

THE UNIVERSITY of
TENNESSEE



Department of Nuclear Engineering



2011 - 2012

University of Tennessee, Knoxville Student Section

Samuel Glasstone Award Submittal for the 2011-2012
Academic Year

April 25, 2012

To the ANS Student Section Awards Committee:

I would like to nominate the University of Tennessee's ANS Student Chapter for the Samuel Glasstone Award, in recognition of this chapter's continued excellence in service to the University, students, local community and National ANS. Our chapter has consistently been one of the most active student chapters in the ANS, as evidenced by its numerous outreach activities, social events, and strong participation at the ANS Student Conference each year. Some of the activities this year include:

- The Knoxville Science Expo for K-5 students held February 25, 2012 (featured in the March/April 2012 edition of ANS News).
- Nuclear Science Merit Badge workshop held March 31, 2012, with over 30 boy scouts and girl scouts in attendance.
- Introduce a Girl to Engineering Day held at the Y-12 National Security Complex
- PicNuke social event held in the Fall of 2011
- ANS tailgate for the UT-Vanderbilt game
- UT Engineers Day featuring nuclear science demonstrations for High School Students
- Participation at TVA Public Board Meeting hearings, providing a strong voice for the advocacy of nuclear power here in Tennessee.
- Numerous evening programs featuring speakers from nuclear industry and national labs
- Several students volunteered at the EPRRSD 2011 and PHYSOR 2012 Topical Meetings
- Sending 17 students to the ANS Student Conference, with 9 oral/poster presentations, and two students winning best presentations in their respective sessions

The UT Student Chapter has enjoyed a strong relationship with the Oak Ridge/Knoxville Chapter of the ANS and has been valuable resource for the OR/K Chapter. I am proud of how well our student chapter has aided the professional development of our students by establishing contacts with industry and national labs, and by organizing and participating in community outreach activities.

The UT Student Chapter is worthy of this year's Samuel Glasstone Award, and I ask that you give them your full consideration.

Sincerely,



Lawrence Heilbronn
Faculty Advisor, University of Tennessee ANS Student Chapter
Secretary, Oak Ridge/Knoxville Section of the ANS

Introduction

The University of Tennessee, Knoxville (UTK) is proud to be one of the longest standing student sections of the American Nuclear Society (ANS). The enrollment this year in the Department of Nuclear Engineering is greater than ever before and has given the student section the potential to become a very prominent fixture on the University of Tennessee, Knoxville campus. The student section has performed many outreach events this year and has become a vocal proponent for the nuclear industry in Tennessee.

Amongst the many successes of our social and topical events, the student section has been able to provide many opportunities for research and job placement for its members. The student section has focused on increasing participation with ANS national by having more students attend conferences and present conducted research. Another objective this year has been to increase overall student member participation, and provide opportunities for students to interact with one another to foster a sense of community. This objective relates to not just outreach and social events, but also to attending local section meetings. This year has been very successful for the student section in these areas and the new leadership of the student section is positioned to make a deeper impact on the community, the college, and national American Nuclear Society.

The UTK ANS student section was able to participate in many outreach events such as participating in teaching grade school children about radiation through the Knoxville STEM academy, hosting meetings with local Boy Scout troops for the Nuclear Science Merit Badge, being a part of the *Introduce a Girl to Engineering Day*, and having a display table about the Department of Nuclear Engineering at many events on

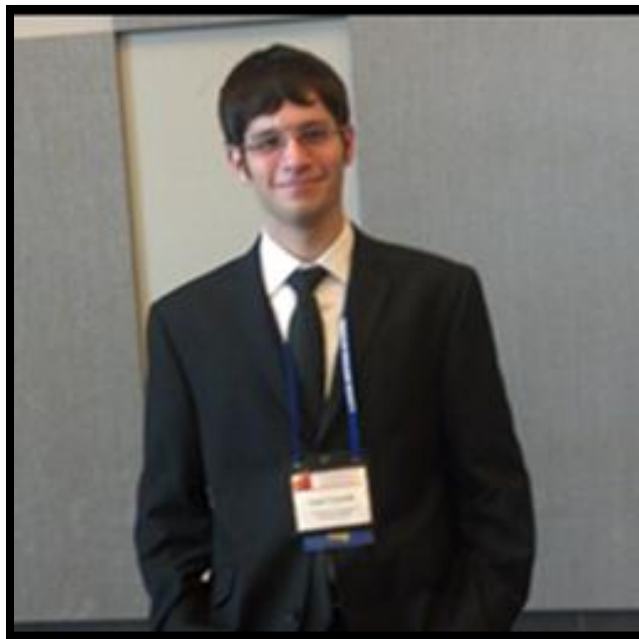
campus. In addition to the outreach events, the student section hosted social events such as the annual Pic-Nuke picnic, UTK-Vanderbilt Tailgate, and several member meetings. The most important service the student section provides to its members is networking opportunities through meetings with companies, national labs, and alumni. To assist the students in the department, a resume workshop was offered this year to help prepare students for job fairs and interviews.

Executive Board

The UTANS Student Section was run successfully by a small core group of officers relative to the size of the student section. It aided in the efficient and swift manner of regular meetings and special events were operated. Shown below are the officers for the academic year of 2011-2012:

President:

Lane Carasik is a senior in Nuclear Engineering at the University of Tennessee who is interested in Nuclear Thermal Hydraulics and Verification and Validation. He intends to attend graduate school in Nuclear Engineering starting in 2013. His responsibilities included overseeing the executive board, contacting and scheduling speakers, organizing section participation at National Meetings, coordinating with ANS Oak Ridge/Knoxville Local Section, and ensuring general wellbeing of the section.



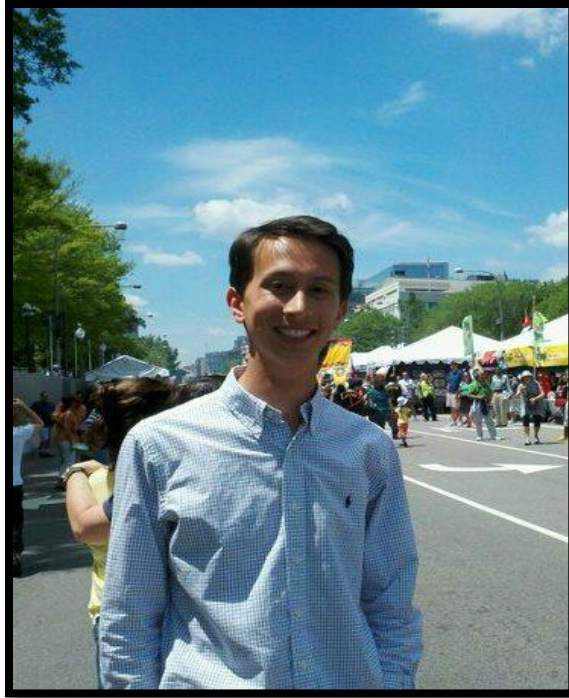
Vice President:

Price Collins is a senior in Nuclear Engineering who is interested in small modular reactors and next generation power plants with an emphasis on reliability. His responsibilities as Vice-President included coordinating and reporting outreach, conducting the nuclear science merit badge with local boy scouts, organizing social events, and taking care of delegated tasks from the president.



Treasurer:

Mark Walker is a senior in Nuclear Engineering at the University of Tennessee. He will be attending Princeton University in the fall, where he will be studying towards a Ph.D. in Public Affairs in matters related to nuclear security and arms control. In the past year, he served as treasurer of the UT-Knoxville student ANS chapter, where he was responsible for dues collection and chapter finances.



Webmaster:

Ryan Sweet is a senior in Nuclear Engineering and is interested in next generation reactors and fuels. His responsibilities as webmaster included creating a new website for the student section and updating it for meetings.

Facility Advisor:

Dr. Lawrence Heilbronn is an Assistant Professor of Nuclear Engineering at the University of Tennessee and Secretary of the ANS Oak Ridge/Knoxville Local Section. His current research interests involve high-energy neutron production from heavy-ion interactions. He has been instrumental in providing communication between the student and local section and has provided advice to guide the student section the last three years.



Section Management

The executive committee was responsible for every event in which the student section participated. Members were asked for 25 dollar dues that go to funding the section meetings and supplementing the costs associated with attending the student conference. The president and treasurer made sure every event and meeting had food and drinks provided as well as organizing the events themselves. Some of these events were joint meetings between the ANS student section and Institute of Nuclear Materials Management (INMM), and Women In Nuclear (WIN). The communications was maintained by the president through the UTK ANS mailing list that was used to inform members of events and require volunteers for the local ANS section outreach events. The vice president was very active in outreach events and responsible for coordinating with the local Boy Scout Troop for the Nuclear Science Merit Badge sessions. The UTK ANS webpage was well maintained by the Webmaster who will be the new president for the upcoming school year. This year, the student section created a conference committee whose job would be to prepare the student section's bid for the next ANS student section conference. Though a bid was not submitted, this committee is still standing and will reconvene next year to work towards getting the ANS student section conference in Knoxville.

Professional Development

Many companies in the industry participated in the student section meetings and were invaluable recruiters for our graduates and summer researchers. The section hosted guest speakers and alumni to give advice to members on what the field is like after graduation. Also, a resume workshop was held early in the year to provide students with a critique on their resume and advice on interviews and job applications. A list of meetings with guest speakers and professionals from the industry is listed below.

Resume Workshop:

The UTK ANS held a resume workshop on September 12, 2011 for sophomores and juniors before the Fall Career Fair. The resume speaker went over the basics of a proper resume for students and young professionals and older students that had interned or co-oped with various companies reviewed resumes of younger members.

Nuclear Regulatory Commission Presentation:

On September 27th 2011, the NRC held a presentation for the student section presented by Joe Glitter Alumni of UTK Nuclear Engineering that showed the student section the current activities of the NRC and what would be happening over the next couple of years as more plants are asking for extensions of licenses and the planning of new reactor builds commencing. The organization was looking for undergrad interns as well which provided members an opportunity to get experience in the field as undergraduate students.

AREVA Recruitment Luncheon:

On September 27th 2011, a luncheon with AREVA's Rob Burgin and two other alumni of UTK Nuclear Engineering was held the day of the UTK fall career fair. They presented an outline of the hiring and training process within the company and the structure of what kind of work a nuclear engineer undertakes at AREVA.

US Navy Nuclear Propulsion Recruitment Meeting:

On September 28th 2011, the Nuclear Navy sent representatives, Joshua Carrigan and James Henkel, recent Alumni of UTK Nuclear Engineering, to present the current opportunities with the Nuclear Navy including the NUPOC and Naval Reactor Engineering Programs.

WorleyParsons Recruitment:

On October 11th 2011, Dennis Graves, Chief Mechanical Officer of WorleyParsons, presented on the Fukushima-Daiichi accident and the handling of the ailed reactors post-earthquake and tsunami. This meeting was an opportunity for students to interact with Mr. Graves to network for professional opportunities with WorleyParsons

Nuclear Criticality Safety Engineering:

On October 25th 2011, Ron Green, Criticality Safety Engineer of Nuclear Safety Associates, presented on the field of Nuclear Criticality Safety Engineering involving the type of work one would expect to do in this field.

B&W Y-12 Informational Meeting:

On November 22nd 2011, Dr. Gerald DeVault, Director of the Nuclear Nonproliferation and Global Security Programs at B&W Y-12 and alumni of UTK Chemistry Department, gave a presentation on the history of Oak Ridge and what role Y-12 filled for the scientific community there. Chris Robinson, Director of Nuclear Material Initiatives and Laboratory Liaison, was present after the meeting to discuss future opportunities with B&W Y-12.

Pro2Serve Joint Informational Meeting:

On January 24th 2012, The company, Pro2Serve, gave a presentation at a section meeting on what the company does and what job opportunities are available within the company. After the presentation, students were able to ask the presenter questions and get contact information. This meeting was jointly hosted with INMM and WIN.

ORNL and NESLS Information Meeting:

On February 13th 2012, Dr. Bernadette Kirk recently retired from Oak Ridge National Laboratory (ORNL) gave a talk on the graduate, internship, and job opportunities at ORNL and any national lab under the umbrella of the Department of Energy (DOE). Dr. Kirk provided invaluable information on what research careers entail at DOE facilities and Nuclear Engineering Science Laboratory Synthesis (NESLS) at ORNL. This meeting was jointly hosted with INMM and WIN.

TVA Bellefonte Nuclear Power Plant Presentation:

On February 28th 2012, Walter M. Justice, Site Engineering Manager for Tennessee Valley Authority's Bellefonte Nuclear Power Plant and Alumni of UTK Mechanical Engineering came to present what TVA was doing to get Bellefonte online

and what his role was at the construction site. This included valuable industry information from the point of view of a site manager for a utility company.

Alumni Gordon G. Fee Informational Meeting:

On March 3rd 2012, Gordon G. Fee retired C.E.O. & President of Lockheed Martin Energy Systems Inc. and Alumni of UTK Nuclear Engineering presented his life work and where his Nuclear Engineering degree has taken him. His career involved anything from working for the Department of Energy to now working as a consultant for an entertainment company in Oak Ridge, TN. This session provided valuable information of the diverse job field available to nuclear engineers and a chance to meet Alumni of older generations.

B&W mPower SMR Presentation and Recruiting Meeting:

On March 27th 2012, Pamela Horning, Vice President of B&W Technical Services Group, presented the mPower small modular reactor design that is intended to be built at the Clinch River site near Oak Ridge, TN. Mrs. Horning also offered her contact information for possible opportunities with B&W.

Westinghouse AP1000 Presentation:

On April 17th 2012, Westinghouse's Weston Boyd and Steven Ketcham presented the newest reactor to be built in the U.S., the AP1000. The speakers provided information on the current status of Vogtle and Summer Nuclear Power Plants construction of the twin AP1000s at each site. The speakers also discuss the status of the AP1000s being built in China's Sanmen and Haiyang Nuclear Power Plants.

Local Section Dinner Meetings:

The ANS Oak Ridge/Knoxville Local Section host monthly dinner meetings involving dinner and a speaker. Every year UTK ANS students are invited and encouraged to join the local section at their meeting and are enticed by free dinner. The meetings offer students an opportunity to network local professionals and speakers.

Outreach and Community Service:

The UTK ANS student section had many outreach events that were meant to bring more awareness and knowledge to the field of nuclear science. Speaking with the public about radiation has been a chief goal when planning an outreach event. This topic is one generally misunderstood by most people and it is the job of trained radiation workers to shed light on the subject. The ANS Oak Ridge/Knoxville Local Section and the Student Section has partnered for several events. The Local Section usually coordinates and organizes the outreach events and the Student Section assists in the organization and staffs the events. Listed below are several outreach events undertaken this year by the UTK ANS Student Section.

Department of Nuclear Engineering Presentations for Middle and High School Students:

For three consecutive Mondays in July of 2011, a small presentation on Nuclear Engineering was given to middle and high school students which included a hands-on lab as well as a showing of the UTK Pressurized Water Reactor simulator. This outreach was intended to not only educate children on nuclear science, but to get them interested in the field so that one day they may become nuclear engineers also.

Freshman Move-In Day:

On Aug. 13th 2011, UTK-ANS students helped freshmen students moving into the dorms as part of welcome week.

College of Engineering Alumni Homecoming Tailgate:

On November 5th 2012, the UTK College of Engineering hosted an alumni tailgate for the homecoming game against Middle Tennessee State University. UTK-ANS

in collaboration with WIN and INMM hosted a table exhibit with a poster displaying current research, events, and other topics of interesting going on within the Department of Nuclear Engineering. Alumni got a chance to see how the department was doing and the direction we would like to go in the future.

Woodland Elementary Science Night:

The Woodland Science Night on November 11th 2011 was an outreach event for grade school students to learn about simple machines and the physics behind it. Several UTK ANS students volunteered and lead demonstrations of various simple machines. This outreach event was co-hosted with the ANS Oak Ridge/Knoxville Local Section.



Science Expo, Knoxville STEM Academy:

On February 25th 2012, the ANS Oak Ridge/Knoxville Local Section, UTK-ANS Student Section, and Women in Nuclear Oak Ridge Section hosted the inaugural STEM Academy event in the downtown Knoxville area. Children of ages six through thirteen were able to learn about robotics, electricity and magnetism, circuits and nuclear science involved in Nuclear Engineering from members of the local professional sections and the student section. Several students organized and lead exhibits in one of the focus areas of the Expo. In one exhibit, children were given a Geiger-Mueller counter and asked to find radiation sources hidden within a mock setup of a town or port. This interaction allowed of the several members of student section to teach children the principles of radiation shielding, detection, and nuclear security. This event was sponsored by several organizations such as B&W Y-12 and SpectraTech.



Introduce a Girl to Engineering Day:

On February 23rd 2012, as part of National Engineers week, student members from UTK-ANS participated in the Introduce a Girl to Engineering event at the New Hope Center of Y-12 National Security Complex. The goal was to encourage the participating high school aged girls to enter STEM careers and promote diversity. Girls learned about Nuclear Engineering from the student members and opportunities in Nuclear Engineering.





Boy Scouts of America Nuclear Science Merit Badge:

On March 31st 2012, UTK ANS students instructed around 30 local Boy Scouts for the Nuclear Science Merit Badge. The topics covered ranged from the basics of nuclear power production to radiation detection and safety. Lunch was provided and a hands-on activity was performed to show the scouts how detection and shielding worked. A cloud chamber was also brought to demonstrate the particle nature of radiation as well as the UTK-NE PWR simulator.

Social Events

This year the student section determined that activities should be focused towards professional development and outreach. The student section still hosted three large social events the Fall PicNuke, UTK-Vanderbilt Tailgate, and ANS BBQ for Visiting Graduate Students.

Fall PicNuke:

The annual fall PicNuke was co-hosted with INMM at Knoxville's Tyson Park on August 26th 2011. The social gathering involved grilling burgers and hot dogs, games, and yelling. This is an event that is open to all majors involved in Nuclear Engineering.



UTK-Vanderbilt Tailgate:

The tailgate was hosted by the student section for the University of Tennessee and Vanderbilt University football game on November 19th 2011. The tailgate involved grilling burgers, eating and drinking, and discussions of who had the better team.



ANS BBQ for Visiting Graduate Students:

The student section hosted several visiting prospective graduate students on March 4th 2012 with a BBQ night. The students enjoyed food, drinks, and discussing what interesting things you can get in trouble for in Knoxville.

Student Research Showcase

The Student Section hosted the second annual Student Showcase on April 5, 2012 at the Pasqua Engineering Building for the ANS Oak Ridge/Knoxville Local Section. Local professionals were invited to the University Of Tennessee Department Of Nuclear Engineering to meet current students and to learn more about the research that is being conducted at UTK. Students presenting at the showcase used this as an opportunity to present their research and network with the local professionals interested in their research. The showcase also served as a practice run for the students presenting research at the ANS Student Conference.

TVA Public Board Meetings

The Tennessee Valley Authority hosts public Board of Directors to make major decisions affecting the valley in a transparent manner. The meetings begin with comments from the audience that cover any issue on the agenda or not on the agenda. After the public comment session, the board of directors is briefed by various TVA staff members and voting occurs. The UTK ANS has participated in two meetings listed below.

Bellefonte I Approval:

On August 18th 2011, ten UTK ANS students attended the TVA Board of Directors meeting decision in Knoxville, TN on whether or not the Bellefonte Nuclear Power Plant Unit I completion is should go forward. Several UTK students had the chance to speak during the public comments session promoting the completion of Bellefonte I. The decision that followed the public comment session approved the completion of Bellefonte I.



Watts Bar II Cost Extension Approval:

On April 26th 2012, three UTK ANS students attended the TVA Board of Directors meeting decision in Greeneville, TN on whether or not the Watts Bar Nuclear Power Plant Unit II should be given the cost and schedule extension for completion. One student was able promote nuclear energy by suggesting the board approval the new completion schedule and budget of Watts Bar Unit II.

Videos of the Public Comments Sessions for both meetings containing UTK student comments are found at the following link:

<http://www.tva.com/abouttva/board/index.htm>

ANS National Conferences

The student section sent several students to the summer, winter, and student national conferences to increase student participation in National ANS events and provide UTK ANS with a national presence going forward.

ANS Summer Conference:

The ANS National Conference in June 2011 was attended by several UTK ANS graduate students and one undergraduate student. The UTK student section had for the first time in several years an official representative at the Student Section Committee Meeting. Also a few graduate students presented papers at the conference and selected presentations are listed below (Non student members and Advisors not listed):

Independent Benchmarking of a Hybrid Monte Carlo Simulation Particle Transport Code - Nathan P. DeLauder (G)

V&V Methodology Comparisons: AIAA G-077(1998), ASME V&V 20 (2009), ASTM E1355-05a(2005), NEA/CSNI/R(2007), and NRC CSAU(1988) - Spero Peters (G) and Bi Zhang (G)

ANS Winter Conference:

The ANS National Conference in November 2011 was attended by several UTK ANS graduate students and undergraduate students. The UTK student section had a several representatives at the student section committee meeting as well. The following graduate and undergraduate students presented at the conference (Non student members and Advisors not listed):

Thermal Camera Imaging for Security Monitoring of GCEP Systems, Charlie Morrow (G)

Molecular Dynamics Simulations of Cascade Evolution Near Trapped Interstitial Cluster,
Nathan Capps (U)

CAD Model Connecting Physical Construction and Computational Simulations for CFD,
Lane Carasik (U)

ANS Student Conference:

The ANS Student Conference in April 2012 was well attended by a mixture of 17 UTK ANS graduate students and undergraduate students. The UTK ANS had 9 presentations presented by 11 students during the conference and won two division awards. The UTK ANS student section sent several representatives to the Student Section Committee Meeting and volunteered to partner with newly Chattanooga State College ANS Student Section as a mentor. The following graduate and undergraduate students presented at the conference (Non student members and Advisors not listed):

Podium Presentations:

Auto-Regression Modeling of Pressure Transducers for Monitoring of Gas Centrifuge Facilities, Charlie Morrow (G) – **Division Award**

Enclosure Thermal Stratification within a Twin Jet Mixing Facility, Lane Carasik (U)

Local Area Fast Neutron Background Measurements, Benjamin Dabbs (G) – **Division Award**

Neutronics Studies of Uranium-Based Fully Ceramic Micro-Encapsulated Fuel for PWRs, Nathan George (G)

Posters Presentations:

Dynamics of the IRIS Reactor Coupled to a Desalination Plant, Price Collins (U) and Mandi Valentine (U)

Nuclear Forensic Science Educational Needs, Matt Baruzzi (G) and Lily Crabtree (G)

Oak Ridge/Knoxville ANS Educational Outreach Summary, Aaron and Dense Lee (G)

Thorium Fuel, Remy Devoe (U)

Warhead Counting for Treaty Verification Using Fast-Neutron Coded-Aperture Imaging, Braden Brown (G)



ANS Topical Meetings

This year the UTK ANS had a unique opportunity to volunteer and assist in two topical meetings held in Knoxville, TN. The topical meetings were hosted by the ANS Oak Ridge/Knoxville Local Section.

Emergency Management and Robotics for Hazardous Environments 2011 (EPRRSD):

The EPRRSD Topical Meeting was held in Knoxville, TN on August 7th to 10th. This meeting was attended by several UTK students and two UTK ANS members volunteered to help at the Topical Meeting.

PHYSOR 2012 Advance in Reactor Physics (PHYSOR 2012):

The PHYSOR 2012 Topical Meeting was held in Knoxville, TN on April 15th to 20th. The organizing committee included Ivan Maldonado, Associate Professor of Nuclear Engineering at UTK, and Lane Carasik, UTK ANS Student President for 2011-2012, as the Student Chair of the meeting. The UTK ANS enlisted several members to assist in the topical technical sessions and special events. The UTK ANS also had several student members present at the meeting (Non student members and Advisors not listed):

PWR Core and Spent Fuel Pool Analysis using SCALE and NESTLE, Evan Murphy (G)

Fast Reactor 3D Core and Burnup Analysis Using VESTA, Nicholas Luciano (G)

Neutronics Studies of Uranium-Based Fully Ceramic Micro-Encapsulated Fuel For PWRs, Nathan George (G)

Application of Fully Ceramic Micro-Encapsulated Fuel for Transuranic Waste Recycling In PWRs, Cole Gentry (G)

Next Year's Officers

On April 3rd 2012, the UTK ANS elections were held for several positions. The new officers will serve for the academic year of 2011-2012. The officers are listed below:

Cabinet:

President	<i>Ryan Sweet</i>
Vice President	<i>Aaron Selby</i>
Secretary	<i>Remy Devoe</i>
Treasurer	<i>Lee Wennerstrom</i>
Webmaster	<i>Dan Wells</i>

Board of Representatives:

Graduate Representative	<i>Adam Caswell</i>
Senior Representative	<i>Drew Hall</i>
Junior Representative	<i>John Stooksbury</i>
Sophomore Representative	<i>Brent Fiddler</i>



Conclusion

The UTK ANS student section has achieved a lot this year in respect to membership growth, professional development, outreach, and national participation. We have developed from just a group of students getting together for pizza to a group that cares about our futures and the future of the Nuclear Engineering Field. We have participated in several outreach events in respect to both visiting local grade schools teaching about nuclear science and technology and attending TVA Board Meetings promoting nuclear energy as part of their growing power production. We set normal meetings twice a month to facilitate building a sense of community among student members within our section and to bring in speakers regularly. We brought in several speakers this last year to aid in professional growth of student members and build a larger network for the University Of Tennessee Department Of Nuclear Engineering. We continue to work closely with our local section to make a more effective impact on the local community towards promoting nuclear science and technology and assisting in building friendships between students and professionals. This year, we participated in several national and topical ANS meetings and have significantly improved our presence with the National ANS.

I am proud of the effort committed by the University of Tennessee American Nuclear Society Student Section towards advancement of Nuclear Science and Technology and I hope you give our section your full consideration for the Samuel Glasstone Award.

Thank you,



Lane Carasik

President for the 2011-2012 Academic Year

Special Thanks to

Christina Conners for her service to the student section for participating and leading many outreach efforts.



The ANS Oak Ridge/Knoxville Local Section for their efforts in providing professional growth and outreach opportunities for the student section.

