American Nuclear Society

University of Illinois at Urbana-Champaign Student Section

Samuel Glasstone Award Application

2012 – 2013

University of Illinois at Urbana-Champaign ANS Student Section

Faculty Adviser: Rizwan Uddin
President: Molly Bilderback
Vice President: Robert Geringer
Treasurer: Brian Pekron
Social Chair: Kristin Schoemaker
Outreach/Engineering Open House Chair: Kathleen Weichman
Webmaster/Engineering Council Representative: Michael Cheng

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Department of Nuclear, Plasma
and Radiological Engineering

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104 South Wright Street
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May 8, 2013

TO WHOM IT MAY CONCERN

As the faculty advisor of this chapter, I would like to take this opportunity to strongly support the nomination of the student section of the American Nuclear Society at the University of Illinois at Urbana-Champaign (UIUC ANS) for the American Nuclear Society Samuel Glasstone Award.

The chapter has been very active over the last few years, and this year the University of Illinois student section has continued this trend. Among many others, some notable things they have done in the past year are:

- Organized tours to Argonne National Laboratory, and a triple-student-section tour of the Exelon LaSalle Generating Station.
- Hosted small-group information sessions with industry representatives from six different companies and organizations.
- Represented our section at the 2012 ANS Annual Meeting in Chicago, IL, as well as sent ten students (including three presentation groups) to the ANS Student Conference at the Massachusetts Institute of Technology.
- Helped the Central Illinois ANS local section host workshops for boy scout merit badges.
- Organized presentations on nuclear energy, plasma, and fusion for the College of Engineering Open House (EOH)

In providing assistance to keep student involvement in this organization as well as facilitating student communications with the faculty and department, student chapter of the ANS at the University of Illinois has been a valuable presence in the nuclear engineering program. I very strongly recommend our student chapter for this year's Samuel Glasstone award.

Sincerely,

Rizwan Uddin, Professor

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1. Statement of Purpose

The University of Illinois American Nuclear Society Student Section (UIUC ANS) exists and operated to serve its members and the Nuclear, Plasma, and Radiological Engineering (NPRE) department in many ways. Our primary aim as a student section is to provide to students interested in nuclear topics opportunities to further themselves professionally through the local and international ANS network of scientists, engineers, and other nuclear specialists. Additionally, our chapter strives to keep its members informed and educated on nuclear topics and issues so they may act as educated advocates for the nuclear field to the public. To further expand our members' familiarity with the nuclear field, it is important to us that we regularly provide them with opportunities to tour power plants, national labs, and any nuclear-related facilities that are able to provide to interesting and educational real-life experiences. Finally, we aim to facilitate social camaraderie between our members, faculty, and department by hosting social events of various types.

2. Section Management

Since its foundation in 1961, UIUC ANS has historically been operated almost exclusively by its executive board, and the past academic year was no exception. The positions on this board were adjusted from the previous year's layout to better reflect the division of labor and to facilitate a smaller turnout of students interested in executive positions as compared to previous years. To achieve this, the role of Communications Chair was absorbed primarily by the President and, to a lesser degree, by the Social Chair. However, some of our outreach events required more extensive and long-term planning than the executive board could facilitate. Because of this, the Engineering Open House (EOH) Planning Committee was formed of students specifically interested in helping with outreach events without requiring the commitment of an executive position for the purpose of aiding in the planning of our largest outreach event of the year. This helped greatly in facilitating non-executive involvement in our outreach efforts, and ultimately resulted in a much more competitive election for the board positions of the coming academic year. This, in turn, allowed us to implement a new position, vice treasurer, in order to familiarize a reliable underclassman student with the complexities of the position of treasurer.

2.1 Leadership Positions

The members of the 2012-2013 Executive Board, the Inaugural (2012-2013) EOH Planning Committee, and of the 2013-2014 Executive Board are acknowledged below.

Outgoing Executive Officers, listed below from left to right, back to front.

Brian Pekron, Treasurer- Brian is a senior in nuclear engineering, graduating this May with his bachelor's and continuing on to graduate school at the University of Wisconsin-Madison.

Robert Geringer, Vice President- Robert is a senior in nuclear engineering, continuing his studies in pursuit of dual degrees of nuclear power engineering and geology.

Michael Cheng, Webmaster and Engineering Council (EC) Representative- Michael is a sophomore in nuclear plasma engineering, continuing his studies in pursuit of his bachelor's at Illinois and continuing in serving his current positions on the incoming executive board.

Kathleen Weichman, Outreach and EOH Chair- Kathleen is a senior in plasma engineering, graduating this May with her bachelor's as well as a minor in French and continuing on to graduate school at the University of Texas at Austin.

Molly Bilderback, President- Molly is a senior in nuclear engineering, graduating this May with her bachelor's and continuing on to graduate school at the University of Michigan in Ann Arbor.

Kristin Shoemaker, Social Chair- Kristin is a senior in nuclear engineering, graduating in May with her bachelor's and continuing on to Officer Candidate School for the US Navy in preparation for her service on board our nation's nuclear submarines.

Incoming Executive Officers, listed below from left to right, back to front (not shown- Michael Cheng and Paul Rackouski).

Pawl Piotrowicz, Vice President- Pawel is a junior in plasma engineering, continuing his studies in pursuit of his bachelor's at Illinois.

Omar Almasri, Outreach and EOH Chair - Omar is a sophomore in nuclear engineering, continuing his studies in pursuit of his bachelor's at Illinois.

Louis Chapdelaine, Treasurer- Louis is a sophomore in plasma engineering, continuing his studies in pursuit of his bachelor's at Illinois in hopes of completing his degree with a Physics minor a year early.

Nick Rivera, President- Nick is a junior in nuclear engineering, continuing his studies in pursuit of his bachelor's at Illinois. He has previously served as the president of another campus engineering organization, the Society of Hispanic Professional Engineers.

Simone Pensabene, Vice-Treasurer- Simone is a freshman in nuclear engineering, continuing his studies in pursuit of his bachelor's at Illinois.

Paul Rackouski, Social Chair- Paul is a junior in nuclear engineering, continuing his studies in pursuit of his bachelor's at Illinois.

(See Michael Cheng above.)

The 2012-2013 EOH Planning Committee consisted of:

Omar Almasri	Molly Bilderback	Louis Chapdelaine
Robert Geringer	Pawel Piotrowicz	Paul Rackouski
Rui Lin Tan		Yuhui Zhao

At the end of every academic year's spring semester, UIUC ANS holds elections for board positions. Candidates must have expressed intention to run in the previous weeks and notified that they must prepare a brief presentation in case of the event that they run contested, which is most frequently the case for certain positions. These presentations are informed by summary descriptions provided by the current officers of their positions. Candidates present their case for election and voting is opened, either in-person at the election meeting or online via message to the UIUC ANS e-mail. Candidates are elected by popular vote, with further measures taken in the event of a tie (most commonly, this has consisted of a re-run of the previous process, sometimes with a compromissory position available for the loser). Once the new board is elected,

the new and old boards come together for a transition meeting to pass on pertinent information and more detailed expectations for each of the positions. All non-executive board committees are operated on a volunteer-staffed basis.

2.2 Membership

Membership of UIUC ANS is divided into two parts: official and unofficial. Official status of student section membership of UIUC ANS has been limited to members who have paid dues, set at $20 for the entire academic year of membership, whereas unofficial members have not paid these dues. This fee is used to fund various section activities throughout the year, including funding of social events, purchase of representation clothing such as T shirts and hoodies, and food provided at the monthly general meetings. Additionally, certain activities are restricted to members who have paid their dues, such as attendance to the ANS National Student Conference. However, regardless of due payment, all members (official and unofficial) are welcome, invited, and encouraged to participate in social, professional, and outreach events as a whole.

2.3 Meetings

UIUC ANS typically holds general meetings once monthly, occasionally with supplementary intermediate meetings. The main purpose of the general meetings is to update members on the status of our chapter and to announce upcoming events. They are also at times utilized by the department to announce events, present guest speakers, or hold information sessions. We often work together with our department to host a guest speaker of some kind, generally a representative from industry, notable visiting alumni or department associates, or our own researchers and professors. This helps to provide an added incentive for our members to attend our meetings and engage with the speakers in a comfortable and informal setting.

To ensure diligent and effective management, the UIUC ANS Executive Board holds weekly meetings to plan and organize events and activities. These meetings also facilitate delegation and division of work on current and future tasks as well as allowing the officers to report on task progress. Though the meetings are relatively informal and open to input and debate from all officers, the president ultimately has the final say in what decisions the student section makes as a whole.

2.4 Communication

UIUC ANS utilizes many means of communication to keep in touch with our members. Aside from the conventional e-mail list (operated through ansatuofi@gmail.com), we communicate by way of the department's facebook page (https://www.facebook.com/groups/211872318921762/), our own society facebook page (https://www.facebook.com/groups/127395308703/), and our own website. In previous years, UIUC ANS has utilized a website hosted on a web server from the College of Engineering. However, this led to many technical difficulties, and as such, the Webmaster has been involved in creating an independent website over the past semester.

Additionally, in order to maintain communication with the College of Engineering, UIUC ANS is responsible for attending the monthly meeting of Engineering Council (EC), which is our university's student engineering organization oversight board. These meetings are required in order for the organization to maintain good standing in EC, but are also used to provide organizations with ideas, information, resources, and requirements from the college.

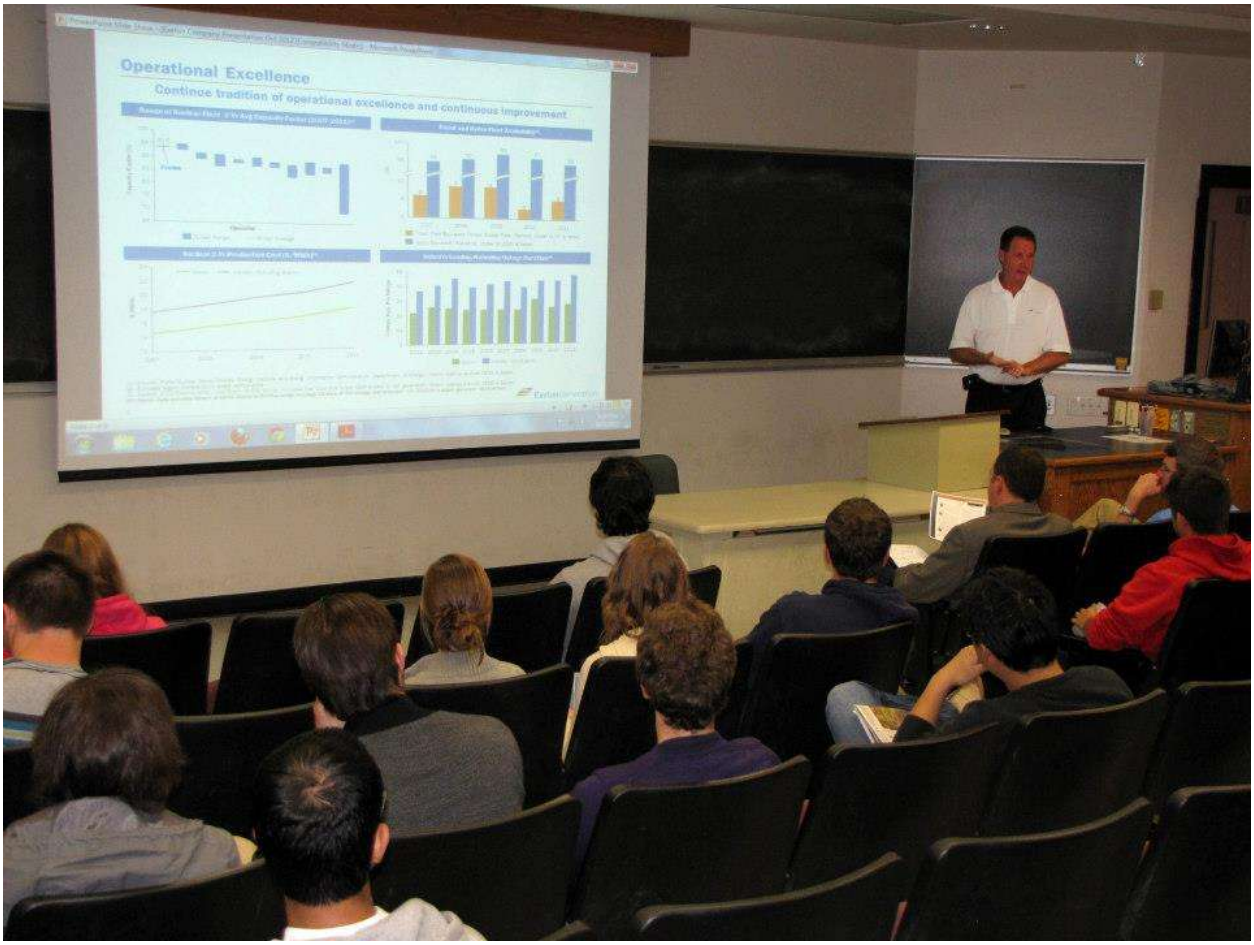
3. Professional Development

A large focus has been placed this year on providing professional development opportunities for our members. This has been in part due to the upholding of a section legacy of providing excellent professional opportunities, but also due to the difficulty our students have been experiencing in finding full-time employment and internships as compared to previous years, most likely due to the recent loss of momentum of the nuclear industry resulting from the combination of economic issues and the aftermath of the Fukishuma Dai-Ichi incident. In an effort to help our students work through this issue, UIUC ANS has increased efforts from the previous year in providing employment and internship information and guidance.

3.1 Alumni Interchange

Every year during the University of Illinois Homecoming week, the NPRE department invites its alumni from across the country and all corners of the nuclear industry to participate in the Alumni Interchange. The interchange consists of two portions. The first consists of presentations scheduled throughout the day. These are given by the alumni from industry to

familiarize students with what exactly each company does, and what they could expect from employment with them.



Students sit in on a presentation from Exelon Corporation, a company that has hired many full time employees and summer interns from our department in recent years.

The second aspect of the interchange consists of morning and afternoon small-group sessions where students may openly converse with the alumni industry representatives about all aspects of being a professional in a nuclear engineering field (what their jobs are like, what their career paths were, what their advice is in seeking internships or employment with the companies they are representing, etc.).

Students in small group meetings with NPRE alumni industry representatives from various companies.

The alumni interchange was, as it has proven to be in past years, quite successful in providing students with opportunities to gather useful career information. Students had the opportunity to distribute their resumes for consideration for full time or internship employment on a much smaller scale than they are able to at general engineering career fairs. Also, they are able to meet and converse with the representatives on a level extending far beyond the career fair elevator pitch. This helps not only increase the likelihood of returned interest in their resume from the companies, but also to establish contacts at many different companies with a broad range of focuses, which is useful in any future pursuits of professional advancement as well.

3.2 Company Information Sessions

As the intentions of UIUC ANS to increase the availability of professional development opportunities were well-known, the NPRE department approached the board with the prospect of collaborating in providing more opportunity for our students to network with engineers from the "real world". The executive board and the department staff worked together to organize many information sessions throughout the spring semester of the 2012-2013 school year, when many seniors would begin more actively seeking employment and underclassmen are more rigorously applying for internships. The department utilized its network of alumni in industry to provide for these meetings professionals to speak to and with our students, which ANS would host and utilize its student network to publicize. Representatives of a wide range of educational backgrounds and institutions, professional experiences, and career histories participated in helping us host these sessions. Additionally, attempts were made to invite a reasonable number of recent graduates (within the past 5 years) of multiple degree types to provide extra insight on the process of transitioning from a university student to a full-time employee. The sessions consisted of an initial pitch by the company representatives on what their company does and what opportunities they had for our students, followed by Q & A time for students to ask any questions they had of the representatives. When the question session ended, students were encouraged to engage one-on-one with the representatives to express any deeper questions or thoughts they still had, as well as to exchange contact information and submit resumes. Over the semester, a total of six very successful information sessions were hosted with the companies and organizations in the following list:

- ERIN Engineering and Research, Inc.

- Nuclear Regulatory Commission
- Bechtel Power Corporation
- Exelon Corporation
- Babcock & Wilcox Company
- ENERCON Services, Inc.

These sessions were well-received by ANS members as well as the general student body of the NPRE department. All six sessions showed good attendance by undergraduate and graduate students alike. There was even some attendance by recent alumni still in search of employment, which extended beyond the attendance demographics we initially expected from these sessions.

4. Nuclear Facility Tours

UIUC ANS sees great importance in providing opportunities for our members to become as familiar with the nuclear industry as possible. In order to achieve this, we have expended great efforts to maintain a schedule of at least one nuclear facility tour per semester. This year, we had great success in achieving this, organizing tours with not only our student chapter, but with other reasonably local student sections of ANS as well.

4.1 LaSalle Generating Station

During the fall semester, UIUC ANS undertook the task of organizing a joint tour with the student sections from Purdue University and the University of Wisconsin-Madison. The tour was given by Exelon's of their LaSalle County Generating Station in LaSalle, Illinois. The tour group consisted of 15 students: 6 from the University of Illinois, 5 from the University of Wisconsin, and 4 from Purdue. The event began with a brief presentation on the operation of layout of the site then moved inside the security perimeter for the tours of various aspects of the station. The facilities toured included the diesel generator, the turbine deck, the refuel floor, and the control room. Station employees acted as the tour guides, and would thoroughly explain each facility as it was toured. The guides accepted and encouraged all and any questions from students.

The triple-student-section tour group in front of the LaSalle Station.
(Photo credit to Nam Phan, President of Purdue American Nuclear Society)

4.2 National Laboratories

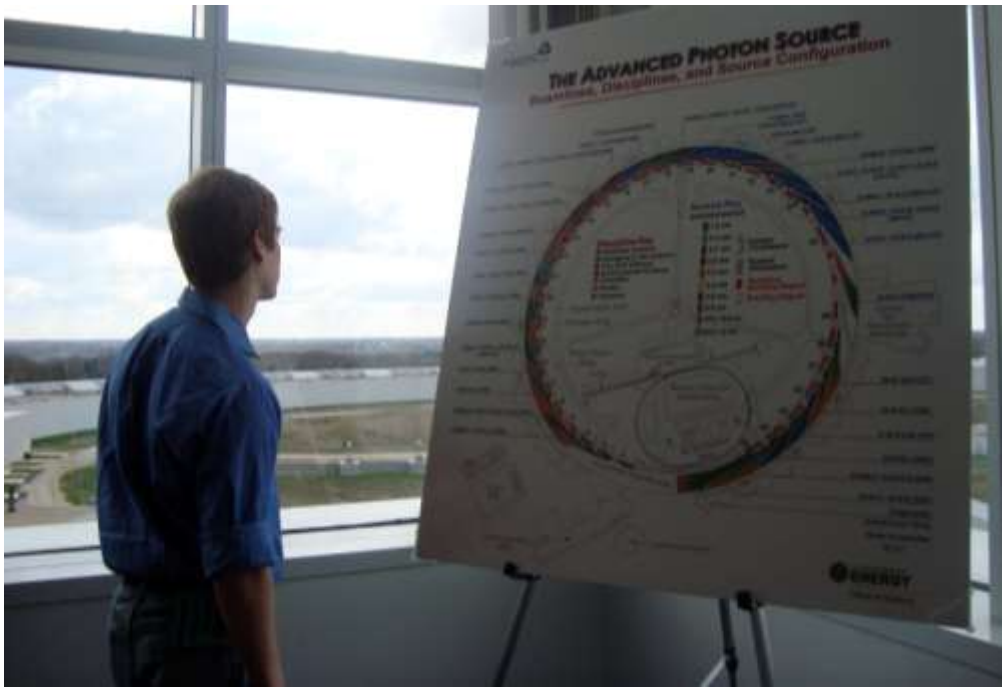
This year, UIUC ANS organized two tour trips to the Argonne National Laboratory in Argonne, Illinois, one tour each semester. Two tours were organized in order to provide the opportunity for a larger number of students to gain exposure to a research-type facility.

During the fall semester, Argonne National Laboratory was the host of the Energy Showcase, an event similar to the Argonne Open House event traditionally hosted in that it is also open to the public, but that is smaller in scale. This was done in order to facilitate a larger exposure to all that the laboratory has to offer in a one-day event. The Energy Showcase featured interactive demos, exhibits, and tours, providing attendees the opportunity to interact with energy researchers and innovators within a hands-on atmosphere. At the time of this event, the annual group of visiting students from our department's exchange program with the University of Pisa in Italy was on campus. Because this event would provide them a great

opportunity to learn more about the research done in the nuclear industry in America and at Argonne specifically, they were invited to join the tour group. Along with our own resident students, many of the Italian students did attend (along with our exchange student guide Dr. Calogero Sollima), and were able to experience the tours not only at the Argonne Energy Showcase, but with their time leftover travelled to Fermi National Accelerator Laboratory in Batavia, Illinois and toured some of the facilities there as well.

Though the fall semester tour of Argonne National Laboratory was a definite success, UIUC ANS felt that a tour personalized for a small group of nuclear engineering students would be slightly more relevant to our field, and more insightful to the research conducted at Argonne than the open-to-the-public Energy Showcase was. We contacted Michael Kaminski, an alumni and adjunct professor of the University of Illinois and engineering researcher at Argonne National Laboratory, in order to organize a personal tour for a group of ANS members, which turned out successful. The facilities toured included the Advanced Photon Source (including the nanoprobe room) and the nuclear museum, which has exhibits on many of the reactor systems designed or built by Argonne's sites in both Chicago and Idaho (the now-Idaho National Laboratory is the former-Argonne West location).

UIUC ANS members at the Advanced Photon Source.



Viewing the Advanced Photon Source from above.

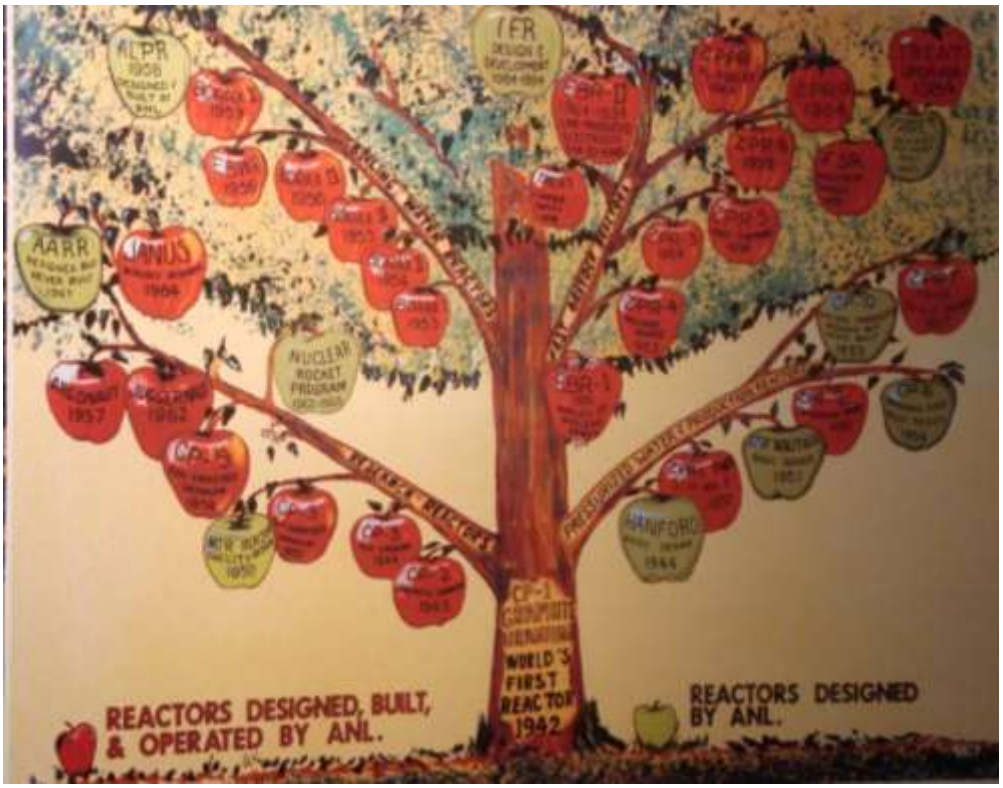


Chart in the nuclear museum of all reactors designed, built, and operated to date by Argonne National Laboratory.

5. Outreach and Community Service

A category of the types of activities that UIUC ANS organizes is activities that give our members the opportunity to participate in community service and outreach on behalf of the nuclear industry. It is a goal to have a minimum of one outreach event per semester, with additional events encouraged strongly.

5.1 E-Night

At the beginning of the fall semester every year, Engineering Council hosts an event for new students in the college to come and explore what the different engineering societies and student organizations have to offer. These organizations are given the opportunity to show off projects, events, resources, and ways for the students to get involved with Engineering Council and the College of Engineering as well as to speak with the Deans and engineering faculty. ANS hosted a table displaying the events that we have historically held in past years, staffed by students that have been previously involved in ANS to give examples of what ANS does, distribute ANS pamphlets with information and facts about nuclear science, and answer any questions the visitors have. At this event, a sign-up sheet is provided for students to join the e-mail list, which resulted in over 50 new e-mail signups and ultimately returned many new members, including several freshmen nuclear engineering students.

ANS table at E-Night with information brochures, signup sheets, and event pictures.

5.2 Dream to Inspire your Vision in Engineering

Dream to Inspire your Vision in Engineering (DIVE) is an event hosted by the college for high school students, giving them the opportunity to learn about what engineering is, what engineers do, and the job opportunities available to engineering graduates. Engineering societies form all departments are invited to host exhibits for high school students to explore and to provide a number of students of various backgrounds to answer their questions. This was the first year an NPRE society participated, and it proved successful. Many of our own members and students volunteered to help, and many students were interested in our exhibits (including a demo on how a Geiger counter detected the counts from a radioactive source and various other "props", such as an Americium-containing fire detector and authentic, Uranium-paint Fiesta ware.

Some of the student volunteers at the ANS DIVE exhibit.

5.3 Boy Scout Merit Badge

It has become a tradition for our section to co-host (with the Central Illinois regional section of ANS) an event at which boy scouts can earn their nuclear science merit badges. The requirements to earn this badge are, as of 2011 (found at http://meritbadge.org/wiki/index.php/Nuclear_Science):

1. Do the following:
    a. Tell what radiation is.
    b. Describe the hazards of radiation to humans, the environment, and wildlife. Explain the difference between radiation exposure and contamination. In your explanation, discuss the nature and magnitude of radiation risks to humans from nuclear power, medical radiation, and background radiation including radon. Explain the ALARA principle and measures required by law to minimize these risks.
    c. Describe the radiation hazard symbol and explain where it should be used. Tell why and how people must use radiation or radioactive materials carefully.
2. Do the following:
    a. Tell the meaning of the following: atom, nucleus, proton, neutron, electron, quark, isotope; alpha particle, beta particle, gamma ray, X-ray; ionization, radioactivity, and radioisotope.
    b. Choose an element from the periodic table. Construct 3-D models for the atoms of three isotopes of this element, showing neutrons, protons, and electrons. Use the three models to explain the difference between atomic number and mass number and the difference between the quark structure of a neutron and a proton.
3. Do ONE of the following; then discuss modern particle physics with your counselor:
    a. Visit an accelerator (research lab) or university where people study the properties of the nucleus or nucleons.
    b. Name three particle accelerators and describe several experiments that each accelerator performs.
4. Do TWO of the following; then discuss with your counselor the different kinds of radiation and how they can be used:
    a. Build an electroscope. Show how it works. Place a radiation source inside and explain the effect it causes.
    b. Make a cloud chamber. Show how it can be used to see the tracks caused by radiation. Explain what is happening.
    c. Obtain a sample of irradiated and non-irradiated foods. Prepare the two foods and compare their taste and texture. Store the leftovers in separate containers and

under the same conditions. For a period of 14 days, observe their 149 rate of decomposition or spoilage, and describe the differences you see on days 5, 10, and 14.

d. Visit a place where radioisotopes are being used. Using a drawing, explain how and why they are used.

5. Do ONE of the following; then discuss with your counselor the principles of radiation safety:
    a. Using a radiation survey meter and a radioactive source, show how the counts per minute change as the source gets closer to or farther from the radiation detector. Place three different materials between the source and the detector, then explain any differences in the measurements per minute. Explain how time, distance, and shielding can reduce an individual's radiation dose.
    b. Describe how radon is detected in homes. Discuss the steps taken for the long-term and short-term test methods, tell how to interpret the results, and explain when each type of test should be used. Explain the health concern related to radon gas and tell what steps can be taken to reduce radon in buildings.
    c. Visit a place where X-rays are used. Draw a floor plan of this room. Show where the unit, the unit operator, and the patient would be when the X-ray unit is operated. Explain the precautions taken and the importance of those precautions.
6. Do ONE of the following; then discuss with your counselor how nuclear energy is used to produce electricity:
    a. Make a drawing showing how nuclear fission happens, labeling all details. Draw another picture showing how a chain reaction could be started and how it could be stopped. Explain what is meant by a "critical mass."
    b. Build a model of a nuclear reactor. Show the fuel, control rods, shielding, moderator, and cooling material. Explain how a reactor could be used to change nuclear energy into electrical energy or make things radioactive.
    c. Find out how many nuclear power plants exist in the United States. Locate the one nearest your home. Find out what percentage of electricity in the United States is generated by nuclear power plants, by coal, and by gas.

7. Give an example of each of the following in relation to how energy from an atom can be used: nuclear medicine, environmental applications, industrial applications, space exploration, and radiation therapy. For each example, explain the application and its significance to nuclear science.
8. Find out about three career opportunities in nuclear science that interest you. Pick one and find out the education, training, and experience required for this profession and discuss this with your counselor. Tell why this profession interests you.

In order to help the scouts earn this badge, both lectures and hands-on activities are provided by both members of the UIUC student section and of the Central Illinois section. Student volunteers gave lectures fulfilling the requirements found in the above link and performed demos for the scouts, including cloud chambers, construction of model atoms, and experiments and demonstrations with radiation and counters. Overall, these sessions not only help boy scounts the opportunity to earn their Nuclear Science merit badge, but they also give us the opportunity to engage young students in learning about radiation and basic nuclear science, something they are seldom taught in school and on which public knowledge is extremely lacking.

5.4 Engineering Open House

Every year midway through the spring semester, the college hosts an event, Engineering Open House (EOH) to showcase to the public the projects and exhibits that engineering and science students have been working on throughout the year. The event is open to anyone, and typically attracts over 20,000 attendees, with large attendance by grade school and high school students. All scientific organizations and societies are invited to host exhibits, and this year ANS continued our section's history of participating in this event. Throughout the school year leading up to the event, this year's board implemented a change in organization in planning for this event. Since over the years this event has evolved to involve quite a bit of planning work, more than can be comfortably performed by the EOH Chair themself, we created a subcommittee (the EOH Planning Committee) of volunteers to assist our executive officer in planning and updating the demonstrations and presentations.

Every year, the ANS exhibit at this event has consisted of two sections: one lecture on nuclear radiation, fission and power generation and another lecture on plasma applications and

fusion, with both presentations accompanied by related demos. During the power demo, we ask for a volunteer from the audience (preferably a younger student) to set off the "mousetrap reactor"- an acrylic container with a hole cut in the top set over a wooden base, which is covered in set mousetraps with ping pong balls balanced on top of them. When the volunteer drops one additional ping pong ball in the hole cut in the top, it sets off one mousetrap, which sets off those around it, and ultimately results in a chain reaction of mousetraps being set off by the ping pong balls. This is used to illustrate the fission chain reaction that drives nuclear power production after it has been explained in the lecture.

Member volunteers setting mousetraps for the "mousetrap reactor".

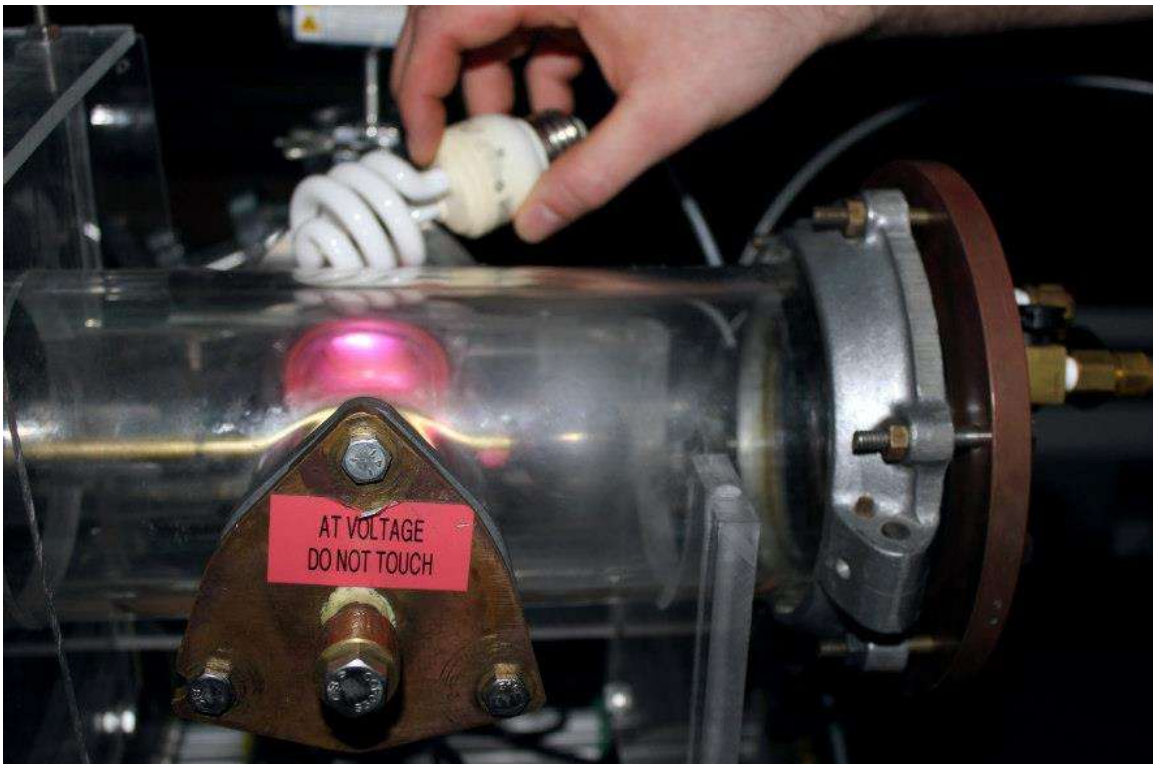
Volunteers experiencing the dangers of setting up the mousetrap reactor.

Additionally, during the explanation of the different types of radiation, a Geiger counter hooked up to the PA system in the lecture hall is used to illustrate the difference between an alpha, beta, and gamma source, as well as the difference between a stronger and weaker source of the same radiation. After the lecture is over, audience members are invited up to use the counter on various radioactive sources and everyday items, such as Americium fire detectors and Fiesta ware.

Projecting the counting clicks from gamma and beta sources over the lecture hall speakerphone.

For the plasma lecture, during the explanation of what a plasma is (an ionized gas), a DC plasma chamber built by our own Center for Plasma-Material Interactions (CPMI) research facility is used to generate an argon plasma for the audience. During the portion of the presentation that explains magnetic confinement of plasmas in fusion reactors, magnets bars are used to make the plasma in the chamber "dance", showing that plasmas are charged and can be manipulated by magnetic fields. Additionally, when explaining the different ways that plasma is used in and

applied in the production of things we use every day, a fluorescent light bulb is used to demonstrate that these bulbs are lit with plasma by showing that the ionized plasma in the chamber can be used to light the plasma within the bulb. This same experiment is also done using the plasma balls commonly sold as toys. After the presentation, the audience is invited to try this experiment with the plasma ball (though they are not allowed to approach the DC plasma chamber, due to exposed high voltage plates that could result in serious electric shock).



A fluorescent light bulb being lit by the plasma in an argon DC plasma chamber.

In addition to these exhibits, UIUC ANS and Exelon (a frequent sponsor for EOH events) teamed up to provide a new exhibit at this year's open house: a "booth" staffed by Exelon engineers and nuclear engineering students to debunk the common myths surrounding nuclear energy and to give short lectures on how these aspects of nuclear energy actually work. Additionally, a simple set up with a Geiger counter and source items of various types of radiation was provided for visitors to experiment with what is needed to block radiation (paper for alpha particles vs. aluminum for beta particles, for example).

NPRE student volunteers explain to a high school student why different materials are needed to block different types of radiation. Exelon engineers can be seen in the background with a model fuel rod, used to explain what really goes on within a nuclear reactor core.

Overall, the outreach efforts of UIUC ANS (with the help of dozens of student volunteers and professional volunteers and sponsors) aim to help provide exposure to nuclear science for many young students that are rarely taught anything about these topics in school, and are commonly exposed to incorrect information by the media. This is the ultimate goal of all of our outreach events: to expel common misconceptions and spread the truth about the nuclear industry. We believe it is part of our duty as nuclear engineers to inform the public about the nuclear industry as openly, honestly, and factually as possible.

6. Social Events

Social events are crucial to the camaraderie that UIUC ANS wished to build not only among its members, but also between the faculty and students of our department as well. We try to host multiple social events every semester for our members, staff, and faculty to intermingle.

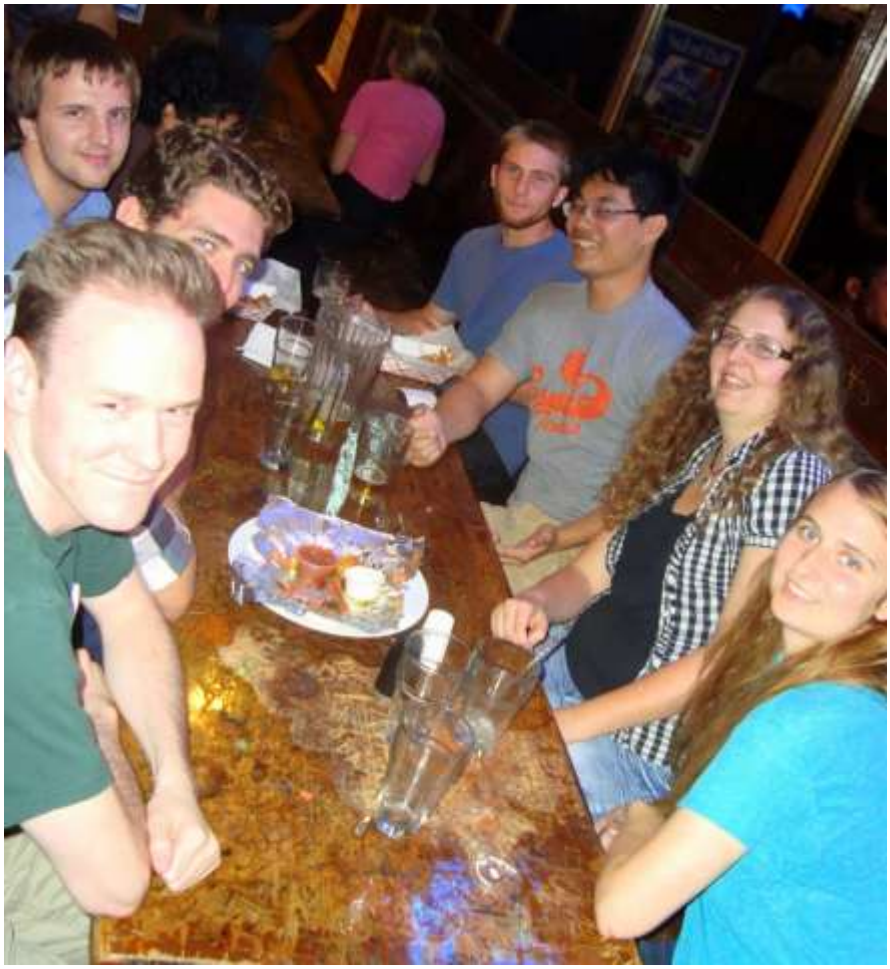
6.1 Welcome Back Cook Out

Every year at the beginning of the fall semester, UIUC ANS holds a cook out outside of our department building (Talbot Laboratory) to welcome new students to our department and to provide a reunion and welcome back event for our returning students. This event is held every year after the meeting of the department's freshman introduction class to encourage their participation, as young member involvement is crucial for an active and supported student chapter of ANS. All new and prospective members from the e-mail list obtained at E-Night are invited, as well as returning members and department students, staff, and faculty. It provides an excellent environment for those unfamiliar with ANS or the NPRE department to meet with many people involved in these groups in a relaxed, casual setting. This has proved very successful in getting freshmen and new members involved from the beginning of the semester.

ANS officers manning the grill at the welcome-back cook out
(left to right: Kristin Schoemaker, Michael Cheng, and Brian Pekron)

6.2 Happy Hours

ANS also hosts happy hours on a regular basis throughout the semester. All members and invited to come and partake in appetizers (provided by ANS) and mingle with other students. These are typically attended by 10-20 students from all years of study, from freshman to PhD students. They provide an excellent opportunity for students to share knowledge down the line on classes, professors, and courses of study in a casual setting, and for our members to get to know each other on a friendlier basis.



A group of ANS members at an ANS happy hour at Murphy's Pub, a location popular with ANS members for food and drinks.

6.3 Bar Crawls

Popular with the upperclassmen in the department, ANS holds one campus bar crawl each semester, which normally consist of visits to four campus bars as a group. This event is highly anticipated throughout the year, as it normally has a very high attendance rate by most of our regular members, who have normally become a very close group over the years as members of ANS together.

Some of the ladies of ANS on the fall semester bar crawl.

Undergrad and grad students intermingling on the spring bar crawl.

6.4 Haunted Barn

Around Halloween, ANS normally organized an excursion to take advantage of the many corn mazes and haunted houses that are prevalent throughout central Illinois during this time of year. This year, ANS organized a trip for members to walk through the "Midway of Madness" haunted barn at the Champaign County Fairgrounds in Urbana, Illinois.

6.5 Bowling Night

In order to host more events that younger members might be interested in attending (as opposed to happy hours and bar crawls), ANS decided to hold a bowling event following our January general meeting. Alongside a food court and arcade, there is a bowling alley located in the basement of the University of Illinois Student Union, at which ANS reserved space for our members to compete across 3 lanes in an unofficial bowling competition.

Some of the participants in the ANS bowling night.

6.6 Pi Your Professor

With the permission and generous cooperation of some of our department's most prominent professors, ANS hosted an event on Pi Day (3/14) at which students were given an opportunity to gain some small sense of vengeance for the weekends spent and all-nighters pulled on homework, studying, and programming projects. At the "Pi Your Professor" event, students had the opportunity to (gently) smash whipped-cream-on-paper-plate pies into the faces of Doctors Claire Sullivan (professor of the intensive radiation detection laboratory course), Rizwan Uddin (professor of the courses most consistently rated most difficult in the department, the advanced neutronics and thermohydraulics courses), and James Stubbins (professor of the senior design course, the nuclear power economics and fuel management course, and our very own department head). This event was made into a fundraiser to help curb the costs of the student conference, enabling us to afford bringing more students. As expected, this event was a *smashing* success. All participation in this event is completely voluntary on the part of professors, and students are not allowed to actually throw or forcefully project their pies in any way. No professors were harmed in the performance of this event.

Preparing for Pi Day festivities in the yard of Talbot Laboratory (left to right, Dr.s Stubbins, Sullivan, and Uddin).

Students begin to arrive.

The aftermath.

6.7 Professor Happy Hour

This year, our department has had the good fortune to take on many new faculty members; by the fall semester, we had taken on three new professors within the last year. In order to give students the opportunity to meet these professors, whether they are underclassmen getting to know the professors before they take their classes or upperclassmen meeting the professors whose courses they will no longer need to take, ANS hosted a happy hour with all three of the new professors in attendance. The new professors at the time were Doctors Clair Sullivan (radiation detection expert), Tomasz Kozlowski (nuclear reactor simulation specialist), and Yang Zhang (material physicist). This event proved very successful in allowing the new professors to get to know the students of their department, as well as provide students for meeting the professors if they had not and to get to know the professors better if they had already made their acquaintance. This is very important for ANS, since the facilitation of good student-faculty familiarity and interaction is of high priority to our organization and department as a whole. Additionally, though she joined our department since the hosting of this event, NPRE has also taken on and additional professor, Doctor Zahra Mohaghegh, who specializes in socio-technical risk analysis perspectives of the nuclear power industry.

7. Conferences

It is very important for UIUC ANS to represent our student section and department in the public sector. As such, it is very important for us to be able to send students to annual meetings and student conferences.

7.1 2012 Annual Meeting

UIUC ANS's vice president, Robert Geringer, was able to attend the 2012 Annual Meeting, "Nuclear Science and Technology: Managing the Global Impact of Economic and Natural Events", held that summer in Chicago. Our department encouraged students to represent our chapter at as many meetings and conferences as possible, and we benefited by Geringer taking the time out of his summer schedule to attend and represent UIUC ANS. He participated as one of the Student Staff Coordinators, and found the economics-related presentations to be especially interesting of the sessions he attended while there.

7.2 2013 Student Conference

This year, UIUC ANS was able to send ten students to the National Student Conference, including five of our six executive officers, two podium presentation groups, and one poster presentation group. Robert Geringer gave a podium presentation on deep borehole storage of used nuclear fuel and radioactive wastes (*Deep Borehole Storage of Nuclear Waste in Central Illinois Geology: A Technical, Economic, and Political Feasibility Analysis*), Ashley Farnan and Brent Cross presented a poster on an X-ray tomography radiological imaging system (*Increasing W-Ray Fluorescence Emission Tomography (XFET) Speed with Novel Geometry*), and Kristin Schoemaker and Kathleen Weichman gave a podium presentation on a radiation detector designed to for use as an iPhone attachment (*SEE RADS Platform: Social, Every Day, and Emergency Radiation Detection System*). All three presentations were on content the student presenters' senior design groups had accumulated and generated over the spring semester, with the help of their other group members and faculty advisers.

Some of the attendees to the 2013 student conference.

All presentations were delivered quite successfully, with Kristin and Kathleen's presentation going so far as to win the Best Undergraduate Paper Award for the Radiation Detection technical track.

Brent (left) and Ashley (right) presenting their group's poster.

Kathleen (left) and Kristin (right) with their award certificate that their group's (including Japsreet Rehal and Benjamin Russel, who could not attend the conference) presentation won.

It is always important to UIUC ANS to bring as many students as realistically feasible to the student conferences. Though students participating in presentations are given preference, we still encourage those not presenting to attend because these conferences provide an invaluable networking opportunity. It is rare to find a network of conference attendees so large and diverse in educational backgrounds, educational institutions attended, and technical concentration that are all nuclear in nature. Given this and the consistently high reviews our past attendees give of the conference experience, we take this conference as an opportunity to give our more advanced students the opportunity to network in preparation for entering the professional industry as well as to provide our students that will be continuing their involvement in our student section of ANS a positive and more comprehensive experience of what ANS as an organization is about to drive their involvement and to encourage involvement of their classmates in the coming years. Underclassmen attendees have consistently become more highly involved in the section's activities after their conference experiences, even going so far as to hold executive positions. For this reason, UIUC ANS always looks forward to attending the annual student conference with the highest number of student attendees we can manage.

8. Conclusion

UIUC ANS had a highly eventful and very productive 2012-2013 academic year. Though our department is small, we have utilized this to our benefit to try and create a comfortable, familiar, and enriching atmosphere among our members and between the students, staff, and faculty of the NPRE department as whole. It is very important to us to be able to involve our students enough at our school that we may encourage them to break out into the larger circle of the nuclear industry as a whole by participation in facility tours, professional development, and outreach to other students as well as to the public sector. We believe this not only allows these experiences to motivate and diversify the academic experience of our students, but also allows them the inverse opportunity: to give back to and improve the public image of the nuclear community.

It was a pleasure to share our year's experiences with the Glasstone Awards Committee. We hope that you have enjoyed learning how the American Nuclear Society has enriched the experience that a nuclear engineering student has at the University of Illinois. UIUC ANS thanks you for the time you took in reviewing this report and for considering us for this award.