&T and toured various campus laboratories and our Nuclear Reactor facilities on June 5, 2012. Ameren and Westinghouse managers also visited us on June 5, 2012 and toured the reactor and other campus laboratories.

We continue to make improvements in our program. However, we need your continued support in meeting our challenges which include providing scholarships for our freshman students and to provide matching funds for the NRC Faculty Development and Graduate Fellowship grants and DOE Reactor Upgrade and General Infrastructure grants. Thank you for your support. We look forward to hearing from you.

Best wishes,

Arvind S. Kumar
Program Chair & Reactor Director
Nuclear Engineering
Missouri S&T
Dr. Lee’s Advanced Radiography and Tomography LAB (ARTLAB)

This year was an amazing year to me. I received DARPA Young Faculty Award from the Department of Defense (see the picture on the right). I am the first professor at Missouri S&T who received this award, which came with a grant amounted $298,576 for 2 years. I also received a grant from DOE as the PI. The amount of this grant is $300,000 from DOE for one year with a matching fund of $50,000 from Missouri S&T. This grant will be used to upgrade Radiation Measurement and Spectroscopy Laboratory in the NE Program.

The name of my research lab has been changed to Advanced Radiography and Tomography Laboratory (ARTLAB), and the following is research activities of my students.

Edwin Grant, a PhD candidate is developing a novel flat-panel x-ray source based on nitrogen-incorporated ultrananocrystalline diamond (N-UNCD) field emitters. The design is based on a 2-D array of millions of micro sized x-ray sources similar to the way that pixels are arranged in a flat-panel display. From Monte Carlo simulation studies, micro x-ray cells, ranging from 50-100 μm wide, could generate an adequate bremsstrahlung spectrum with x-ray output intensities of 1.48E12 MeV/mC when 100 kV was applied between the cathode and the anode. Vaibhav Sinha, a PhD candidate is developing a Neutron/X-ray Combined Computed Tomography System (NXCT) at Missouri S&T Reactor (MSTR) site. This is the first approach to develop a neutron and x-ray combined computed tomography system. Vaibhav is also working on various aspects of the NXCT system ranging from beam diagnostics to system performance evaluation. This imaging system is expected to be useful for non-destructive evaluation (NDE) of materials and structures including biomaterials and nuclear materials, and for homeland security as well. Khairul Anuar, a PhD student, is developing techniques to study the characteristics of multiphase flow in a packed bed reactor using a digital x-ray image analysis technique. Athanas Mutiso, a PhD student, is preparing a study of neutron activation effect and radiation dose during neutron tomography imaging. Muhammad Abir, a PhD student, is working on limited angle tomography of irradiated nuclear fuel. In collaboration with Idaho National Laboratory (INL) he is preparing a setup for digital neutron imaging at the INL site. He will also help with several setups including Computed Radiography (CR) plate neutron imaging, digitized film neutron radiography and neutron sensitive MCP coupled with Timepix sensor at INL neutron radiography facility. Ashish Avachat, a PhD Student, has developed a contrast enhancement algorithm for digital mammograms using wavelet transforms. Currently he is working on the flat-panel x-ray project. Fahima Islam, a MS student, is working on developing CT and neutron tomosynthesis reconstruction algorithms. She is studying on various reconstruction algorithms and trying to develop an efficient algorithm which has a tradeoff between accuracy and computation time. She is also working on digital image processing tools such as special resolution properties, noise properties, etc. She is also interested in imaging physics modeling and simulation. Michael Acton, an undergraduate student, is interested in gaining a working knowledge of the various techniques used in industrial and medical imaging with an emphasis on reactor and nuclear fuel imaging.
My name is Xin Liu (pronounced Sheen Lieu \lju\:). I joined the program as an assistant professor in September 2011. In our department history, we have never had more than six faculties before. I am very proud to be the first 7th faculty member in our department history. Here is a little background about me. I am originally from China and I received my PhD in Nuclear Engineering in 2003 from the Department of Engineering Physics, University of Wisconsin-Madison. After that I joined the Advanced Photon Source Division at Argonne National Lab as a postdoctoral fellow, where I had shaped my research interest in nondestructive evaluation (NDE) using ionizing particles. Following postdoctoral work, I joined Mayo Clinic, and later GE Healthcare as a research scientist designing the most advanced medical diagnosis tools using x-rays. I am glad that I joined the nuclear engineering program at Missouri S&T.

My research interests spread in nearly all the fields of nuclear engineering and technology. In the past I have been focusing on radiation imaging and applications of radiation imaging to non-destructive evaluation and medical imaging. I have been working on radiation imaging since my Ph.D. research at University of Wisconsin-Madison. While working at Argonne National Laboratory, Mayo Clinic, and GE Healthcare, I collaborated with world-class physicists, engineers, and physicians to develop the most advanced x-ray computed tomography (CT) system for medical diagnosis and NDE. I have published 20+ peer-reviewed journal papers, registered 5 patents (2 granted by US and 3 pending), and coauthored one book chapter. Representative publications from my past work can be found at my personal homepage (http://web.mst.edu/~xinliu).

My current research involves Radiation Detection and Measurement, Monte Carlo Simulation, Small Nuclear Energy System, Nuclear Medicine, and Multiphase Visualization and Simulation. I am establishing a nuclear computation laboratory in Missouri S&T. There are three ongoing research projects in our lab: 1) smart phone based radiation detector design which can be used as a small hand-held multichannel gamma-ray spectrometer. An abstract titled “scintillation detector integration with the Android platform” co-authored by one of my students - Edward Norris received positive reviews and was accepted by the 2012 American Nuclear Society Winter Meeting. An example GUI of the smart phone based gamma spectrum analysis software is shown below; 2) Monte Carlo simulations of advanced CT system. A complex modern CT system is modeled though a computer-aided design (CAD) software. The photon transport in this CT system is simulated using Monte Carlo method.

Edward Norris
The 3D CAD model (see the figure below) is used as an input file to the Monte Carlo simulation; 3) Small nuclear energy system featuring thorium fuels and natural convection. I have one undergraduate student - Jonathan Schattke on this program. Recently we also received a Faculty Development grant from NRC. This grant is a 3-year continuing grant for a total of $450,000 that will be used to build the nuclear computation laboratory. We are seeking highly motivated students to join us.

In this past summer, I visited several universities in China. Similar to the situations in U.S., there are not too many nuclear engineering programs in China now. However, the Chinese nuclear power industry is developing fast now. Currently, there are 26 nuclear reactors under construction, which require many well-trained nuclear engineers to operate. The enrollment of every nuclear engineering program in China increased dramatically compared to that of 10 years ago. More and more universities are now interested in nuclear technologies too. I was invited to give a talk at Shaanxi University of Science & Technology, which does not have a nuclear engineering program now (see the figure below).

Nuclear has bright future. I promise you that our lab is very committed to your success. We welcome you to join us to explore the good opportunities in all areas of nuclear engineering.
Reflections and Projections

Hello all. My name is Ayodeji Alajo. The highlights of my past academic year are presented here. I received a reactor upgrade grant from the US Department of Energy. The grant is a total of $250,000, of which $50,000 is matching fund from Missouri S&T. With this grant, we are on course to make our research reactor available for distance learning via the internet.

A number of projects are supported by NRC faculty development grant (FDG) of 2011. Aaron Peterson’s work on design criteria for integrating safeguards into current and future LWR fuels is supported by the FDG. His effort in the past year was focuses on the development of new methods for unique identification of nuclear fuel assemblies. We are looking at the use of radionuclide finger-printing to profile nuclear fuel from fabrication to post-irradiation storage. We succeeded in identifying candidate radionuclide to be employed in the finger-printing scheme. Kelly O’Bryant is an MS student who is working on the modeling and validation of MSTR power profile and burnup.

The model accounts for thermalhydraulic changes in the reactor core and surrounding water. Through this project, we seek to better understand the state of the reactor fuel as well as the neutronics and thermalhydraulic implications on the remainder of the fuel’s life. Kelly’s work is supervised in collaboration with Dr. Usman and Dr. Castano. Results from the two projects were presented at the 2012 annual meeting of the American Nuclear Society. Currently, we are studying the response of the radionuclides in various irradiation fields. Manish Sharma, a PhD student is developing proactive strategies in personal dose monitoring, prevention and mitigation. His scheme for radioactive source location prediction was successfully modeled. Experiments were successfully performed to verify the method. Manish is co-advised by Dr. Lee. Safwan Jaradat, a PhD student, has his effort focused on particle transport analysis for special nuclear material detection. Other research effort includes the determination of acceptable void criteria in PWR emergency core cooling systems. This project is supported by Ameren with a grant of $20,000. Lifeng Wang, an MS student, is working on this project. Brandon Lahmann, a junior during the past year worked on a novel method in accelerating cross-section processing for neutron transport computation. He was jointly advised by Dr. Usman.

On the academic front, I developed a graduate course in reactor physics, which is now part of our required curriculum. An elective course was also developed to teach Monte-Carlo techniques in nuclear science and its implementation in MCNP. If you are a junior, you will pass through me in NE 205, which I really love teaching. Other exciting endeavors of the last academic year include being a freshman adviser for nuclear engineering program, participating in open houses, visiting with prospective students and their families, and involvement in NE summer camp. Overall, the year was great.

My projection for this year and the coming ones is exciting. I look forward to teaching my courses with great enthusiasm. All of my research efforts will be continued. We are anticipating interesting results. I will continue to serve as freshman adviser for the nuclear program. It is one of the most rewarding experiences I’ve had here. It’s a good feeling to know that one’s service impacts the molding of future nuclear engineers... Priceless!
Dr. Castaño’s Group Report:

This last academic year has been a whirlwind of activity and varied successes in our Nuclear Engineering Department. Our department is easily experiencing the fastest grow in a long time. Our successes include getting our 7th faculty member (Dr. Liu), our best funding ever (grants from NRC, Darpa, Exelon, AREVA), and our highest enrollment ever in both our graduate and undergraduate programs. All this happens despite the difficult economic times the country is experiencing and the deep budget cuts to public education at the state level. We are doing rather well in attracting external funding to our programs, and are strengthening
our department’s infrastructures and have many interesting plans for the years to come including increasing the power of MSTR, expanding the reactor building, acquiring a gamma source for material experiments, acquiring a ion accelerator, and more. All this flurry of activity is improving our ability to offer highly relevant nuclear engineering degrees that industry, government, and other graduate schools highly value.

By the way, congratulations are due to my last three graduate students to obtain their master’s degrees. Brad Richardson is working for Transware International near Chicago analyzing and designing shielding containers. Jason Pleitt is working for Entergy in Mississippi as a Nuclear Safety Analysis Engineer, and Vivek Rao has been admitted as a PhD student in another academic unit (environmental engineering) in Missouri S&T. Jessika and Chrystian are still continuing to pursue their PhD’s in our group, and our group might be hiring soon a third PhD candidate between this year and next. Actually Robert Zedric applied for and obtained a Fellowship from the South Carolina Universities Research and Education Foundation (SCUREF). This is also a first for our department, since only last semester I applied for our university to be considered among the institutions’ that could apply for such fellowships and also grants on Nuclear Forensics, and Non-Proliferation research. Robert is now deciding if he will pursue his fellowship in Missouri S&T, MIT, Mizzou, and a few other candidate schools. The department also was the beneficiary of NRC fellowships and I hope we can hire a student to pursue his fellowship in the area of nuclear materials. Finally, last month I was informed that NRC was reviewing compliance (a first step) to give my group a Curriculum Development Grant on Corrosion of Nuclear Materials. This is a welcome development, and hopefully this will strengthen our curriculum in the area of Plant Life Management (PLm), which is related to understanding and mitigating corrosion and degradation in our ageing nuclear power plant fleet.

As the title of this article implies, this was an interesting year from the perspective of traveling and there were some rather unique opportunities to travel and professional development I want to share with you. Last Fall, Jessika and I made a poster presentation in the Missouri Nanofrontiers Meeting in Springfield, MO, and we won fifth place. In the ANS Winter Meeting in Washington DC, Chrystian Posada, Edwin Grant (co-advisee), and Brad Richardson, presented four oral presentations related to our nuclear reactor (MSTR) modeling and validation as well as simulation work in the flat panel X-Ray source. By the way, Edwin and Chrystian won also 1st and 2nd place Graduate Research Showcase that recognize innovative research conducted at Missouri S&T. I am very proud of my very hard working graduate students. This is one of the joys of being a professor.

On the spring, I was invited to judge the Nuclear Energy University Program grants in Washington, DC. Besides seeing the Japanese cherry trees blossom, it was a great opportunity to learn about “grantmanship” (grant writing ability), and to see what other programs across the US (57 grant applications in total) are doing to improve their programs (BTW, we are in good shape!).

I was also specially invited (expenses paid) to a UO2 and MOX Fuel Performance Seminar in Idaho Falls, ID in May 2012. This was an excellent overview of the behavior of different nuclear fuel forms under evaluation. The information gather in this seminar will help our material research initiatives as well as enrich our course on nuclear materials (NE-341). The same week the fuel workshop was offered there was also another conference: The IAEA Third International Conference on Nuclear Power Plant Life Management for Long Term Operation (PLm) in Salt Lake City, so I killed two birds with one stone. This was also an outstanding conference with ample participation from utilities all around the world. We received a firsthand account of the Fukushima accident, and also of what problems all other nuclear facilities in Europe, Russia, Japan, Korea, and others. It was a great learning experience. I have all the presentations and plan to incorporate some of this information in the nuclear materials class.

In the summer I was invited (expenses paid again) to the Modeling Energy and Validation School carried out in both Idaho National Laboratory and Oak Ridge National Laboratory. The school was outstanding, both in the scope as well as the quality of the participants. The participants were mostly professors, postdocs, and PhD level students from the US and abroad. It was very nice visiting back both INL and Oak Ridge for a week each and learning about their programs and unique facilities. I spent a year working in ORNL for my PhD degree.

To close my traveling this year, I, together with eleven other professors were selected by the French Section of the American Nuclear Society to the Tour of French Nuclear Facilities for US Professors of Nuclear Engineering. This is an outstanding opportunity to visit and know our French colleagues nuclear facilities.
We visited: SAMARIS large scale seismic test facility in Saclay (near Paris), MELOX and ATALANTE (MOX fuel fabrication plant and hot lab research), the AREVA’s Large LWR fabrication facilities near Chalon, France’s geological repository under construction (ANDRA) near Bure, and finally La Hague reprocessing site and the newest nuclear power plant under construction nearby (Flamaville). I was most impressed by this trip, as our French colleagues have some facilities that are not available in the US, and seeing reactor pressure vessels, heads, and steam generators being welded, finished, and shipped was a new experience to me. Same as seeing MOX fuel pellets on the other side of a plexiglas window by the dozens as they are prepared and packed for the different customers (Japan at the time). The geological repository is under active construction (I brought back some rock samples), all in all a great experience. The only sad part is the feeling I developed that our own nuclear program in the US lacks the vibrancy of our French counterpart. We have a lot of impressive facilities, but when you visit some of our hot labs, or nuclear research labs it feels as if our best times were past, while the French labs have an industrial feel to it. They are working at breakneck pace to keep up with the demand. It was a good feeling to see a place where nuclear is a popular word and where they are doing more and newer things to keep with the developments.

Besides this ton of traveling and good news with graduates, grants, and projects, last semester we also offered the first Radiochemistry course in more than ten years in Missouri S&T. It was a popular course with 40 students registered and the NRC grant funding this initiative was extended for another 6 months so that we can finish building our radiochemistry lab (the glove box is finally in!).

From the research perspective, we manage to produce samarium, nickel, and palladium nanoparticles free floating and supported on carbon nanotubes. The computer simulations of the distributed X-Ray source and the construction of a prototype are ongoing, with the test facilities for field emission being built in Fulton 213 (spherical high vacuum chamber and high voltage supplies), and the development of specially designed neutron and gamma shielding was also successfully conducted. Dr. Ahlam Abdulghani from Bagdad University (Iraq) was visiting our laboratories for several months and she worked shoulder to shoulder with Jessika and Vivek to produce new nanomaterials. She is back to her country and we hope she can come back some time in the future and we plan to collaborate from the distance.

Another collaborator of our group is Prof. Henry Colorado, he is a professor of materials in a prestigious university in Colombia, but is currently obtaining another higher education degree in the University of California Los Angeles (UCLA). We have been working on developing new high resilience shielding materials for gamma and neutrons. He has helping greatly Jason with his project.

By the way, I was not the only one traveling in our group. This summer many of my students were also traveling. Jessika was working for the summer in Idaho National Laboratory in a project related to hydrogen embrittlement in high temperature nuclear reactors, Chrystian is still in the Netherlands designing and building a field emission tester, Rob was in Sandia conducting research on non-proliferation, Adam was doing an internship in Argonne National Laboratory, and finally Blake has been doing an extended Co-op with the Fort Calhoun Nuclear Generating Station in Nebraska.

By the way, for those of you who do not know, professors have really long trial periods called “tenure-track”. They basically test us for 6 years to see if we are worth a darn! ☹. Next year, by the time I write the next Newstron article I will be under tenure review. Basically they will decide if I am good enough to stay or I should be looking for greener pastures. We are evaluated in three basic criteria: Research (publications, students graduated, and money raised), Teaching (including teaching evaluation), and Service. I just wanted to share with you that my tenure application period is approaching. So, how am I doing? As far as I am concerned, so far, so good! This has been a great experience and I am still enjoying my time in Rolla. There is never enough time to do the “gazillion” things we are supposed to do. In Dr. Kumar words: “professors always live in negative time”. I think the key is taking our jobs philosophically and doing the best we can. Trying to keep stress at bay and enjoying the trip. In my personal assessment, our current seven mariners (faculty) are navigating the currents well, and our ship (our program) is definitely sailing happily along and prospering. I look forward to see discover and navigate new shores.
Dr. Ahlam Abdulghani: As a research Iraqi fellow visitor in USA, I enjoyed working in the Nuclear Engineering Department at Missouri University S&T for the period of June 6th to October 20th with Dr. Castano, Jessika and Vivek on the production of nickel, vanadium, and platinum nanoparticles supported by carbon nanotubes. We irradiated solutions containing nanotubes, palladium, vanadium, and nickel salts with a $^{60}$Co gamma source in the University of Illinois. We plan to use these nanoparticles in hydrogen storage and nanofluid applications. I presented this work in the poster session of MS&T 2011 conference in Columbus, Ohio on October 2011. I had the chance also to present a lecture about different chemical and physical methods for the reduction of metal ions to produce nanoparticles. We are writing a paper on the production of nickel nanoparticles deposited on multi-walled carbon nanotubes by gamma radiation, which is a new area of research. Working on this project gave me a chance to join radiation safety training courses and to learn different characterization techniques, such as STEM, TEM, and XPS. This experience has encouraged me to create a postgraduate research program in my department to use gamma rays to enhance other chemical reactions in applied science.

Prof. Henry Colorado: is finishing his PhD in Materials Science at UCLA with Prof Jenn-Ming Yang. He is currently working in new ceramic composite materials for structural applications and thermal shock conditions. He had won several awards. Some of the most recent include: SAMPE Student Leader Experience Award Winner (2012), 3rd place for best paper award at the 35th International Conference and Exposition on Advanced Ceramics and Composites (ICACC’11); Neutron Award Student Poster competition at Advanced Test Reactor National Scientific User Facility Users Week 2012-Idaho National Laboratory; Research Aide at Argonne National Laboratory (2011); scholarships for training in nuclear materials science at several National Laboratories: LANL (2010), INL (2011) and ORNL (2012). Henry has a BS and MS in Mechanical Engineering from the National University of Colombia. Henry has a joint appointment as faculty at the University of Antioquia, Colombia.

Chrystian M. Posada: It has been a little more than a year since I obtained my MS degree in Nuclear Engineering. Since then I have been working on my PhD in Nuclear Engineering at Missouri S&T. During my master’s project I designed and simulated a field emission based electron source to be used in a Flat Panel X-ray source. My PhD work includes the microfabrication and testing of the first prototype of the electron source of this flat panel x-ray source. As a result of the work in the Flat Panel X-ray source project, a total of three journal papers have been published in SPIE, JVST-B and ARI. Additionally, our results have been presented at several peer reviewed national conferences. I recently finished the construction of a state-of-the-art high vacuum system equipped with high voltage capabilities to perform the field emission experiments in our laboratory at Missouri S&T. Right now I am in the Netherlands working as a guest researcher. During this time in the Netherlands, I have been gaining valuable practical experience on field emission measurements, electron sources characterization and their final applications. I hope to apply all this experience to my own experiments once I get back to Rolla. In summary, it has been a good year so far, and somehow the end of my PhD seems to be starting to get close.

Jessika Rojas: We have been studying hydrogen as an alternative source of energy (a project funded by the U of Missouri Research Board). During my masters I worked on the synthesis and deposition of palladium nanoparticles on carbon nanotubes using gamma irradiation for hydrogen storage purposes, and also in the synthesis of nickel nanoparticles. The results have been presented in several conferences, TMS, MS&T, MO Nanofrontiers. Additionally, we wrote a chapter for the book *Radiation Synthesis of Materials and Compounds*, Taylor & Francis Group, to be released in early 2013. This area opened to me several options of research using radiation chemistry for the synthesis of some other type of nanoparticles with medical applications (Au, Re, Y). Thus, for my Ph.D., I am focusing on the synthesis of radioactive nanoparticles for cancer imaging and treatment using the same approach. Gamma radiation has the advantage of simple physicochemical conditions that lead to homogeneous reduction and nucleation of the metallic nanoparticles.
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, and I hoped to find it in this rare field. 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 designing a nuclear bar code to tag explosives (nuclear forensics).

Blake Bohn: I’m from Jackson Missouri. I transferred in from 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 a radiochemistry initiative. I did not 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. 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.

Adam Stensland: I am a senior in the Nuclear Engineering department from Edwardsville, IL. Dr. Castano is my advisor and I have been helping out with the Oxide Dispersion Strengthened (ODS) Steel project. I began working last summer (2011). During the summer, I was working at Argonne National Laboratory as a student intern. I am ready to begin my work on campus again this fall. We now have more equipment and materials, so the project is progressing well.

Brian Seawright: I am a Nuclear Engineering senior from Chesterton, Indiana. I have been a part of the Nuclear Engineering since my freshman year. Dr. Castano has been my academic advisor for the past two years. And I have recently started assisting Dr. Castano with his Oxide Dispersion Strengthened (ODS) Steel project. In creation of shaping the fatigue test specimens, I have been repairing a temporary down friction stir welding (FSW) machine. The machines will give us more accurate fatigue test of the different materials.
American Nuclear Society

New Officers

President: Dustin Specker
Vice President: Brandon Lahmann
Secretary: Sarah Gregg
Treasurer: Dylan Prevost

Update

Last year, ANS was involved with several events. Boy scouts spent a day at S&T earning the Nuclear Science Merit Badge. Their day consisted of a broad range of topics including atom structure, types of radiation, and reactors. ANS participated in the Missouri S&T Block Party again. This time selling t-shirts and recruiting new members by discussing what ANS does. Lt. Freedline from the US Navy discussed the NUPOC program at one of our meetings. We have also been planning with the University of Illinois at Urbana-Champaign (UIUC) to have their ANS chapter to visit S&T and to participate in labs at our reactor this semester.

Student Conference

The Missouri S&T chapter of ANS was honored to have five members to attend the 2012 ANS Student Conference. This year the conference was hosted by the University of Nevada, Las Vegas (UNLV) attracting several hundred undergraduate and graduate students from all over the country. During this conference students from a variety of different backgrounds gathered together to share experiences and research relevant to the fields of nuclear science and technology. Popular areas of discussion included several topics such as material science, nuclear safety analysis, thermo hydraulics, and nuclear fusion.

Another attraction of the student conference was the two day long career fair, featuring company sponsors like AREVA, Bechtel, and Westinghouse. Students were invited to speak with representatives from many different companies about the different opportunities available within their respective company. Also in attendance were several different universities representing their graduate programs for students interested in pursuing higher education.

Join ANS

To join ANS just attend any one of our meetings. We meet every other Thursday at 5:15 PM in Fulton Hall Room 227. Our first meeting is August 30th. Dues are $5 each semester.

T-Shirts

ANS is still selling the popular Limit T-shirts. They are $12 for non-members and $10 for members. Contact Dylan Prevost at dmpg24@mst.edu for more information or to purchase t-shirts.
Greetings from Women in Nuclear (WIN)

Congratulations to the new officers for the 2012-2013 academic year!

President: Lindsay Brandt
Vice-President: Brandon Lahmann
Secretary: Jonathan Scott
Treasurer: Amanda Baker

Updates:

January 23-27th, 2012 was National Nuclear Science Week (NNSW). The goals of NNSW are to increase the public’s awareness of nuclear science and to celebrate the advances in the field. WIN participated this year by hosting many events on campus throughout the week. Events included a cloud chamber demonstration, a trivia night, an information booth, and a nuclear medicine presentation. Table tents were also placed around campus to advertise the NNSW activities, give information on nuclear energy, and provide students with facts on the nuclear industry.

Future Plans:

Planning is currently underway to host the third annual Nuclear Career Fair. The Nuclear Career Fair is scheduled to take place on September 24th, the day before the Missouri S&T Fall 2012 Career Fair. The event is open to companies, national laboratories, and government agencies interested in potentially hiring nuclear engineering students.

Nuclear Career Fair 2011

Various workshops such as resume writing and interviewing skills will also be available to students in the weeks prior to the career fair in order to help students better prepare for the event. The Nuclear Career Fair is open to all nuclear engineering students attending Missouri S&T. This is a great opportunity for students and employers to interact in a relaxed setting before the campus-wide event the following day.

Contact Information:

For more information about the Missouri S&T Student Chapter of Women in Nuclear, please email us at win@mst.edu.
The Nuclear Engineering department would like to thank and acknowledge the following alumni, friends, and companies for their generous contributions between July 1, 2011 and June 30, 2012.

**GIFTS**

**$1 - $99**
Matthew Clark Adler 1999
Jonathan J. Andrews 1996
Kerri Andrews 1998
John J. Blase 1974
Heather Anne Boles 1996
Jason Lee Boles 1996
Constellation Energy Grp Fdn, Inc.*
Matthew Edwin Cushman
H. Joseph Dickerson 1997
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Rosalie J. Hadley 1981
Stanton W. Hadley 1979
Garianne Elaine Howard 1989
Timothy Scott Howard 1990
Kenneth F. Keller 1973
James Alan Lawson 1989
Darrell Ray Liles 1996
Gina Lynn Liles 2001
Jan R. Lojek 1969
Lloyd W. Schempp 1969
Jimmy D. Schottel 1970
Dale Alan Shelton 1985
David L. Smith 1980
Rebecca Lee Steinman 1996
Beth Jeanine Bernadette Swafford 2007
Nicholas Tsoufianidis
Warren S. Vaz 2009
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**$100 - $499**
Dr. Smaeil M. Aceil 1984
American Charitable Trust*

**$100 - $499 (continued)**
Thomas W. Barkalow 1974
Dr. David E. Bartine 1966
Bruce Loren Bartlett 1980
Robert Lee Beck 1993
William B. Bobnar 1975
Frazier L. Bronson 1964
Donald James Buth 1985
Cody J. Couch 2010
Mark Kevin Covey 1982
Aaron E. Craft 2007
Christopher D. Cragg 1985
C. Dennis Croessmann 1981
Charles R. Daily 1983
Jane Theresa Diecker 2003
Michael R. Eastburn 1967
Enery Services Incorporated*
Carolyn P. Eshelman 1987
Curtis David Eshelman 1986
Kelly Brian Evanoff 1982
Dr. Phillip Dean Ferguson 1988
Michael John R. Ford 1988
Corie Allene Glenn 2001
Jeremy Wayne Glenn 2003
Micah J. Hackett 2002
Robert L. Hayward 1975
Justin William Hiller 1994
William K. Hinton, Jr. 1976
Timothy Edward Holland 1991
Paul Glenden Justis Jr. 1985
Gregory Scott Kinn 1987
Andrew T. Knudsen 1986
Paul G. Kossina 1977
Jeffrey Paul Krause 1999
Serena Jagtiani Krause 1998
Dr. Peter Gyula Laky 1994
Richard N. Lileston 1979
Ellen Couvillion McLaughlin 1989
Matthew Kevin McLaughlin 1982
Michelle Lynn Mertz 1990
Steven Michael Mertz 1989

*= Matching Gifts
Annual Phonathon
November 4, 5, 6, 7 and 8, 2012

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 4, 5, 6, 7, and 8, 2012. 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!

GIFTS (continued)

$100-$499 (continued)
Craig Matthew Minarich 1998
John Owen Pearman 1984
Bren Andrew Phillips 2005
Katherine Ann Phillips 1990
Robert L. Phillips 1990
Stephanie A. Powelson
PSEG*
Kevin D. Rackley 1980
Donald Edward Rickard Jr. 1985
Mark Thomas Sautman 1991
Donald F. Schnell
Lenard Alan Smith 1992
Gajendra M. Suwal 1976
Russell Ray Thompson 1984
Dr. Henry A. Till 1968
Scott Vrtiska 2001
John Charles Wagner 1992
William C. Wolkenhauer 1962

$500-$999
Bechtel Foundation*
Sheldon A. Easson 1975
Kenneth Thomas Erwin 1997
Ali Ann Simpkins 1989
Philip Jay Simpkins 1989
Jamie Marlene Wieschhaus 2003

$1000-$2999
American Nuclear Society
Omar Ivan Aguilar 1985
William E. Burchill 1964
Deloitte & Touche Foundation*
Kim Menier

$3000-$4999
Harold R. Garner 1976

CORPORATE GIFT
Exelon Nuclear $50,000

Thank You!

* = Matching Gifts
What’s New?
Keep us posted on what’s happening with you or if you have news to share.