

2014-2015

Glasstone Report



2014-2015 Board of Governors
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Introduction

Being established in 1964 this year marked the 51st anniversary of the Student Section of the Rensselaer Polytechnic Institute American Nuclear Society. In these 51 years the Section has developed into an integral piece of the Nuclear Engineering Program and a significant contributor to the betterment of the RPI Mechanical, Aerospace, and Nuclear Engineering (MANE) Department as well as the local community as a whole. The goals of the Section are 1) continually support the nuclear community through increased awareness by public education, 2) to support the Section by providing opportunities of employment, research, and furthering knowledge in the nuclear field, 3) to increase communication between the Section, faculty, and department, and 4) create an atmosphere of a true community through networking and social activity. On this year the Section strived to meet these goals by working with the school, other local ANS sections such as NENY, and inviting more professionals than ever to speak with the Section members.

This year marked another unprecedented number of technical talks hosted by the Section. A diverse group of Thirteen speakers from academia, industry and/or organizations visited to talk with the section. The industry professionals ranged from a RPI nuclear engineering graduate working at Southern Company to the Immediate Past President of ANS, Donald Hoffman, as well as the current President of ANS, Dr. Mikey Brady Rapp, to a CERN scientist who helped lead the discovery of the higgs-boson, to the leader in MCNP development, Dr. Forrest Brown, from Los Alamos National Laboratory. These speakers also provided avenues for students to discuss employment as many of the speakers mentioned internships and jobs being offered at their companies or research groups. With this large number of industry professionals visiting RPI it was possible for the Section to improve its critical relationship with industry.

Three professors also visited the section in order to discuss their research and provide possible employment opportunities to the members. Amongst these professors, two were from the Nuclear Engineering program and one was from the Physics department, therefore furthering ANS's relationship within RPI. This also allows for the professors to meet ambitious students and encourage them to actively strive for a strong college education.

The Section also hosted two student speakers in order to encourage its members to reach the section's goals by being dedicated members. The talk and workshop allowed students to prepare for upcoming conference presentations as well as provide learning opportunities for members who wished to learn the powers of the Engineering Equation Solver (EES) program.

With the recent attainment of a list of Nuclear alumni's contact information it was possible for the Section to keep in touch with its recent graduates and learn about their career, invite them to speak, and even ask for funding to help support the Section. With this record the club has improved its network within industry and graduate level schools and can work with a larger reach hand now.

The Section works on its goals through its six standing committees: Professional Relations, Institute Relations, Outreach, Social, Graduate and Alumni Relations, and Conference. With these six



committees, and the members that make up them, the Section has been able to do some excellent work throughout the year.

Administrative Updates

Recruitment and Membership

The RPI ANS Student Section continually seeks to include the freshmen class into the chapter. Information on the activities and benefits of the organization were presented to the class via activity fairs, emails, and in-class presentations. This included opportunities for homework help, networking with professors and members of the industry, tours of relevant facilities and community service projects. Seven new students were excited by these organization goals and began attending meetings. The average meeting attendance over the course of the year given biweekly General Body Meetings was 14 students with a maximum of 35 students present on one date.

While it is always beneficial to have freshmen join the chapter, only a small portion of the class population typically participates. The nuclear engineering program at Rensselaer recommends students take a survey class for their prospective major their first semester alongside general courses. It is not until the sophomore year that in depth nuclear courses are taken. Thus, until more rigorous and relevant course work is assigned, students usually do not feel the need to join a professional society. As a result, often times the chapter population is dominated by upperclassmen and graduate students. An effort is being made to even out this distribution by having freshmen and sophomores attend meetings on a minimum of a semi-regular basis.

On the whole, members of the student section enjoy the time spent working with the other members. Long lasting friendships are formed regularly with social events being planned on an impromptu basis. This positively affects any important projects that need to be done since a level of trust and communication is often already established. It is common for alumni to continue this connection even several years after graduation. As a result, trips to their various work sites are welcomed. This extends to professional networking connections and provides a positive impression of the program.

Section Bylaws and Rules Update

No changes were made to the Section Bylaws and Rules. Changes to these documents have not been necessary since Spring 2011 wherein the Student Section agreed to include the Conference Committee as an official committee.

Board of Governors

General Body Meetings were held every other Thursday at 8:00pm to discuss upcoming and previous events. All of the executive board should attend these meetings to ensure that all aspects of the organization are being well run. Communication between members is important and encouraged between all levels of membership. This way, no ideas are discouraged and underclassman can become immediately involved.



The 2014-2015 Board of Governors consisted of President Matthew Zimmer (Class of 2015), Vice President Will Noll (Class of 2017), Secretary Alexander Roaldsand (Class of 2017) and Treasurer Amanda Youmans (PhD student). Elections for next year's Board of Governors will be held on Thursday, May 7th.

General Body Meetings and Technical Seminars

A general body meeting normally consists of section business, such as discussing conference plans, followed by announcements and committee updates. The meeting will then end with a talk given by the guest speaker. This year one of the goals of the Board of Governors was to increase the outreach to the general community. As such, during the twice monthly General Body meetings, some time was spent planning and discussing future events that could educate the public on nuclear power. Another goal was to increase the membership's knowledge of the nuclear field, and so, as mentioned, a series of technical seminars was delivered by people in industry, people of academia, and current students. The RPI ANS Section is very fortunate to have close ties to the NENY ANS Section, which over the past year hosted many talks in which the RPI ANS section was invited, as well as co-hosting multiple talks with the RPI ANS Section. Below is an overview of most of the General Body meetings, jointly hosted events, and technical seminars which were offered to the RPI ANS Section members over the past year.

RPI ANS Homework Help

On every Thursday of the academic year older members of RPI ANS offered homework help for anyone who requested it, starting at 7pm and lasting as long as necessary. This allowed younger students to meet older students as they worked through their homework and it encouraged students to attend meetings as homework help and general body meetings often coincide.

RPI ANS Technical Seminar: Dr. Whei Zhou

On September 25th, 2014, Dr. Whei Zhou, and RPI professor, spoke at an ANS general body meeting where she discussed her job as a consultant at INTERA. She shared how one starts a consulting firm and the sort of experience that is required for all the consultants in the firm. Dr. Zhou also shared some of her favorite experiences on the job and reflected on what they have taught as she has moved through her professional career.

RPI ANS Technical Seminar: Dr. Forrest Brown

On October 8th, 2014, Dr. Forrest Brown of Los Alamos National Laboratory gave spoke to the RPI and North-East New York ANS sections regarding his work with the MCNP code. The highly technical talk discussed how Dr. Brown has been working to improve and speed up MCNP by altering inefficiencies in the syntax of the code. He brought the group through many of the major versions of the code and what was different between each code. During the talk Dr. Brown's expertise was easily noticed as he was able to simultaneously convey complex ideas to both MCNP novices and experts without slowing down the talk.



RPI ANS Technical Seminar: RPI Graduate Student Nick Thompson

On October 8th, 2014, RPI graduate student Nick Thompson gave a talk summarizing the research done by himself and fellow graduate student Zeke Blaine. Thompson's work focuses on using RPI's state of the art Lead Slowing Down Spectrometer (LSDS) to take time of flight measurements and Blaine's work focuses on measuring cross section in order to attain more resolved and more accurate measurements of how particles interact with atoms. This talk gave excellent insight into what it is like to be a graduate student for any undergraduates considering going to graduate school.

RPI ANS Technical Seminar: Dr. Don Steiner

On October 16th, 2014, Dr. Don Steiner, RPI professor emeritus and international expert on nuclear fusion, gave an overview of the technology required for nuclear fusion, the current existing and planned nuclear fusion projects, as well as his opinion on the future of nuclear fusion. Conveniently, Lockheed Martin's fusion announcement had been the day before and when Dr. Steiner was inevitably asked about Lockheed Martin's claim he dismissed it as a marketing scheme that would not produce fusion in the short time of ten years. Dr. Steiner explains how he truly believes that the world is still far away from fusion and it will take a lot more time and money in order to develop a working commercial reactor.

RPI ANS Technical Seminar: Bill Clancy of PSEG

On October 23rd, 2014, Bill Clancy of PSEG Bethlehem Energy Center came to talk to the RPI ANS section about his many years in the field. He described how he started his experience of working on maintenance crews for nuclear reactors and is now a manager that has a large responsibility on his hands. He offered useful advice to any students planning on getting a job in the field as his many years allowed for expert advice.

RPI Student Meeting With Dr. John Boice

On November 5th, 2014, Dr. John Boice, a professor of Medicine at Vanderbilt University and President of the National Council on Radiation Protection and Measurements, came to speak with faculty and meet with students. He is an international authority on radiation effects so students were able to pick his brain in the field if they were interested.

RPI ANS Technical Seminar: Dr. Paul Stoler

On November 13th, 2014, Dr. Paul Stoler, a professor in the RPI Physics department, gave a talk on the structure of the nucleon. His talk touched on topics that were not strictly relevant to nuclear engineering, such as quarks, the Higgs Boson, etc., but was nonetheless very interesting and allowed for many questions to be asked as the ANS students were not very well versed in the subject. The Physics department speakers continue to prove that they are excellent guests at RPI ANS meetings.



RPI ANS Technical Seminar: Don Hoffman

Immediate Past President Donald Hoffman visited RPI on November 20th, 2014. He met with various faculty, students, and got a tour of the Linear Accelerator Center at RPI. The night ended with a talk from Don Hoffman which was co-hosted by RPI ANS and NENY ANS. During the talk Hoffman discussed the importance of commenting on Nuclear Equality as well as how ANS has been making a difference in the nuclear world over the past few years.

RPI ANS Technical Seminar: Dr. Wei Ji

On December 4th, 2014 Dr. Wei Ji, a professor at RPI, came to a Thursday student meeting to discuss past and ongoing research being done in his research group. His group is focused on modeling and simulation. He has a diverse group of students who research space applications, electron transport, Monte Carlo code optimization, and multiphysics simulations.

RPI ANS Technical Seminar: Dr. Mikey Brady Rapp

Dr. Mikey Brady Raap visited RPI the NENY-ANS Chapter on February 5th, 2015. RPI ANS and NENY ANS arranged tours of RPI's reactor and Linear Accelerator Center, along with meetings with RPI faculty and students. Later on in the day Dr. Brady Raap spoke at an event hosted by NENY ANS where she discussed the importance of student involvement in ANS and how everyone can make a difference by promoting nuclear power to the public.

RPI ANS Recruitment Seminar: David Traugott of Newport News

On February 12th, 2015 David Traugott, a representative from Newport News Shipbuilding at the Kesselring site, came to a Thursday student meeting to talk about the work they do and to discuss potential employment opportunities at Newport News. The unique training and testing facilities at Kesselring are managed and maintained by Newport News Shipbuilding. Summer intern programs are offered at the main site in Virginia, where the US naval fleet of aircraft carriers and submarines are built and maintained.

RPI ANS Review Session: Nuclear Power Systems Engineering

On March 5th, RPI senior Matt Zimmer led a review session for students taking the Nuclear Power Systems Engineering course. During the session previous exam question were discussed and general questions posed.

RPI ANS Recruitment Seminar: Butch Bornt of Southern Company

On March 12th, Butch Bornt, a nuclear engineer working at Southern Company in Georgia and RPI alumni, came to discuss the work the company does, the current status of the Vogtle 3 and 4 nuclear power plants, as well as potential employment opportunities for students at RPI.



RPI ANS Technical Seminar: Dr. Jim Olsen of CERN

On April 2nd, 2015 Dr. Jim Olsen, the Physics co-Coordinator of the Compact Muon Solenoid (CMS) located on the Large Hadron Collider (LHC) at CERN and faculty member at Princeton, came to talk about the research done relating to the Higgs-Boson. The CMS is the primary detector used in discovering the Higgs-Boson and RPI students got a unique look at how it operates and what kind of data was used to analyze the physical properties of the Higgs-Boson. Olsen's talk started with the basics of how the Higgs-Boson was originally hypothesized and moved on to discuss how the CMS functions and what it is composed of, and finally showed the physical data that led to two independent, but consistent, discoveries of the Higgs-Boson. The talk proved to be excellent and very interesting.

RPI ANS Review Session: Nuclear Power Systems Engineering

On April 15th, RPI senior Matt Zimmer led a review session for students taking the Nuclear Power Systems Engineering course. During the session previous exam questions were discussed and general questions posed.

RPI ANS Workshop: Engineering Equation Solver

On April 23rd, 2015 Matt Zimmer and Dr. Dillon Shaver led a workshop on the Engineering Equation Solver (EES) program available to all RPI students. During the workshop examples of how to solve functions implicitly, integrate, step integrate, retrieve material properties, create pretty plots, and more were given and a student made EES manual was distributed to the section.

Professional Relations Committee

The Professional Relations Committee is responsible for providing section members with internship, employment, and other nuclear opportunities. This year, the committee was headed by Brian Bonilla (Class of 2018). After receiving permission from ANS President Don Hoffman in 2014, the committee drafted letters to be distributed to companies and professionals inviting them to speak or connect with the Section. Besides the nuclear companies that visited the career fairs this year, representatives from Southern Company, Los Alamos National Laboratory (LANL), and PSEG came and spoke to the Section. Other networking opportunities arose when nuclear professionals spoke at seminars on campus or met with students outside the general body meetings. The committee made sure to send thank you notes to speakers in order to express the section's gratitude.

Institute Relations Committee

The role of the Institute Relations committee is to handle all events on campus, working with the MANE Department, the School of Engineering, and other student groups on campus. This year the committee, headed by Chris Daniels (Class of 2018), worked with other groups to co-host events and increase the visibility of RPI ANS on campus. A great effort was put into hosting professors at various meetings to learn about undergraduate research opportunities at RPI and the various research fields within nuclear.



Nuclear Engineering Class Visits

Active members of RPI ANS discussed ANS with other students during their nuclear engineering classes in order to encourage attendance at general body meetings and to promote the activities of the section

RPI Activities Fair

On September 8th, 2014, RPI ANS sent representatives to the RPI activities fair so new and current students could come ask questions about ANS and learn how to become active in the Section.

RPI Medalist Day

On September 11th, 2014, RPI held an “Open House” for prospective students who won the RPI Medal to come and meet RPI students about the school. Four RPI ANS members attended to answer questions about the nuclear program at RPI and any other questions the students may have. RPI ANS brought a CFD simulation of a nuclear reactor channel, radioactive sources, detectors, and information packets to make the booth more interesting and to attract attention. About 30 students interested in nuclear engineering stopped by to discuss the program and the various items at the booth.

Faculty Student Mixer

On April 28th, 2015, RPI ANS hosted a faculty-student mixer in order to improve the relationship in the nuclear engineering program. Food will be catered as well as brought by students and faculty.

Outreach Committee

The Outreach Committee, chaired by Beren Evans (Class of 2016), leads in efforts to establish relations with the public and to promote nuclear power to the public. This is done through school organized events as well as ANS organized events that involve young and old members of the public interested in nuclear power.

Exploring Engineering Day

On February 14th, 2015, the RPI chapter of the Society of Women Engineers (SWE) hosted Exploring Engineering Day (EED). This event brings in 300+ 4-8 graders to the Rensselaer Polytechnic Institute to engage in engineering activities. Section members Amanda Youmans (PhD student), Sophia Benson (Class of 2018), Beren Evans (Class of 2016), and Alexander Roaldsand (Class of 2017) staffed this event where throughout the day they taught a workshop focused on the basics of nuclear fission and nuclear reactors. The workshop used an activity that used simulated neutrons to illustrate how nuclear fission is a chain reaction and demonstrated the concept of criticality. Children and parents were also able to safely handle radiation sources and detectors in order to demonstrate the principles of radiation protection and measurement. In addition, mock fuel pellets were used to demonstrate the benefits of nuclear power and how it compares to other methods of energy production. Section members also answered any questions from the children and parents in a multitude of nuclear related topics. This was the fifth time that RPI ANS has taken part in EED and we plan to take part in it again in the future.



Nuclear Science Boy Scout Merit Badge

For the ninth consecutive year at the Rensselaer Polytechnic Institute that the ANS Outreach Committee hosted the Boy Scout Nuclear Science Merit Badge. This event was held on November 15th and on May 2nd at the Gaertner LINAC Center, RPI's Linear Accelerator on campus. Matthew Zimmer (Class of 2015), Walter Pfuntner (Class of 2015), Nicholas Thompson (PhD Student), Beren Evans (Class of 2016), Amanda Youmans (PhD student), and Will Noll (Class of 2017) helped out with running the activities and giving presentations.

Between both dates Over 50 Boy Scouts and many parents attended, some driving over two hours and spending a night in a hotel. Throughout the day, the scouts were taught about the importance of nuclear concepts and key nuclear definitions relating to topics ranging from parts of the atom to the generation of nuclear power. They also learned about careers in the nuclear field along with how to protect themselves using the principles of ALARA in case of radiation exposure. There were also activities spaced thought the sessions which included drawing chain reactions, using a Geiger counter and a tour of the Linear Accelerator lead by Amanda Youmans (Graduate Student) and Nicholas Thompson (Graduate Student.)

By the end of both sessions, all of the boys had earned the Nuclear Science Merit Badge and many of the attendees left with a deeper knowledge in nuclear science and power. This event was so well accepted that the demand for another session before the end the spring semester convinced the Section to plan one more session in early May.



Figure 1: Attendees and ANS Members of the Second Session



Social Committee

The social committee of RPI ANS is responsible for developing programming that encourages interaction among members outside of the traditional academic experience as well as leading the design of the annual RPI ANS t-shirt. The social committee was chaired by Levi Rosa (Class of 2015) for the 2014-2015 academic year.

Biweekly Bowling

Every other Monday, members of the section gather for an informal bowling tournament at Uncle Sam's Lanes in downtown Troy, NY. This provided section members and their guests with a relaxing, inexpensive venue for socializing, while challenging one another to improve their bowling skills.

Intramural Sports

RPI ANS made a volleyball team in the fall semester and walleyball in the spring semester. Both semesters were great successes and the volleyball team was runners-up in the division tournament.

Apple Picking

On October 25th, 2013 RPI ANS carpoled to go apple picking. This autumn-themed outing to a local apple orchard provided members with the opportunity to enjoy fresh-picked apples and interact with one another in an outdoor setting away from the RPI campus.

RPI ANS T-Shirts

The social committee led a competition in the annual t-shirt design this year where Jaron Senecal's (PhD student) design was chosen as the best. Jaron will receive a free t-shirt for his design.

Conference Committee

The conference committee is tasked with writing a proposal to host the annual ANS Student Conference. This year, only an initial investigation into the logistics of hosting the conference were completed. Both writing the proposal and executing it would require a large number of dedicated students. Unfortunately, not enough interest was generated for this to be possible. Hopefully next year there will be enough interest for a proposal to be submitted.

Graduate and Alumni Relations Committee

The role of the Graduate and Alumni Relations Committee (GARC) is to foster the involvement of the graduate student population at RPI and the section alumni with RPI-ANS. This year, the position of committee chair was held by Dr. Dillon R. Shaver (RPI Lecturer).

Invited Presentations Series

This year the graduate and alumni relations committee expanded its role in RPI ANS by kick starting the "invited presentations" series in the local section. This included inviting professors at RPI to come to the



general body meetings to present some information about their research as well as possible opportunities to join with their research groups

Ongoing Activities

As part of its primary responsibilities, the GARC actively builds and maintains a list of RPI-ANS alumni. Through this alumni list, we were able to offer the 2014 T-shirt and neutron hat designs for sale to the alumni.

Section Accomplishments

This year marked a significant growth in the guest speaker track. High profile speakers that are experts in their respective field spoke as well as multiple company representatives that were offering real job opportunities to the students. With these attractive speakers the section was able to reach more students and increase visibility of ANS and nuclear power on campus

As with previous years, RPI ANS, has continued its weekly Peer Tutoring sessions. Peer Tutoring consists of graduate, and upper classmen helping younger students improve understanding of concepts, homework, or scheduling classes. The increased participation of graduate students has proven to be a huge benefit, as the range of topics being covered has grown significantly. However, the greatest benefit to the students involved has been from forming groups to help each other through difficult assignments.

Conferences

As with previous years, conference attendance continues to be a priority of RPI ANS. All members, regardless of class, or career goals are encouraged to attend conferences. Our section sent three students to the winter meeting in Anaheim and five students and one faculty member to the student conference at Texas A&M. This group of RPI attendees was composed of three presenters, one panelist, and one technical judge and paper reviewer.

Conclusion

The RPI ANS Board of Directors for the 2014-2015 year has been extremely successful in their efforts to increase the section's presence on campus and in the region. By placing a focus on attracting guest speakers, and reaching out to both the student body as a whole and professional organizations, such as NENY ANS and HPS, RPI ANS has expanded its presence, visibility, and influence within the school and region. The section is also becoming known for hosting high profile speakers that attract large audiences. The hope is that in future years the section will grow to reach a level where inviting internationally recognized scientists, from CERN for example, is the standard. Overall, the past year has been a successful one for RPI ANS; with increasing recruitment aimed at the underclassmen in the nuclear engineering program, the section is positioned to continually grow and improve.