

Samuel Glasstone Report 2014-2015
American Nuclear Society,
University of Wisconsin-Madison

Submitted to the ANS Glasstone Award Committee

May 1, 2015



President	Kazi Ahmed	
Vice-President	Drew Nigh	
Treasurer	Ian Jentz	
Public Information	Kelsey Amundson	
Communications	Virginia Haupt	Jennie Aylyng
Governors	Calvin Parkin	McKinleigh McCabe
	Ryan McMurtry	Garrett Andrews
Faculty Advisor	Paul P.H. Wilson	

Contents

1	Introduction	4
2	Section Management	6
2.1	Executive Officers	6
2.1.1	President	6
2.1.2	Vice-President	6
2.1.3	Treasurer	6
2.1.4	Public Information Officer	7
2.1.5	Communications Officer	7
2.1.6	Governor	7
2.2	Chairs	8
2.2.1	Boy Scouts Chair	8
2.2.2	Expo Chair and Committee	8
2.2.3	Science Olympiad Chair	8
2.2.4	Scholarship Chair	8
2.2.5	Conference Bid Committee	9
2.3	Other Positions	9
2.3.1	Webmaster	9
2.3.2	Design Chair	10
2.3.3	Faculty Advisor	10
3	Operations	11
3.1	Office Hours	11
3.2	Active Membership	11
3.2.1	Active Membership Points	11
3.2.2	Captain Neutron	12
3.2.3	End of Semester Banquet	12
3.3	Financial Planning	12
3.3.1	Budget	13
3.3.2	Funding	13
3.3.3	Spending	14
3.4	Website, Google Drive, and other Online Tools	15
3.5	Social Media	17
4	General Meetings and Special Events	18
4.1	General Meetings and Speakers	18
4.2	Coordination with Other Organizations	19
4.2.1	Women in Nuclear (WiN)	19
4.2.2	American Institute of Aeronautics and Astronautics	21

4.3	“The Man Who Saved the World”	21
4.4	EPA Clean Power Rule	21
4.5	ANS National Conferences	22
4.5.1	2014 Winter Meeting	22
4.5.2	2015 ANS Student Conference	23
5	Public Outreach	24
5.1	Madison West High School	24
5.2	Camp Badger	25
5.3	Engineering Tomorrow’s Careers	26
5.4	Engineering Bash	26
5.5	Boy Scouts	27
5.6	Science Olympiad	29
5.7	Engineering EXPO	29
5.8	Essay Contest	31
5.9	STEM Convention	32
5.10	Racine Day and Exploring Engineering Day	32
6	Community Service and Professional Development	33
6.1	Adopt-A-Highway	33
6.2	Engineer’s Week	33
6.3	Industry Liaison Committee	34
6.4	ANS Student Conference Proposal	34
6.5	Phoenix Nuclear Labs Tour	35
6.6	Kewaunee Nuclear Power Plant Tour	36
6.7	Fermi National Accelerator Laboratory Tour	37
6.8	Nuclear Battery Project	38
7	Socials	39
7.1	Ledge Park	39
7.2	Volleyball Tournament	39
7.3	Pic-Nuke	40
7.4	Haunted House	41
7.5	Curling	42
7.6	Wisconsin vs. Ohio St Hockey Game	42
7.7	Mad City Chili Cook-off	43
7.8	Breakfast at Mickies Dairy Bar	43
7.9	Coffee and Doughnuts	43
8	The Future of UW-ANS	44
9	Conclusion	44

1 Introduction



American Nuclear Society

UW-Madison Student Section

During the 2014-2015 academic year the American Nuclear Society, University of Wisconsin-Madison (UW-ANS) has worked very diligently to maintain its track record of planning, organizing, and executing events in areas of service to ANS. These service areas are: public outreach, professional development, and community service. Having been recognized as a very successful student section in many years past, UW-ANS has tried to uphold its image through organization of traditional events as well as undertaking several new projects involving professional development opportunities. Part of this success is due to relationships developed with other organizations such as the American Institute of Aeronautics and Astronautics (AIAA), Engineering EXPO, and Women in Nuclear (WIN), as well as strong involvement with the Department of Engineering Physics, the College of Engineering, and the ANS Wisconsin Local Section.

Every year, UW-ANS participates in many community service and public outreach events as a way to give back to the community that fosters the student section. Some of these events include Adopt-A-Highway, the high school essay contest, Boy Scout Nuclear Science Merit Badge Days, Science Olympiad, the STEM Convention, and Mickies Dairy Bar Fundraiser (during E-week). As always, we got many volunteers for these events, whose energetic presence ensured these were huge successes in the community. Furthermore, our successes in the past led groups we haven't worked with to reach out to us and ask for guest presentations. Such event requests included Racine Day and Exploring Engineering Day.

In addition to community service and public outreach, UW-ANS values professional development opportunities for our students. This year, professional development and networking opportunities were widely available in part due to a growing relationship with the American Nuclear Society Wisconsin Local Section. Students had the opportunity to attend a local section meeting that was hosted on campus where they were able to network with professionals from all around the state of Wisconsin. Furthermore, UW-ANS was able to organize several visits from professionals to give presentations on nuclear engineering and other related fields. UW-ANS also encourages students to become involved at a national level. We sent bigger groups than ever to attend both the ANS Winter Meeting in Anaheim, CA, and the ANS Student Conference at Texas A&M. In addition to these large networking events, members of UW-ANS, as well as other students in the department, attended weekly networking events such as breakfast at Mickies Dairy Bar on Fridays and coffee and donuts on Wednesday mornings.

Last year, UW-ANS started two new large projects that are being continued in the future. The first was the ANS Student Conference Committee. This committee involved 16 students dedicating their time every week to organizing a conference proposal. The second big project for the year was the development of a group to design and build a nuclear battery. This project has made such progress this year that it has already started to win awards in competitions. Having reached our current goals with these projects, we hope to continue them in the future.

UW-ANS members have even had time to participate in social events, despite spending time in class, research, and public outreach and professional development events. The largest social event was the biannual Pic-Nuke which is a picnic held at the beginning and end of every year for the students and faculty of the entire Department of Engineering Physics. In addition, many other outings such as curling, games nights, and even a haunted house visit allowed students to take a break in their busy schedules and get to know one another.

In summary, UW-ANS has been able to maintain a high level of involvement in the community this past year while being able to expand interest in many other types of activities. Overall, the student members of UW-ANS have been committed and driven in everything they have done this year. This has led to a very successful 2014-2015 academic year.

2 Section Management

UW-ANS's yearly success comes from a dedicated and hard working board of executive officers and committee chairs. This group of students consists of seven elected members and many more volunteer members that strive to provide the best opportunities for students and the general public.

2.1 Executive Officers

The executive committee consists of seven elected officers, they are: President, Vice-President, Treasurer, Public Information Officer, Communications Officer, and two Governors. The President, Vice-President, Treasurer, and Public Information Officer are all year-long elected positions while the Communications Officer and Governors are elected semester-long positions.

2.1.1 President

The President's main responsibilities include moderating general member and executive committee meetings, scheduling speakers for general meetings, organizing tours and conferences, managing the section's schedule, and acting as the liaison and representative for the section both professionally and within the College of Engineering. The President should also seek volunteers for other positions like the Webmaster or Boy Scout Officer, and otherwise make sure their duties are performed. The President for UW-ANS this year was Kazi Ahmed, who served as a Governor last spring and won "Most (Radio)Active" at the previous fall banquet. Next year's president will be Kelsey Amundson, who served as Public Information officer this year.

2.1.2 Vice-President

The Vice-President's responsibilities are organizing the section's social activities, acting as President in the President's absence, and providing support for the President. Some of this year's specific duties included coordinating Pic-Nuke and the other UW-ANS socials and ordering new t-shirts. This year the Vice-President was Drew Nigh who has also served as Communications officer in the past. Next year the vice president will be Calvin Parkin who served as a Governor in the spring semester.

2.1.3 Treasurer

The Treasurer's responsibilities included drafting budgets for the entire year, keeping track of all transactions completed by the organization, writing grant proposals, acting as liaison between UW-ANS and the UW-Madison Student Leadership Center (an organization that oversees the donated funds of College of Engineering student organizations), and advising the other executive officers on how best to spend the section's funds. The treasurer this year was Ian Jentz, serving his second term. He will be helping UW-ANS transition to a new Treasurer, Drew Nigh.

2.1.4 Public Information Officer

The Public Information (PI) Officer must develop, organize, schedule, and execute the section's public outreach efforts as well as oversee Science Olympiad and the Essay Contest. Included in this responsibility was proper inventorying public outreach supplies, writing and designing presentations to be used at public outreach events, coordinating with teachers and scout leaders to organize events such as Boy Scouts and the Essay Contest, and working earnestly throughout the summer to coordinate both Camp Badger (an engineering summer camp for middle school students) and Engineering Tomorrows Careers (a summer camp for female high school students interested in engineering). This year, however, the PI was unavailable over the summer so the President performed those duties. The PI for this year was Kelsey Amundson. Next year the PI will be McKinleigh McCabe, who was a Governor during the fall semester and won "Outstanding Public Outreach" at our spring banquet.

2.1.5 Communications Officer

The Communications Officer's duties are to take minutes at executive committee meetings, send out weekly announcements, advertise for upcoming events (usually by flyers, by chalking information on sidewalks, or via email), and to maintain and update the UW-ANS Google Groups mailing list and the UW-ANS social media accounts on Facebook and Twitter. The importance of this position is to ensure that the members, students, and community are properly informed about the events going on within UW-ANS. The Communications Officer for the fall semester was Jennie Aylyng and for the spring semester was Virginia Haupt. The Communications Officer for next fall will be Ryan McMurtry, who served as a Governor this spring.

2.1.6 Governor

This year, the two Governor positions were split into more distinct roles. One Governor took the lead on Adopt-A-Highway (although the other still helps), and the other Governor acted as a liaison to the Wisconsin ANS Local Section. The position allowed for easier collaboration with the local section for meetings or tours, and more opportunities for the two sections to get involved with each other. Governor A was given this responsibility, which included a monthly conference call with the local section executives which relayed information between both executive boards. This included the advertisement of the local section meeting on March 20th, and in the future will hopefully lead to increased opportunity for professional development through speaker presentations, tours, etc. Both officers help with other events throughout the semester such as E-Week. Like the Communications Officer position, Governor is a single-semester position. The Governors last year were McKinleigh McCabe, Garrett Andrews, Calvin Parkin, and Ryan McMurtry. Next semester's Governors will be Kyle Anderson and Kyle Blomstrand.

2.2 Chairs

The chairs of the UW-Madison ANS section are appointed by members of the Executive committee, and therefore are non-elected positions. As such, chairs are not required to attend executive committee meetings and are more committed to a more focused set of responsibilities. Some chairs are consistent, year-long events, while some appear on an as-needed basis. As it happened this year, most of the necessary chairs were elected members of the Executive committee.

2.2.1 Boy Scouts Chair

The Boy Scouts Chair main responsibility is facilitating and organizing UW-ANS's Boy Scouts Merit Badger Workshops, which helps ease the burden of placing too many duties on the Public Information officer. The Boy Scouts Chair should understand the basic operations behind Boy Scouts, the Nuclear Science Merit Badge, and the outreach and communication required in order to organize this event. The Scouts Chair this year was Matthew Jasica, who worked with Virginia Haupt to manage the workshops. Matthew has slowly passed more responsibility over to Virginia, and they will both continue to manage the workshops next year.

2.2.2 Expo Chair and Committee

Engineering Expo is a College of Engineering event occurring every other year that draws thousands of people from all walks of life and knowledge levels. Student organizations and other engineering groups are encouraged to set up fun and educational activities at their booth for all age levels. The main responsibility of the expo chair is the oversight of a successful UW-ANS booth at Engineering Expo. This year Kelsey Amundson was the expos chair and gathered a committee of UW-ANS members to organize and run our Expo exhibit.

2.2.3 Science Olympiad Chair

The Science Olympiad Chair is charged with coordinating UW-ANS members to coach students at a local middle school as they construct projects and study for the Science Olympiad competition in the spring. This year, Kelsey Amundson took responsibility of Science Olympiad as part of her Public Information duties.

2.2.4 Scholarship Chair

The scholarship chair is responsible to organizing and managing the Essay Contest. The Essay Contest is an opportunity for high school students to write an essay on a pre-chosen nuclear engineering topic and submit it for a scholarship to UW-ANS. This year Kelsey Amundson, as Public Information Officer, oversaw the Essay Contest.

2.2.5 Conference Bid Committee

Motivated from the positive feedback on last year's submission, co-chairs Kalin Kiesling and Matthew Jasica recruited Alex Gross as a third co-chair to lead the bid for the 2016 ANS Student Conference. The duties of these co-chairs included organizing a conference bid committee, coordinating with the College of Engineering, City of Madison, and ANS National, and overseeing the creation of a conference proposal.

Once again the co-chairs organized a committee to share the responsibilities of writing the proposal. This committee met every week either as subcommittees or as the full bid committee to organize their sections of the proposed conference. Many students were responsible for site visits to potential conference venues and coordination with City of Madison. The majority of the committee consisted of students that expected to be around in 2016 as well as a few graduating students that offered their help. This year the committee was Kalin Kiesling, Matthew Jasica, Alex Gross, Kazi Ahmed, Kelsey Amundson, Shyamal Anadkat, Kyle Anderson, Madelynn Bouche, Xavier Durawa, Virginia Haupt, Jonathan King, Matt Kriete, Andrew Maile, Amber McCarthy, Drew Nigh, Ryan Norval, Juliana Duarte, Zz Riford, Tony Silvidi, Huali Wu, and Grant Zastrow.

2.3 Other Positions

In addition to our executive and chair positions, there were several other UW-ANS members that provided support to the UW-Madison chapter in one way or another. Like the Chairs, some of these positions are appointed, and others come based on the need at the time.

2.3.1 Webmaster

The two main responsibilities of the Webmaster are to maintain the UW-ANS website and to provide support for the use of Google. Tasks included in maintaining the website are syncing the website's forms with Google Docs, updating pictures and presentations, and ensuring that the website continues to function as intended. To aid the executives in using Google (email, calendar, and docs), the Webmaster organizes information, aids in turnover between administrations, and teaches current users the capabilities of using Google. And the end of this year, the Webmaster began the process of transitioning the entire UW-ANS mailing list, originally within the College of Engineering, to a Google based mailing list. This process is expected to continue into the summer and fall semesters. Often times, this position is shared by the executive officers. This year the main webmasters were the President and the two Communications Officers.

2.3.2 Design Chair

Establish last year per request of a member of UW-ANS, this is a relatively new position. Xavier Durawa was the student who came up with the idea to design and build a nuclear battery as a way to give students more hands-on nuclear engineering activities. The executive board extended his willingness to head this project to a more general position known as the Design Chair with intention that the project can change from year to year. This year, Xavier has passed on leadership to Garrett Andrews.

2.3.3 Faculty Advisor

The Faculty Advisor for UW-ANS is there to provide the chapter with advice and act as a liaison between the organization and the department. Often, the Faculty advisor retains his position for many years, so they are able to provide valuable information to the organization, as the Executives and Chairs often are served by people new or just getting involved in UW-ANS. This year, the Faculty Advisory was Paul Wilson, who has served as the faculty advisor for many years and is highly involved with national ANS as well.

3 Operations

In addition to the contributions of the executive committee and its general members, UW-ANS attributes its success to administrative procedures and processes which ensure smooth operation of the section. These processes made it possible for turnover between the previous executive board and this year's executive board to go smoothly. Because of documents, processes, and experience provided to the incoming executive board, future turnovers between executive board members are simplified.

3.1 Office Hours

UW-ANS officers were required to hold office hours at the UW-ANS student organization office in the Engineering Centers Building at UW-Madison. Each of the seven officers were expected to be available for two hours each week to answer questions regarding club activities, t-shirt sales, and any other concerns. ANS members were encouraged to attend office hours if they had any question regarding UW-ANS, and the schedule of office hours was posted on the UW-ANS website and on the door to the student office. In addition, the executive officers held weekly executive meetings for all organization planning; these meetings are still open for any member to attend. The most frequent non-executive attendees were the conference bid chairs and our Boy Scout Coordinator.

3.2 Active Membership

Active members are UW-ANS students that have paid dues to the section. Dues are \$ 10 per semester or \$ 15 for the whole year. Active membership status is required to participate in social events and professional development opportunities.

3.2.1 Active Membership Points

Beyond paying dues, active members are expected to participate in varying activities held by UW ANS. Active members are rewarded for participating at section events and helping with section business. Points can be earned by attending meetings, workshops, outreach events, tours, etc. that UW-ANS hosted or encouraged.

Active membership points come with benefits, such as reduced T-shirt prices or access to special social and professional development events. In the fall members with sufficient active members points were invited to an end of the semester banquet and were eligible to attend the ANS Winter Meeting. In the spring sufficiently active members were invited to a spring banquet and had the opportunity to attend the ANS Student Conference at Texas A& M University.

These special events serve as an incentive to get UW-ANS members to help with demanding tasks such as hosting boy-scout workshops, creating a bid for conference, or organizing an Engineering Expo display. With these incentives and the Active Membership Points system, the UW-ANS executive board can more easily delegate work to and organize our members.

3.2.2 Captain Neutron

At every general section meeting, UW-ANS likes to recognize one student member who has been particularly active in the period prior to the meeting. The student is honored by being named “Captain Neutron” of the section and maintains this title until another student is picked. Students who receive this award have their picture, often times a silly picture, posted on the bulletin board outside the departmental office for everyone in the department to see. The student also receives a free “I Heart Nuclear” t-shirt. Five Captain Neutrons were named this year, they were: Richard Rolland, Ian Marsh, Zz Riford, Alex Gross, and Andrew Maile.



Figure 1: *Ian Marsh was one of five Captain Neutrons who had their picture posted outside the department office.*

3.2.3 End of Semester Banquet

End of semester banquets are held to award highly active UW-ANS members. Active members who have amassed more than three Active Member Points are invited to a pot-luck banquet and awards ceremony put on by the executive board. Here awards for the most active member, most active undergraduate and graduate, and most active new member are presented.

Members are enticed by a full potluck spread including appetizers, entrees, and deserts. The Fall banquet featured pulled pork tacos, southwestern salad, roasted vegetables, chicken soup, fruit salad, and desert bars. Spring banquet was BBQ themed and included pulled pork sandwiches, garlic bread, country salad, coleslaw, pasta salad, and desert bars. These banquets are followed by officer elections and a games social. Board games, cards, Super Smash WiiU, footbag, and other activities are great for celebrating the end of every successful semester.

3.3 Financial Planning

UW-ANS has continued with past principles in our efforts in obtaining funding and managing spending. As in the past, the task of ensuring income and sponsorship match balanced spending, across all activities of ANS, is the responsibility of the treasurer. UW-ANS has continued digital transaction logging via Google Docs that was started over three years ago. Transactions are logged across both of the UW-ANS financial accounts, and are viewable to all executive officers. Last year's

revisions in reimbursement and spending tracking have also been incorporated: we require forms containing detailed descriptions, receipts, check numbers, and signatures of two executive officers to be presented before transactions can be made. These systems aid in transparency and accountability in spending.

Logistically, UW-ANS has two spending accounts: a checking account with Associated Bank-Corp. and an account through the Student Leadership Center (SLC) in the College of Engineering. The SLC requires engineering organizations keep an on campus account to facilitate the use of money from certain grants. The use of the SLC account is limited to certain approved activities, such as providing travel and lodging at conferences, but cannot be used for some of our activities, such as socials or individual reimbursements. Where the SLC account can't be used, the more flexible personal banking account at Associated Bank is used. The Associated account is also favored since UW-ANS has administrative control over the Associated account but not over the SLC account. Purchases can be made via check or with a debit card. All checks written must be signed by two members of authorized signers which include: the President, Vice-President, Treasurer and Faculty Advisor. Use of the debit card must be approved at a weekly executive meeting. This method ensures more responsibility when spending and has worked well.

3.3.1 Budget

Budgets are compiled by the treasurer at the beginning of the year and presented at an executive board meeting where they are ratified. A ratification meeting serves as a means to discuss how money can be best allocated and ensure a fair distribution of funds across all functions of our section. The budgets encompass all aspects of UW-ANS's spending and earning over the two accounts. As a student organization, UW-ANS also submits these budgets to our engineering Student Leadership Center (SLC). Anticipated expenses are detailed as greatly as possible so that accurate fundraising and income goals can be made for each semester.

All budgets are available in Google Docs format managed by UW-ANS. This makes them available to any executive board member, current or in the future. Thus members of the executive board can reference ratified budgets when planning their agreed-upon events and make appeals if necessary.

3.3.2 Funding

Income comes from three distinct sources: university grants, fund-raising and cash income. The treasurer is responsible for handling all these incomes.

University grants come from both the Engineering and general UW Madison student organization offices. Engineering grants are handled by our engineering departments Student Leadership Center (SLC). Leading up to 2015 these SLC grants were available three times a semester for up to \$550 each time. The SLC has switched policies as of 2015 and these SLC grants are now available once a semester with a higher cap of \$1500. Grants from general UW Madison student organizations come from the Associated Students of Madison (ASM). ASM grants are available at any point during the year and have a cap of \$2000, but have a required hearing and proposal for each application.

Our student section has been diversifying our University grant funding with similar amounts of funding coming from the SLC and ASM this year. Engineering grant funds from SLC were \$1328.95 and were used to obtain new outreach materials from the ANS store and to pay for two hotel rooms at the ANS Student Conference. General grants from ASM were used for the first time this year, as President Kazi decided to investigate this additional funding avenue, which was used to send twelve students to the ANS Winter meeting. A total of \$1957 was raised through ASM in one grant, so it was well worth the effort. In the future we will continue pursuing ASM grants as a primary source of funding, since their process is well-organized, the monetary limit is high, and the restrictions on grant usage are more flexible than those of the SLC grants. This additional source of grant money will ease the work and risk associated with raising funds for large expenses such as conference attendance.

Fund-raising comes from industry sponsorship. The desired amount of funding was determined from semester budgets and was used to provide distinct sponsorship opportunities. Industry partners were given the option to sponsor specific activities that were budgeted. Sponsorship options this year were: Lodging at Winter Conference, Lodging at Student Conference, High School Essay Contest Sponsorship, and Donut Social Sponsorship. Sadly we had less industry participation this year than last, but still received sponsorship from a regular partner. For the second year in a row, Dominion Generation sponsored our lodging in College Station for the 2015 Student Conference. Our Department of Engineering Physics was also a very generous donor this year.

Cash income comes from membership dues, Boy-Scout Workshop registration fees, and t-shirt sales. Unlike grants or sponsorship, cash income is discretionary, giving flexibility in spending. Sixty-three active members paid a total of \$865 in dues this past year while scout registration fees and t-shirt sales at the Boy Scout Merit Badge Workshops netted over \$2500 as of 3/26/2015.

3.3.3 Spending

All spending is estimated and approved as part of the semester budgets. Transactions are monitored and approved by the treasurer and are agreed upon at executive meetings.

UW-ANS is on its second year of the new Debit/Check system. In 2013 we started using a debit card in addition to check writing in an effort to reduce burden on students and the treasurer. With a debit card we no longer rely on student credit cards to make payments on hotel lodging, flights, or vehicle reservations. Centralizing credit and liability to one debit card has greatly relieved executive members who used to put substantial risk when using their cards for ANS purchases. Overhead in accounting has also been drastically reduced as there are less reimbursement forms and checks to be filled out and written.

With the 2016 Student Conference approaching, we have opened a second checking account for use by the conference committee. This second account will allow the Conference Finance Chair to easily manage local donations and expenses. In particular the account will be useful when dealing with caterers, as it can make use of UW-ANS's state tax exempt status.

3.4 Website, Google Drive, and other Online Tools

UW-ANS uses the atomicbadger.org domain and Google Apps to send information to the member list and to keep the student section organized. The Google word processor, spreadsheet, and presentation software are all used to assemble, coordinate, and disseminate information about activities and proceedings. A non-exhaustive list of these uses includes:

- Executive committee meeting agendas and minutes
- Budgetary planning
- Membership information
- Active membership point submission and monitoring
- Event sign-ups
- Event schedules
- Meeting presentations
- Event pictures
- Collaborative editing
- Announcements
- Logo and other administrative item storage

In addition to these "standard" document abilities, Google Docs also offers Forms. Forms is a simple tool that allows the quick creation of surveys or applications that can be embedded in a website. When filled out and submitted, the Form sends the information to a spreadsheet and creates summary statistics for all of the submissions. This service from Docs is an important part of the current website. Two of the main uses for the Forms option include Active Member point submissions and event sign-ups.

Two features of Google Docs are extremely useful in the day-to-day operations of UW-ANS. The first is the use of Shared Folders. All of the aforementioned Google Docs content is not only shared with all of the executive committee but also placed into a folder structure that clearly labels the document's purpose. Secondly, on the technical side, Google Docs now offers Google Apps Script as a means to read, process, and write data between all the services of Google Apps (Sites, Calendar, Docs, etc.). For example, our past Webmaster wrote a program to automatically determine active from non-active members on our roster using this tool.

This year we also migrated the entire UW-ANS mailing list to Google Groups. The previous mailing list was the College of Engineering's Computer Aided Engineering (CAE) mailing list. Unlike CAE, Google Groups allows anyone to request membership in the mailing list with a customized message. Furthermore mailings are archived and can be viewed through the Google Groups at any

time by all participants. Another benefit over CAE is increased power of members: they can draft e-mails to send to the entire list after approval by the President, Communications Officer, or Faculty Advisor.

This year UW-ANS continued to fully utilize the Google Apps suite of services. Building upon the previous years' success in using Google Apps, Google Apps is now considered as a natural and effective means for collaboration among current UW-ANS officers and members while providing a steady and promises base for the future. A screen shot of UW-ANS section's website is given below in Figure 2. On the homepage of the website there are instructions on how to become an active member and a calendar of ANS office hours held by members of the executive board.

Finally, UW-ANS also created an account under the president@atomicbadger.org email on a collaborative \LaTeX writing website. Continued use of \LaTeX will facilitate multiple exec officers writing reports or even creating small documents together. As more time is spent with \LaTeX , future executive officers plan to build templates that are more compliant with ANS National graphics standards, for the purpose of communicating with more consistent imagery.



Figure 2: A screenshot of the atomicbadger.org domain

3.5 Social Media

UW-ANS maintained its presence on Facebook and Twitter this year. With students checking their Facebook more often than their email, it is becoming the best way to quickly and readily relay information to a particular group, and can even be utilized to advertise to the general public in certain cases. UW-ANS continues to use the Department of Engineering Physics Facebook page, Figure 2, for posting about events. Several UW-ANS executive members were given permission to edit the web page, which has proven to be a useful tool in helping advertise events, meetings, and keeping others informed about the current events going on in UW-ANS.



Figure 3: A screenshot of the cooperatively managed Facebook page

The UW-ANS Twitter account was also useful this year for communicating club updates, advertising meetings, and more. Most importantly, we made sure to use Twitter during key national events, such as tweeting with #nuclearequality during the comment period on the EPA Clean Power Rule, and tweeting with #teamnuclear during Nuclear Science Week.

4 General Meetings and Special Events

UW-ANS provides professional development opportunities to its members. As in past years, The section continued to provide a wide variety of speakers, conference attendance opportunities, industry facility tours, and seminars. In addition to general events described in sections 5-7, UW-ANS hosted various special events this year. These special events are presented below.

4.1 General Meetings and Speakers

Professional development opportunities arise from hosting guest speakers. We like to have guest speakers visit our UW-ANS General Meetings so they can see what organization does, and can meet with students after their talk. This generally leads to excellent section meeting attendance. Of course, free food might also have some kind of effect on those results. Table 1 lists all guest speakers hosted this year, their affiliation, and the type of meeting they spoke for.

Table 1: *List of Guest Speakers and Meetings*

Date	Guest Speaker(s)	Company/Event
September 03, 2014	-	Fall Kickoff Meeting
September 15, 2014	Ryan Boscow, Malika Taalbi	NNSA Graduate Fellowship
September 22, 2014	Brian Strebel, Sue Ivanauskas	Bechtel Marine Propulsion Corporation
September 24, 2014	Amy Laspe	Sandia National Laboratories
October 20, 2014	Dr. Ross Radel	Phoenix Nuclear Labs / General Meeting
November 20, 2014	Dr. Matthew Quinn	Fermi National Accelerator Laboratory General Meeting
December 03, 2014	-	Banquet and Elections
January 28, 2015	-	Spring Kickoff Meeting
February 02, 2015	LT Haggerty	U.S. Navy
March 09, 2015	Dr. Thomas Fanning	Argonne National Laboratory General Meeting
March 18, 2015	-	ILC Student Feedback Session
March 20, 2015	Dr. James Harvey Dr. Ross Radel	NorthStar Medical Radioisotopes / ANS Local Section Meeting
April 22, 2015	Thomas Drury, PE	AREVA / General Meeting
April 23, 2015	Brewster Shaw & ILC	ILC Committee Meeting
April 29, 2015	-	Banquet and Elections

4.2 Coordination with Other Organizations

Coordination with other student organizations on events is highly encouraged in the College of Engineering. This year, UW-ANS continued collaboration with other student organizations and participated in other student organizations events. UW-ANS worked especially closely with WiN this year and strengthened our relationships with Polygon, Camp Badger, and Engineering Expo.

4.2.1 Women in Nuclear (WiN)

Over the past few years the UW-Madison Women in Nuclear Chapter has not been extremely active, but this year our Public Information Officer was also the President of the UW-Madison WiN Chapter. This made it easy to host joint events between UW-ANS and WiN. Two events that were jointly hosted included a breast cancer awareness fundraiser and a Girl Scout Workshop.

Professors in Pink was a breast cancer awareness fundraiser held during the month of October (breast cancer awareness month). For one week students, professors, and alumni donated money to purchase pink items for professors to wear during their lectures. Surprisingly, many nuclear engineering professors volunteered to participate, and we even convinced an Engineering Mechanics professor to participate. The pink items ranged from pink bow-ties to flamingo or bunny suits. The week after the donations were collected professors picked which day they were going to wear their pink items (this was during Nuclear Science Week) and had to give all of their lectures in their costumes. Professors in Pink raised over \$750 that was donated to the National Breast Cancer Foundation. Based on positive feedback from both students and professors we plan to make this a yearly event (although professors may demand role reversals to exact revenge).



(a) Gregory A. Moses



(b) Douglass L. Henderson



(c) Paul P.H. Wilson

Figure 4: Professors who volunteered were required to teach classes in their assigned attire.

On March 14, 2015 (Pi Day!) UW-ANS and UW-WiN held a girl scout workshop to teach girls about nuclear science and technology. Even though we called it a girl scout workshop, we opened the workshop to any girl that wanted to attend. This workshop consisted of girls from third grade to seventh grade, which was a younger group than we expected. However, the attendees still asked many questions, and their comprehension of the material at the conclusion of the workshop was amazing, especially for the younger attendees. During the workshop we discussed the basics behind radiation, fission vs. fusion, famous women nuclear scientists, careers and applications, and all attendees got the opportunity to tour our TRIGA reactor. After the workshop, we received only positive feedback and many of the adults were glad to see that we were reaching out to girls and encouraging them to consider engineering.



Figure 5: *Girl Scouts learn about time, distance, and shielding*

4.2.2 American Institute of Aeronautics and Astronautics

The Engineering Mechanics/Engineering Mechanics and Astronautics (EM/EMA) program is within the same department (Engineering Physics) as the Nuclear Engineering program at UW-Madison. As such, the student organization associated with the EM/EMA degree, AIAA, and UW-ANS commonly coordinate events together, in a very similar manner as with WIN.

Most importantly, UW-ANS and AIAA organized two discussion sessions (Industry Liaison Committee Meeting) for students to give feedback to the Department of Engineering Physics. The first session allows for students to give anonymous feedback to the ILC; at the second session ANS and AIAA leaders discuss this feedback with the ILC which is then refined and presented to the department.

UW-ANS and AIAA will also continue the softball rivalry that started two years ago with the 3rd Annual ANS vs. AIAA Softball Game to be held on May 8th. This event will decide the current best-of-3 match-up. It will be played during Pic-Nuke so it will certainly be quite an eventful night.

4.3 “The Man Who Saved the World”

After the success of our showing of the documentary “Pandora’s Promise”, UW-ANS decided to offer a screening of the film “The Man Who Saved the World” on February 4th at the Marquee Theater on Campus. This film is about a Soviet officer who judged a report that the United States had fired nuclear missiles to be a false alarm, ultimately preventing nuclear war. UW-ANS publicized this event within the section and also to other potentially interested academic departments such as the departments of History and the Department of Physics on the UW campus. The Union of Concerned Scientists organized screenings of this movie around that time, which led us to host this event. Of course, we made a point not to hand out any suggested propaganda, and maintained it as only a simple screening, ensuring the event was simply a way to spur discussion on a topic not normally explored in class.

4.4 EPA Clean Power Rule

UW-ANS took the call to action about the EPA Clean Power Rule seriously. We too believed that it was important to show policymakers that ANS is an active body of many professional and student members from across the nation, and that we can mobilize on important issues. We set up and managed a booth in the Engineering Research Building (ERB) lobby for a few days leading up to the December 1st deadline to comment to the EPA. ERB is home to our department, and it hosts many offices for graduate and undergraduate researchers, so the main lobby has a high nuclear engineer flux. As shown in Figure , students, professors, or other passersby could stop and learn about the proposed ruling, then make comments on multiple laptops. We offered a doughnut to anyone who made a comment; an estimated 60 people commented from our station.



Figure 6: *Students discuss the EPA Clean Power Rule in the ERB lobby*

4.5 ANS National Conferences

UW-ANS sent our members to two ANS conferences this year. We were able to attend both the 2014 ANS Winter in Anaheim CA as well as the 2015 ANS Student Conference at Texas A&M University. The conferences provided excellent opportunities for students to present their research and projects to professionals and other students, network with other nuclear engineers, and talk with recruiters at career fairs.

4.5.1 2014 Winter Meeting

Twelve UW-ANS members attended the 2014 ANS Winter Meeting. Most students attended in support of our bid for the 2016 ANS Student Conference. These bid members were able to network with companies and professionals at the conference, gathering support and awareness of for the conference. Other students gave talks and submitted papers to the conference and were able to meet professionals within their fields of interest.

This was UW-ANS's first year sponsoring attendance at the Winter Meeting. We found it to be a better opportunity for our graduate and more senior members than student conference, as the setting was more serious and conducive to the greater depth of graduate work. We plan on continuing to offer winter conference as an option for members who have advanced projects and research that they would like to present on a larger stage.

4.5.2 2015 ANS Student Conference

Twenty-nine UW-ANS members attended the 2015 ANS Student Conference. This was record attendance for our section. This was also the first student conference for sixteen of our students, who ranged from freshmen in our nuclear engineering program to graduate students. Some of our students presented papers and participated in governance meetings while yet a larger group attended in support of UW-Madison's second bid to host an ANS conference. This was an unequivocal opportunity for every student in attendance.

At the close of conference we found out that UW-ANS will be hosting the 2016 ANS Student Conference in Madison. This was an outstanding award, as our conference committee had spent two years prior preparing bids to host conference. The theme of the upcoming conference is "Being a Critical Member of the Nuclear Industry" and will focus on η -uclear opportunities, f -orming our public image, ρ -rofessional development, and ϵ -ntrepreneurship. We are very excited about this conference, and are sure that it will be momentous for our section and ANS overall.



Figure 7: 2015 ANS Student Conference Attendees

5 Public Outreach

5.1 Madison West High School

Near the end of the 2013-2015 academic year, a local high school student who found our website approached UW-ANS, asking how he could learn more about nuclear and get involved with the society. We invited him to participate in our usual summer outreach event, Camp Badger, but we also decided take it one step further for his school.

On May 30th 2014, UW-ANS visited Madison West High School to talk about nuclear power to three engineering classes. With this visit, we wanted to test an alternative approach to public education, based on the fact that it's easier for people to support what they can understand. Instead of using statistics and general facts to garner support for nuclear, we did a "Demystifying Nuclear" presentation which explained the fundamentals of nuclear power generation from basic principles (Atoms/nuclei - fission - chain reaction - control - energy - power conversion). In figure 8, students are seen learning about SCRAM, as an example of how smart design choices keep reactors safe. To support this lecture, we ran a multi-stage neutronics demo using ping pong balls. Students pretended to be fissile nuclei, and they threw their ping pong balls in the air once struck by a neutron from another student.



Figure 8: *Students learn about reactor control*

Students were very engaged with this presentation and we noticed dramatic improvement in their understanding. Initially students had very typical responses such as asking if we would talk about bombs, but after the presentation questions like "If we understand how to control nuclear so well why are people against using it?" were asked. This visit proved that at least part of the fear of nuclear comes from people having no idea (it's black magic!) what goes on inside a reactor. Since these were high school engineering courses, we decided to teach them as much as we could about reactors and how they work. After covering the neutron multiplication, we explained the concept of control elements, as well as negative temperature feedback. There was some danger of these topics being too advanced, so we avoided math and kept things very visual and interactive. We repeated the neutronics demo but with some students acting as absorbers, or with students spaced further apart, to illustrate these concepts.

In the future, UW-ANS will expand on this lesson plan and develop a day camp for high school students. The camp will be much like our Boy Scouts event, but with more advanced material, including the reactor physics demo. The Madison West High School students were quite receptive to the lesson, which is a good sign that other local high school students would be interested in a longer event in the future.

5.2 Camp Badger

Over June and July 2014, UW-ANS members gave fourteen presentations about nuclear to middle school students for Camp Badger, a summer camp that covers diverse topics. We used a modified version of the "Demystify Nuclear" presentation which explains the fundamentals of nuclear power generation from our high school visit on May 30th. We cut down details to make it easier for middle school children, and replaced half the presentation with some radiation basics and an overview of nuclear engineering careers and the diverse applications of nuclear science and technology. We still used the neutron multiplication demo with ping pong balls. Students were very surprised they could learn about what goes on inside a nuclear reactor. By letting the attendees act as fuel elements and throw around ping pong balls to represent fission, it was easy to explain the basics of reactor physics to young kids. Figure 9 shows one group of students getting ready to act as a reactor core. In addition, the attendees were able to use our portable counters, with radioactive sources made for teaching, to experiment with time, distance, and shielding. Over the course of the summer, these presentations reached over 200 children, as well as the Camp Badger volunteers and their supervisors, who are eager to work with us again. In the last week of April, we just received confirmation from Camp Badger that we are signed up again for this summer.

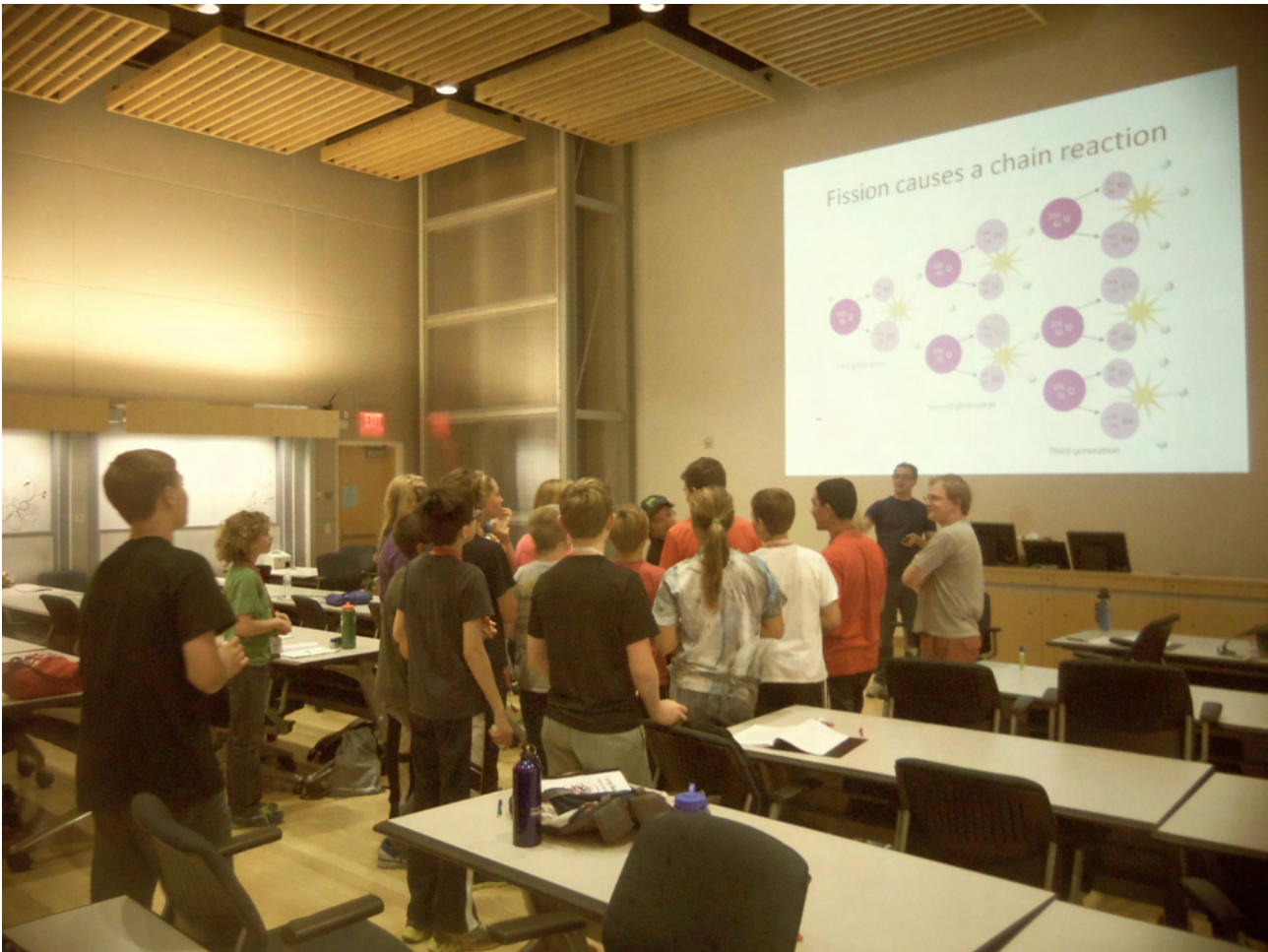


Figure 9: *Students pretend to be a nuclear reactor*

5.3 Engineering Tomorrow's Careers

Continuing an outreach opportunity that started last year, UW-ANS was asked to participate in a summer camp Engineering Tomorrow's Careers (ETC) hosted by the Society of Women Engineers (SWE). ETC is a camp for high school junior and senior females that are interested in studying engineering in college. A group of UW-ANS members put together a presentation to teach the group what it is like being a nuclear engineering student at UW-Madison and some career opportunities after graduation.

5.4 Engineering Bash

At the beginning of every academic year the College of Engineering hosts an Engineering Bash, which allows Freshman to explore the different engineering student organizations. All student organizations put together a 2 minute presentation that provides an overview of their respective organization and their is a student organization fair afterwards. Every year UW-ANS puts together a table to discuss what our student organization does and the activities we have planned for the year. In addition, we also bring a few outreach materials including a mock fuel bundle and some ANS information pamphlets to teach other college students about the benefits of nuclear science.

5.5 Boy Scouts

Some of the largest outreach efforts of the UW-ANS student section are the Nuclear Science Merit Badge Workshops. These workshops continue a tradition of excellence nearly a decade old, offering an environment for young scouts in the Boy Scouts of America (BSA) to earn their nuclear science merit badge. The workshops provide a junction between today's ANS members and tomorrow's scientists, engineers, and leaders.

During the 2014-15 year the UW-ANS student section hosted a total of 356 scouts and 177 adults from all over Wisconsin and northern Illinois at three fall semester and three spring semester workshops. Advertising for these workshops is done through our website and through a network of BSA troops and councils grown from year to year. Each workshop hosts up to 75 scouts and 35 adults at a maximum, and most of these workshops are filled up weeks in advance. These workshops are aimed primarily at scouts in 7th through 12th grade, but many younger motivated scouts have successfully completed these workshops as well. The only prerequisite for this workshop is a homework assignment, also completed and submitted electronically, that goes over basic nuclear science and terminology. This assignment ensures that scouts are familiar with concepts such the building blocks of matter and radiation before the workshop so that the workshop itself may focus on more engaging activities.



Figure 10: *Scouts and their parents watch the Wonders of Physics lunch presentation*

Each workshop goes from 10 AM to 4 PM, and includes a one-hour lunch break during the middle of the day. The facilities at UW-Madison enable the scouts to earn all of the merit badge's requirements in our one-day session. All scouts and adults begin the workshop together as we go through a brief review of the homework, introduce nuclear reactions including fission and fusion, and discuss radiation safety. This presentation incorporates activities such as building models of atoms using pipe cleaners and small poms. After this the scouts split into groups and rotate through various stations. These include tours of the University of Wisconsin Nuclear Reactor and the Inertial Electrostatic Confinement Fusion laboratory, which discuss nuclear fission and fusion in more detail and show off the exciting technology available at UW. Each tour is led by students currently working in the respective lab. The other three stations include a hands-on radiation counting station, a cloud-chamber station featuring

homemade chambers and a practical simulation of half-life using “radioactive skittles”, and finally a presentation on careers and applications in nuclear engineering. Oftentimes the lunch break will feature a guest presentation from the Wonders of Physics, which features many exciting demonstrations and encourages scouts to learn how the world around them works.

Of course, none of these workshops would be possible without the volunteering efforts of the UW-ANS members. Each workshop will have a staff size of anywhere from 10 to 20 volunteers who assist for either half-day or all-day shifts. These volunteers work at the detectors, cloud chambers, and careers stations (with 2-4 volunteers per station) and also help out with set-up, registration, and cleaning up. Volunteering for these workshops is a way for many younger members of ANS to get involved with the organization. It also is a great way for students to practice discussing what they have learned in school to a non-technical audience. Besides sharing their knowledge with the Scouts, many volunteers will also discuss nuclear energy and related topics with the adult attendees, showing that there is something new for everyone to learn at these workshops.

This year’s Boy Scout Coordinator was Matt Jasica, who has held the position for three years. New activities were introduced this year to the workshop as a way to better engage the scouts. For example, a radiation dose game has scouts match a list of sources to their respective doses as a way to put into perspective how significant everyday (and not-so-everyday) sources of radiation are. Activities have also been added to the Careers station asking scouts to brainstorm and reflect on what they think some of the most interesting uses of radiation and nuclear science are. New, more robust cloud chambers have also been constructed, although these tend to be even more temperamental than the previous design and still require some work. Our workshop was also recently featured on the local news, highlighting the unique opportunity these scouts have to learn about nuclear science. Our program has also influenced many other groups on campus, who have been consulting with us on growing their own energy and plant science merit badge workshops. UW-ANS is very proud of its Nuclear Science Merit Badge Workshops and we anticipate their continued growth and success.

Table 2: *Attendee estimates for UW-ANS Nuclear Science Merit Badge Workshops*

Academic Year	Workshops	Attendee Estimates
'06-'07	5	240 Scouts, 120 adults
'07-'08	5	250 Scouts, 120 adults
'08-'09	6	300 Scouts, 150 adults
'09-'10	5	229 Scouts, 119 adults
'10-'11	6	360 Scouts, 150 adults
'11-'12	5	250 Scouts, 115 adults
'12-'13	6	350 Scouts, 150 adults
'13-'14	6	350 Scouts, 160 adults
'14-'15	6	356 Scouts, 177 adults

5.6 Science Olympiad

For the past 12 years, UW-ANS has been actively working with the Wisconsin Young Scientists of America (YSA) Science Olympiad (SO) Program. This year, UW-ANS members served as mentors at Edgewood Middle School. Edgewood Middle School's Science Olympiad team met once a week for one hour between October and March, and fortunately we were able to send at least one volunteer (normally we sent three volunteers) every week. The mentors helped with bridge building, air trajectory, experimental design, simple machines, and many other events.

Many of the projects listed above involve construction topics that may exceed the coaches and parents knowledge. These projects require a lot of work outside their weekly meetings, but the students were able to discuss designs with UW-ANS students and the UW-ANS students were able to provide feedback on their designs and construction. After their Regional Competition, the students saw where their designs failed and our mentors were able to assist them in improving their designs for the State Competition.

In addition to providing volunteer and outreach opportunities, Science Olympiad is also a source of funding for ANS based on the amount of time our mentors spend with the students. The College of Engineering pays UW-ANS per hour per mentor of work (including transportation). Through YSA, this year we earned close to \$500 to put toward section operations.

5.7 Engineering EXPO

Engineering EXPO is a College of Engineering wide event that happens every two years on the UW-Madison Engineering Campus. This year, Engineering was hosted from April 16th - April 18th 2015, and included exhibits from student organizations, engineering research groups, individual/group student projects, and a few nearby industries. The first day of the EXPO is geared towards elementary and middle school students, the second day is for high school students, and the final day is open to the public. Every year thousands of people attend Engineering EXPO, and they come from all over Wisconsin, so this an amazing opportunity for our student organization to teach students and adults about nuclear science and radiation.

This year our public information officer was also the UW-ANS Engineering EXPO exhibit chair. Our Design Chair Xavier Durawa has also been very involved on the administrative side of EXPO for the past few years. With the help of a committee of UW-ANS members, we were able to organize the exhibit and create many posters and demonstrations to present over the course of Engineering EXPO. Our title and theme for EXPO room this year was "The (Nu)clear Choice". The different stations that made up the exhibit included:

- **Radioactive Beanie Babies:** This station was geared towards the younger attendees (but a lot of the high school students enjoyed it as well). We had attendees dress up in chemical suits and pretend they were radiation workers; they had to find which beanie babies had radioactive sources sewed into them using Geiger-Counters. After they found a beanie baby with a radioactive source they had to place the beanie baby in a "hazard area" that we outlined on the floor.

- **Natural Sources:** At this station we had people calculate their annual dose and over the course of EXPO we were compiling everyone's annual doses and graphing them for all attendees to see. Also, we taught people how smoke detectors work and showed them a few other sources that might be found around the house (including fiesta ware, salt, etc.)
- **Radiation in Everyday Life:** Most of this station was centered around ANS informational pamphlets. We also had a radiation game where attendees guessed the doses they received from doing certain activities, such as eating a banana, living 50 miles from a nuclear plant for 1 year, flying from New York to LA, getting a dental x-ray, etc. Most people were surprised to learn that the only thing emitted from the cooling towers at nuclear power plants was steam. Our last portion of this station included a large bubble diagram that illustrated a wide variety of places where radiation is used, such as smoke detectors, medical procedures, exit signs, agriculture, archaeology, etc.
- **Counters:** At this station attendees learned about time, distance, and shielding using radioactive sources and counters. We provided alpha, beta, and gamma sources and people attempted to determine the varying effects of shielding on different sources. After this station, people understood the penetrative capabilities of different types of radiation as well as the inverse square relationship between intensity and distance.



Figure 11: *Visiting students learn about natural sources of radiation*

- **Nuclear Reactors:** The EXPO Committee worked with the UW-Madison Reactor Laboratory to obtain a model of our test reactor on campus and a mock fuel bundle. At this station, we discussed some of the components that make up nuclear reactors and the energy density of nuclear fuel. Many attendees (both students and adults) were surprised to learn that one UO₂ fuel pellet can produce as much energy as one ton of coal. This led to a lot of questions related to further development of nuclear power.
- **Fission Demonstration:** About twice a day we gathered large groups of people to enter our exhibit to participate in a fission demonstration, where people pretended to be components of a reactor core. Initially, we had all the members pretend to be U-235 and every time they got hit by a neutron (represented using ping pong balls) they released two neutrons. Then we chose a few attendees to act as absorbers and catch the ping pong balls flying around. This was the easiest way for attendees to learn about reactor theory and control. We even outlined a reactor pressure vessel with tape on the floor, so they could see the relative size of nuclear reactors.
- **Trivia:** A trivia game was organized that summarized the topics that were discussed in the above stations, but a category about famous nuclear science was added. When large student groups entered the exhibit this was a fun activity, because the students were able to compete with each other which reinforced what they learned at our exhibit.

5.8 Essay Contest

Almost every year our student section hosts a scholarship essay contest to high school seniors. We award the winner of the contest \$500 that they can use towards their college education at any university. The funding for the scholarship is provided by the UW-Madison Engineering Physics Department. The essay prompt was written by the public information officer and approved by the rest of the executive board. This year the grading rubric was readily available on our atomicbadger website for all students wishing to participate. This year the prompt was:

Storing and disposing of nuclear waste has always been a hot topic when discussing nuclear technology. Please write how you would deal with nuclear waste by comparing and contrasting how the USA handles nuclear waste storage to how other countries handle nuclear waste (e.g. France, Russia, Sweden, etc.)

The information was posted on our website in the middle of December, allowing for a substantial amount of time to research and prepare the essay. Some of our members visited their high schools and talked to students about the contest, and also provided a short information session about nuclear science and technology. Unfortunately, this year we only had one submission, but it was obvious that the student put in a lot of time to prepare the essay so they were awarded first place. Since we want to expand this scholarship opportunity and make the world a better place, we are brainstorming ways we can increase participation. Two ideas we have discussed include: people visiting schools again closer to the submission deadline, and working with high school administration to have them add our scholarship to their scholarship directories or booklets.



Figure 12: *PI elect McKinleigh McCabe stands with the class he spoke to at his alma mater*

5.9 STEM Convention

This year UW-ANS was invited to a local STEM Convention at North Shore Middle School in Hartland, WI. The convention took place on Saturday, February 7. The convention was geared to the students attending the middle school but it was also open to the public. Many of the students were presenting their own science projects but other exhibits included a programming exhibit, 3D modeling, scuba diving, robotics, and talks about solar and wind energy.

The UW-ANS exhibit had multiple stations that provided information about nuclear science as well as a few hands on activities. We had attendees use Geiger Counters to find radioactive sources that we sewed into beanie babies, learn about time, distance, and shielding by playing with counters, and participate in a trivia game. In addition to the hands on activities, we had posters that discussed misconceptions about nuclear power and handed out ANS information booklets.

Many of the students were interested in learning more about nuclear science and radiation. We also had multiple students ask us about studying engineering in college and how they can prepare. We have been invited to present at the STEM Convention again next year.

5.10 Racine Day and Exploring Engineering Day

This year UW-ANS was invited to participate in Racine Day (November 14, 2014) and Exploring Engineering Day (January 30, 2015). The purpose of both of these events was to expose middle school students to different engineering disciplines. Throughout the school day different engineering groups gave 30 minute presentations, allowing the students to ask questions. The UW-ANS presentation discussed atoms, radiation, and a brief overview of how nuclear reactors work. Unfortunately, we were scheduled at the end of the day for both events so the students were tired, but there were still a few students that showed interest.

6 Community Service and Professional Development

6.1 Adopt-A-Highway

UW-ANS has continued its participation in Adopt-a-Highway with Dane county for the 11th consecutive year. Members volunteered to clean the section of University Av. between Segoe Rd. and County Highway Q in Madison. This is a major traffic road that leads directly to the UW-Madison campus. Per the requirements, ANS cleans this at least 3 times a year between the months of March and November of every year. Participating members are awarded with active member points for community service following the event.

6.2 Engineer's Week

At UW-Madison, the Polygon Student Engineering Council, which helps allocate some University funds to engineering student organizations, manages our school's E-week. During E-Week (February 22nd through 28th), members of the student organizations of the College of Engineering compete against one another in a series of events hosted by participating student organizations. UW-ANS had a strong showing against other professional organizations such as the student chapter of American Society of Mechanical Engineers (ASME) and Theta Tau. We competed in events like Tallest Tower, Euchre, Mario Kart, and more. We also hosted three events: the Mickies SCRAMbler Eating Contest, the Energy Game, and the Tug-of-War Tournament.

The Mickies SCRAMbler Eating Contest is an event in which participants eat as many scramblers from Mickies Dairy Bar (a local breakfast favorite) as they can throughout the entire week. This event is also an excellent community service activity, as both Mickies and UW-ANS donate \$1 for every scrambler eaten to a foundation or charity of the winning team's choice. This was the ninth year that UW-ANS has hosted and won this event during E-Week. A total of \$150 was raised and donated to the American Heart Association. Although this kind of charity (and Adopt-A-Highway as well) does not directly contribute to the nuclear industry, we feel that community involvement is a huge part of our public image. For many people who know little about nuclear, these activities help give a face to the people inside the nuclear world.

Another event we host during E-Week is the Tug-Of-War Tournament. This was our third year hosting this event, but unfortunately turnout was not the best, as this year E-Week was not advertised well outside of UW-ANS. A few teams still participated. This event is a good physical activity to help engineers let out the piles of stress we are all too familiar with.

The most important event UW-ANS hosts is the Energy Trivia Game, which also serves as an excellent public outreach event. The game consists of having student organization teams answer engineering and energy related questions; upon answering these questions correctly, that team can then buy power plants (whether nuclear, solar, coal, etc.) to generate electricity. Hosting the event gave UW-ANS the opportunity to teach other student organizations about electricity generation. We try to have no bias and be strictly objective about the different types of electricity generation, but of course that naturally leads to a nuclear-positive message anyway.

6.3 Industry Liaison Committee

Every year, The Engineering Physics Department hosts a group of high ranking alumni from across the nuclear and aeronautics fields. These alumni form the Industrial Liaison Committee (ILC), which exists to advise the department and suggest changes based on their impression of the nuclear, engineering physics, and aeronautics & astronautics programs. Prior to interacting with the ILC, UW-ANS, AIAA, and a representative from the Engineering Physics program organize a meeting open to all students in the department. At this meeting, the students are given the opportunity to anonymously voice concerns and suggestions which UW-ANS and AIAA can then relay to the ILC. The Presidents of the two organizations write up a report detailing those comments to present at a later date to the ILC. This process allows students to make comments and suggestions they would otherwise feel uncomfortable bringing to the department.

This year, the ILC visited the department on the evening of April 23th, and met with undergraduate and graduate students (a smaller group this time - only those very interested in speaking to the ILC directly) of the Engineering Physics Department over dinner. UW-ANS President Kazi Ahmed, AIAA President Adam Mayer, and EP Program Representative Bradley Gundlach presented their report of the students concerns to the ILC. Other students present at the meeting added their input as well and brought up other concerns and suggestions for improvement.

6.4 ANS Student Conference Proposal

For the second year in a row, UW-ANS compiled a bid to host the American Nuclear Society Student Conference, this time for 2016. Bid Chairs Kalin Kiesling, Matthew Jasica, and Alex Gross led a committee of 18 other members in pursuit of this objective. The remainder of the committee was split into five subcommittees: Technical, Finance, Hospitality, Non-Technical, and Publicity. Once again, our faculty advisor Paul Wilson, former Engineering Physics Department Chair Jake Blanchard (now an Associate Dean), and Dean of the College of Engineering Ian Robertson supported this bid. The committee also worked closely with representatives of the Madison tourism industry, most notably Manager Michael Ferguson of the Madison Concourse Hotel, the site of the proposed conference. Michael was eager to have another chance at hosting conference, and put us in contact with a professional conference planner who gave us valuable feedback on the proposal.

The writing process started as early as June 2014 and finished in the final weeks of February 2015. We already covered a lot of ground with the 2015 bid, but there were still significant changes to be made. During the fall semester general meetings were held every other week to cover general information and continually check on progress. During off-weeks the individual subcommittees met to discuss and accomplish their respective tasks. By the end of the fall semester the significant planning milestones had been completed. Over Winter Break, Committee members drafted their respective portions of the document, which was revised and compiled during the spring semester. Once again, this process was a great learning experience for newer UW-ANS members. On March 1st, after weeks of long meetings and painstaking review, we submitted the bid to the Student Sections Committee of ANS National.

We are very proud to say that UW-Madison will host the 2016 American Nuclear Society Student Conference. Former UW-ANS President Kalin Kiesling worked very hard to earn this opportunity, and we are all excited to work together and closely with ANS National to host an excellent conference. The current president Kazi Ahmed and president elect Kelsey Amundson are also subcommittee chairs for the 2016 conference. We are very excited to welcome ANSers from all around to Madison.

6.5 Phoenix Nuclear Labs Tour

On March 20th, UW-ANS students toured Phoenix Nuclear Labs (PNL) in Monona, WI. PNL specializes in accelerator-driven fusion technology, and produces some of the strongest commercial neutron generators (outside of fission power reactors). They have demonstrated the benefit of their technology for a wide variety of applications, including medical isotope production, explosives detection, neutron radiography, radiation survivability testing, and more. Founded by a UW-Madison alumnus and currently managed by former UW-ANS President Ross Radel, PNL has always been an excellent industry contact for UW-ANS. Since its founding, PNL has hired many UW-Madison nuclear engineers.

During the tour of PNL, UW-ANS students were able to walk through every area of the lab floor and see multiple accelerators at various stages of development. Some devices in the middle of construction were very sprawled out, so we were able to ask questions about all the internals; PNL engineers were very helpful in explaining the physics and functionality of their technology. On the other end of the spectrum, we were also able to see their most polished product yet, a compact device for testing radiation detectors. In Figure 13, some UW-ANS students listen to the PNL engineer leading the tour. After the tour, students could also discuss internship and job opportunities.



Figure 13: *UW-ANS students learn about a neutron imaging experiment at PNL*

6.6 Kewaunee Nuclear Power Plant Tour

On March 27th, UW-ANS students visited the decommissioned Kewaunee Nuclear Power Plant (KNPP), which is just south of Kewaunee, WI. Entirely due to the economics of stiff competition with natural gas, the plant ceased operation on May 7th, 2013. We started arranging this opportunity after coincidentally meeting a KNPP engineer at the 2015 ANS Winter Conference, who promised that touring a decommissioned plant would be more exciting than touring an operating plant. For this reason, we were highly anticipating the tour all semester. The tour fit into our schedule perfectly, as we had organized a tour of KNPP in the past while it was still operating, and last year we toured the Point Beach Nuclear Power Plant (which is actually visible from KNPP).

As promised, UW-ANS was able to visit many areas of the plant which would normally be off-limits if it had been operating. In Figure 14, the fifteen UW-ANS students who visited the plant are pictured standing inside containment. The large structure to the right is one of the plant's two steam generators, which were actually replaced along with a 20 year license extension not long before decommissioning. Directly behind the group and to the top structure of the reactor core is visible. UW-ANS was also able to visit other normally restricted areas of the plant, including the control room, and learn about many other supporting systems.



Figure 14: *UW-ANS students inside containment at KNPP*

6.7 Fermi National Accelerator Laboratory Tour

Following Dr. Matthew Quinn's talk in the Fall, we decided to arrange a tour of Fermilab during the spring. With the help of Maddie Wolter, a former UW-ANS executive and Radiation Physicist at Fermilab, we scheduled a general tour and additional tours of the MINOS and DØ facilities, for May 1st, 2015. This event was an excellent opportunity for our members to glimpse the frontier of modern physics, as Fermilab is working to become the world leader in neutrino research. Over a full day our students were able to see places on general lab tour for the public as well as numerous other devices like NOVA (a neutrino detector), MINOS (a muon detection facility), DØ (their iconic Tevatron collider), and much more.



Figure 15: *UW-ANS students take over the Fermilab Tevatron loop*

Fermilab hosts excellent tours as all their facilities are highly accommodating and filled with informational stands for visitors. We were able to see deep inside most of DØ since it is not currently operating, and it was easy to take pictures almost anywhere in the facility. Many of the tour participants either worked with fusion facilities at UW-Madison, at our Ion Beam Lab, or at Phoenix Nuclear Labs, so much of Fermilab's technology was relevant and interesting for us based on experience and familiarity.



Figure 16: *UW-ANS at the underground exit point of the neutrino beam heading toward the $DØ$ detector*

6.8 Nuclear Battery Project

In fall of 2013, a small group of UW-Madison students in UW-ANS started a project to research nuclear batteries. Betavoltaic nuclear batteries, which utilize beta-emitting radioisotopes as their source of power, have recently sparked interest due to advancements in micro- and nano-electronics. These devices open a window for betavoltaics; in ultra-low power applications, betavoltaics vastly outperform chemical batteries in longevity and energy density. With the support of former Department Chair James Blanchard, who has extensive research experience with betavoltaic microbatteries, and other faculty, the team investigated niche applications for the technology. They considered cutting edge technology such as diamond semiconductors for their design, and investigated local companies that can help make this kind of product. The project has created a nuclear battery concept called RaPID (Radioisotope Powered Isolated Device), which has won \$800 so far in contests such as the Energy and Sustainability Challenge. The UW-ANS Nuclear Battery team spent this past year polishing a battery design for a specific application which has yet to be tackled with nuclear batteries, and they are currently seeking a patent. Design Chair Xavier Durawa passed leadership on to the younger Garrett Andrews this year. The team will continue work into future semesters; one long-term "reach" goal is assembling a functional prototype.

7 Socials

In addition to the professional development opportunities provided, UW-ANS hosts many socials for its members throughout the year. These events give students the ability to relax in a social setting and network. These events help build camaraderie between all of UW-ANS, including students, faculty, alumni and friends.

7.1 Ledge Park

As is tradition, this year's first social outing was a two-night camping trip at Ledge Park in Horicon, WI. The trip occurred just before the start of the academic year and so it was attended by members from the previous year. This year's 6 participants indulged in the many activities that this park has to offer, like hiking the bluffs and running on some of the trails. Participants were fortunate this year to have immaculate weather for the entire trip. The night was concluded with a cookout of burgers, hot dogs, and s'mores while relaxing around the fire. This trip was a blast for all who attended and a great way to blow off some steam just before the start of the school.

7.2 Volleyball Tournament

For the first time in recent memory, UW-ANS hosted a volleyball tournament for fraternities and engineering student organizations as both a social and charity event. Teams could pay a fee to sign up and compete in the tournament. All proceeds went to Crohn's and Ulcerative Colitis research. This was a great way to meet other students from around the campus and get a good workout.



Figure 17: *ANS members warming up for the next match*

7.3 Pic-Nuke

Another tradition, Pic-Nuke is a cookout hosted by UW-ANS twice a year— a couple of weeks into the start of the fall semester and then before the last week of classes at the end of the spring semester. The event is just a few blocks away from campus at the Henry Vilas Park in Madison, WI. Everyone in the Engineering Physics Department including students, faculty, family, and friends are invited to attend, and it is a great way to introduce many new students to UW-ANS for the first time. Typically food is served for over 80 guests over the course of the night.

During Pic-Nuke, we play many games like Ultimate Frisbee, bean bag toss, and a relatively new UW-ANS favorite, footbag. We also hold a contest to build marshmallow and toothpick towers. Prizes for this contest include our "I Heart Nuclear" shirts, ANS mock nuclear fuel pellets, nuclear mugs, and more.



Figure 18: *Students and faculty taking in the beautiful weather together*

7.4 Haunted House

At dusk on one Fall evening, members of our section bravely ventured to Horror in the Dark at Olin Park for a Haunted House social event, our most spooky social yet. Though some of us were quite nervous, we decided that it was worth it to support a good cause (proceeds benefit Madison's homeless). Inside the house, we worked together to navigate through the dark corners and creepy rooms filled with homicidal clowns. Overall, this activity helped us grow stronger as an organization because we were able to bond in a less "professional" setting. Executive board members, active members, and non-active members alike formed new relationships that will help strengthen our organization. In addition, we were able to start planning for the ANS Winter Meeting which almost all of us in Figure 19 attended! Ultimately, activities like this one are a good way to bolster our organization by strengthening personal connections between members, reward active members, and have some fun after a long week of work.



Figure 19: *Some students were scared. Others were not.*

7.5 Curling

Wisconsin is a center of many unique traditions and activities, including the sport of curling. On November 22nd, ten UW-ANS members visited the Madison Curling Club to learn and play this game for the first time. Fortunately, the UW-ANS members were quick learners. The physics of the game was certainly captivating, as there was a lot of elastic scattering going on during the event. Everyone spent the last hour of the outing playing a competitive game that ended 3-2. Not bad, considering most students had just learned the game that day!



Figure 20: *Nuclear engineers excited to have learned how to curl*

7.6 Wisconsin vs. Ohio St Hockey Game

On Saturday, March 14th, eight ANS-ers attended the UW vs. Ohio State hockey game together. It was a historically bad season for the skating Badgers, who finished 4-26-5, and this game was no exception—they lost 3-0. The event served to bring club members together in a less professional setting as well as reward Active Members for their participation by covering the ticket cost. Ultimately, this event built friendships between club members of different ages while supporting our University, even though we lost the game!

7.7 Mad City Chili Cook-off

Near the beginning of the spring semester, UW-ANS entered a “Top Secret Atomic Chili” in this year’s city-wide chili cook-off. To determine the recipe, we made a Google Doc and all the executive officers collaborated on ideas with researchers from Los Poblanos National Laboratory (it is so secret no one has even heard of it). On the Friday night before the competition, the executive officers got together to cook the chili; this was a great bonding experience which strengthened organization leadership for the rest of the semester. The competition was held around dinner time the next day.

The Mad City Chili Cook-Off event itself the following Saturday was a fun event for club members to socialize in a non-professional setting. Many UW-ANS members of all ages made it out to the Essen Haus to vote for ANS’s Classified Atomic Chili. At our table, we had a list of ingredients and the ANS banner to advertise our organization. In the end, our chili won the First Prize for People’s Choice with 43 votes, garnering a 200 dollar cash prize! Of course, during the competition we did not let the opportunity for public education slip by. We acknowledged that our chili was indeed radioactive when inevitably many people asked, but we also stated that every other chili in the competition was also radioactive, due to trace amounts of natural C-14 and K-40 present in organic material. We clarified to everyone that radiation is natural and exists all around us.

7.8 Breakfast at Mickies Dairy Bar

In addition to the occasional social outings, UW-ANS also has a long-standing tradition more than a decade old of weekly breakfasts at Mickies Dairy Bar. Students, faculty, and occasionally some ANS guests or visiting alumni meet at 7 AM every Friday morning at this diner nearby campus to start off the final day of the week.

7.9 Coffee and Doughnuts

Every Wednesday UW-ANS makes coffee and provides doughnuts from the local Greenbush Bakery on the second floor lobby of the Engineering Research Building, the home of the Engineering Physics department. This is another great UW-ANS tradition that has been around since 2005. Students and faculty often take a few minutes to network and chat between classes. Coffee and Doughnuts has become such a tradition that professionals visiting the Engineering Physics department have offered to pay for the doughnuts and lounge in ERB so they can meet students. This year, visitors from Idaho National Laboratory and Oak Ridge National Laboratory participated in Wednesday Coffee and Doughnuts.

8 The Future of UW-ANS

UW-ANS is very proud of the continued involvement of younger students and increased involvement of graduate students this year. This is good because the younger students are taking on leadership roles early on so they have time to highly develop their leadership skills for later. Some of the increased graduate student involvement is owed to former President Kalin Keisling, who is now a graduate student.

The executive board next semester is a mix of a few young students, who will have great learning opportunities, and some execs with significant ANS leadership experience, who will be able to further improve our section. The experienced members on next year's executive board include President Elect Kelsey Amundson and Treasurer Elect Drew Nigh, who hold arguably the toughest positions. Furthermore the other elected officers may be young, but they have already shown strength in their positions (e.g. Public Information elect McKinleigh McCabe won "Outstanding Public Outreach" this year).

There still are crucial challenges for UW-ANS next year. The most significant of these is hosting the 2016 ANS Student Conference. The section will work very closely with the Conference Committee (and there is appreciable overlap in leadership) to ensure a successful event. UW-ANS will have to mobilize its members and garner tremendous support for this event. Furthermore UW-ANS will work to continue the branding and imagery changes started this year, to create an image more consistent with ANS National. This is even more important because of the 2016 ANS Student Conference.

9 Conclusion

The American Nuclear Society, University of Wisconsin-Madison Student Section has had over 50 years of experience providing members the opportunity to reach out to the general public, volunteer in the community, increase professional interaction, and even learn a little more about nuclear science themselves. The Student Section has consistently received thanks and praise from members of the community as well as parents and students at events. All of the members of the society have been nothing short of extraordinary this year. With the outstanding success of new events this year, the continued support of old traditions, and the selection to host the next student conference, UW-ANS will continue to set an example for newer student sections from all kinds of institutions. UW-ANS is prepared for several more years of just as much, if not more, involvement.