# American Nuclear Society University of Illinois-Urbana-Champaign

## Samuel Glasstone Award Submission

Assembled by the 2023-2024 Executive Board:

Jake Mitstifer | President Harrison Brosius | External Vice-President Riley Trendler | Internal Vice-President Piper Fernau | Outreach Chair Nicholas Norman | Secretary Rhys MacMillan | Treasurer Davin Hess | Public Relations Chair Ethan Nicolls | Social Chair

Special Thanks To:

Rizwan Uddin | Department Head Madicken Munk | ANS Student Section Faculty Advisor Becky J. Meline | Coordinator of Academic Programs Barbara J. Russell | Administrative Aide Sarah Drum | Office Support Associate

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## 1 Introduction

The University of Illinois Urbana-Champaign student section of the American Nuclear Society (ANS-UIUC) has continued to build on the successes of previous years. With a recent enrollment increase within the Department of Nuclear, Plasma, and Radiological Engineering (NPRE), our student section has capitalized on this opportunity by creating more engaging activities while continuing our traditional events. ANS-UIUC has done this by (1) continually building a foundation of active freshmen and sophomores who are passionate and will remain engaged throughout their academic careers; (2) expanding our involvement to other departments and student groups; (3) ensuring that section events are meaningful to the community with which we interact and our members; and (4) creating a friendly, welcoming environment that is enjoyable for new and seasoned members of our organization.

Our section has expanded our repertoire of outreach events and hosted events with professionals from many different fields of nuclear science. We have sought to work more closely with our University's Women in Nuclear (WIN) section, the NPRE Department's Graduate Student Advisory Committee (GSAC), and sustainability related Registered Student Organizations (RSOs). We have also expanded our network outwards, building ties with student sections from Missouri Science & Tech (MS&T), University of Michigan, University of Wisconsin-Madison, and Purdue University.

Section involvement has continued to increase significantly, with 122 members attending our events throughout the year. Not counting social events, our members put in a combined total of 1,156 hours at our events, which is 1.47 times higher than last year. The involvement of underclassmen and new members this year has been at an all-time high. These increases are because of restructuring of the Underclassmen Round Table (UCRT). UCRT was transformed into a project-based committee focused on providing early hands-on experience and leadership opportunities to underclassmen. Through this committee, four exhibits were developed to demonstrate the different uses of nuclear science. This success has caused our section to grow our executive board for the first time in nearly a decade.

ANS-UIUC has demonstrated incredible tenacity for improving the community. Our section has achieved remarkable successes in the past year, earning prestigious recognition for both our members and faculty advisor despite being one of the smallest engineering organizations (and majors) at the University of Illinois Urbana-Champaign. We hope you value the fruits of our labor as much as we do, and that you consider our section for the honor of winning the Samuel Glasstone Award.

## 2 Section Management

At the core of any strong ANS student section is its leadership. The ANS-UIUC executive board included students from nearly every stage of their academic career (sophomores, juniors, and seniors) and students from our two most popular concentrations in the Nuclear Engineering program at the University of Illinois Urbana-Champaign (Power and Plasma). The diversity of the school year and concentrations allowed this year's board to provide meaningful events for general members and gave a voice to most everyone represented in the ANS-UIUC section. This year's board was extremely dedicated to maintaining a strong public outreach presence, creating and reforging ties with other student sections, being good nuclear advocates, providing leadership opportunities for freshmen, and providing many diverse opportunities to our members.

This section details the leadership of our student section and the interaction we have with the Department of Nuclear, Plasma, and Radiological Engineering and the College of Engineering at the University of Illinois Urbana-Champaign. Without these crucial elements, the student section would not see the success that it has over the last year.

#### 2.1 Executive Board

The ANS-UIUC executive board consists of eight positions, each with their own unique duties as seen in the section constitution. Each board member and their role may be found below.



Figure 1: 2023-2024 ANS Executive Board



Jake Mitstifer President



Harrison Brosius External Vice-President



Riley Trendler Internal Vice-President

Jake is a senior, transitioning to graduate school, in NPRE with a Power concentration and is getting a minor in political science. He works with Prof. Roy and Prof. Brooks researching Consent-Based Siting and public opinion. Previously, he worked with the SoTeRiA Research Laboratory to help develop PRA methodology and interned at the Nuclear Regulatory Commission over the summer. He is also the ANS Student Section Committee's website sub-chair and public policy education and awareness subchair. In his free time, he enjoys bouldering, playing board games, video games, and D&D with his friends.

Harrison is a junior in NPRE who is seeking to pursue the Plasma and Fusion Sciences track. With Professor Mohan Sankaran from the SPEC Lab, Harrison conducts research on the reduction of iron oxides using an atmospheric-pressure microwave plasma device. Outside of school, Harrison enjoys skateboarding, playing the bass clarinet, and thrifting!

Riley is a junior in NPRE with a concentration in Plasma and Fusion. He works at the Center for Plasma Material Interactions, where he is involved in research with liquid lithium plasma-facing components. Riley is also an Engineering Learning Assistant for an introductory freshmen engineering course. In his free time, Riley enjoys hanging out with friends, playing violin, working on electronics projects, and climbing things.



Piper Fernau Outreach Chair

Piper is a sophomore in NPRE with a concentration in Plasma and Fusion. Piper conducts research in the SPEC Lab group with Professor Mohan Sankaran. Her research is focused on PFAS degradation by plasma and electrochemical methods. Outside of ANS, Piper is the content chair for Women in Nuclear and a Women in Engineering mentor. She enjoys embroidering, spending time with her friends, and thrifting.



Nicholas Norman Secretary

Nick is a sophomore in NPRE with a concentration in Plasma. He works at the Center for Plasma Material Interaction doing liquid lithium research under the general fusion group. Nick enjoys hanging out with friends, working out, and gaming in his free time.



Rhys MacMillan Treasurer

Rhys is a sophomore in the Power concentration of NPRE. He is starting research on advanced reactors and fuel cycles under Madicken Munk this year. Outside of school, Rhys enjoys playing rugby, gardening, and climbing rocks and trees.



Davin Hess Public Relations Chair



Ethan Nicolls Social Chair

Davin is a Junior from Maryland in the NPRE department concentrating on Power, Safety, and the Environment with a minor in Computer Science. He has spent time researching at both the Center for Plasma-Materials Interactions Lab and the Illinois Plasma Institute. Outside of school, he has spent internships at X-Energy and resto-modding classic cars. He also enjoys playing soccer, skiing, rock climbing, and cooking.

Ethan is an NPRE junior in the power concentration. He participates in research at the Multiphase Thermo-fluid Dynamics Laboratory. He recently completed an internship at the Palo Verde Nuclear Generating Station where he worked with the Reload Analysis group within Nuclear Fuels. In his free time, Ethan enjoys playing water polo, going on road trips with his team, and hanging out with friends.

#### 2.2 Committees

#### 2.2.1 Outreach Committee

One of the most important aspects of outreach is effective communication. We wanted to make sure that new and returning students got the practice and training necessary to be able to successfully advocate for nuclear science. As a result, we continued to host biweekly Outreach Committee meetings throughout the year where we engaged in activities to further our advocacy skills. We wrote letters to state representatives, practiced nuclear trivia, held discussions, heard from guest lecturers, and generally practiced our communication skills through simulated conversations.

In a notable outreach committee meeting before Nuclear Science Week, Sam Dotson, a graduate student from the NPRE department gave a presentation outlining the strategies and observations that he has accumulated over his years as a professional nuclear advocate. During this committee meeting and several others, the outreach committee members practiced important outreach techniques and verbiage, specifically focusing on assisting new outreach committee members.

In other outreach committee meetings, we reflected on our strengths and weaknesses after each specific event we had. These include the Nuclear Science Week booth, Green Quad Day booth, the Boy Scouts event, and the Engineering Open House. The outreach committee members use the time of reflection to grow in their nuclear outreach abilities and become better prepared for the next outreach event.

#### 2.2.2 Underclassmen Round Table

The Underclassmen Round Table (UCRT) has grown the most this year compared to other areas of our student section. UCRT is a project-focused committee focused on providing early hands-on experience and leadership opportunities to underclassmen. The underclassmen that joined UCRT gained a variety of skills from coding to using power tools and knowledge about nuclear science projects that they eventually presented to the public at Engineering Open House (EOH). UCRT was organized and led by the Internal Vice President, and a total of 27 weekly meetings were held throughout the year. During the first few meetings, underclassmen brainstormed nuclear science project ideas and voted on five projects to pursue. Underclassmen then organized themselves into groups based on which project they were most interested in. The five projects were the fusor, a model boiling water reactor, a model PET scan, a cloud chamber, and an ANS UIUC student section TikTok account.

After a few weeks of project planning and designing, elections were held. A Project Lead and Project Secretary was elected for each of these groups, except the TikTok group which only had a Project Lead. Each candidate gave a speech to their project group, and the Internal Vice President collected paper slips with the votes from each group member. These elections created nine new leadership positions within our student section, which gave underclassmen important leadership experience and a feeling of purpose within our section. Project Leads reported to the Internal Vice President weekly, and Project Secretaries kept notes and records of information relevant to the project. The Internal Vice President still headed the Underclassmen Round Table and was responsible for scheduling meetings and assisting project groups with more difficult tasks like making trips to Home Depot for parts or ordering parts online.

For the remainder of the fall semester, groups designed their projects, compiled parts

lists and budgets, assigned roles within their groups, and began ordering parts. The model reactor group and model PET scan group 3D modeled a variety of parts. The model reactor group also assembled a 2-foot tall cooling tower using wire and paper mache, and a photo is displayed in Figure 2. The Internal Vice President applied for a grant from the ANS Local and Student Sections Strategic Fund initiative, and our section was thrilled to receive the full amount requested (\$4934). On top of covering all the materials expenses for the projects, this funding allowed us to provide pizza at every meeting, which was extremely effective at maintaining high attendance numbers.



Figure 2: Model Reactor group building the cooling tower

When students returned from winter break, parts lists were finalized and the Internal Vice President placed numerous orders. The model reactor group also began programming LED strips to represent flowing water at different temperatures. The model PET scan group also programmed LED strips to represent the flow of radioactive glucose throughout the bloodstream. Groups began 3D printing at an on-campus workshop. A photo of the model reactor Project Lead and Project Secretary working on their project is shown in Figure 3. A photo of the PET scan group building their project is shown in Figure 4. The cloud chamber group acquired dry ice and began testing the cloud chamber. The TikTok group posted a few videos. The fusor group had the most work to do, as their project was the most complicated. The fusor group worked every weekend at a university lab, the Center for Plasma-Material Interactions, with the Internal Vice President to assemble the fusor, procure parts, and eventually test the fusor. A photo of the first plasma in the fusor is shown in Figure 5.



Figure 3: Model Reactor Project Lead and Secretary building the containment building



Figure 4: PET Scan group adding LED lighting



Figure 5: Fusor group achieving plasma for the first time

Assembly continued up until EOH. As EOH unfortunately fell on the same weekend as the ANS student conference, our student section was split between these two events. All projects were finished in time and were successfully presented at EOH to an audience of thousands of people.

## 2.3 Faculty Advisor

ANS-UIUC is lucky to have a fantastic relationship with our department and faculty advisor. Professor Madicken Munk has served as our faculty advisor this past year. Munk has worked hard to help build a strong community in our section by planning ANS office hours and attending our weekly happy hours. During office hours, members could get to know our adviser and chat about school work, news, and other topics of interest.



Figure 6: ANS-UIUC Faculty Advisor Madicken Munk

## 3 Operations & Management

#### 3.1 Weekly Executive Meetings

Our executive meetings were held weekly on Sundays. These meetings are attended by all executive board members and are used to plan events, delegate tasks, and review events from the past week. Meeting minutes are kept to keep track of discussions. The meeting notes and the meetings themselves are open to the general body so that any member can bring up concerns or suggestions to the board.

#### 3.2 Bi-Weekly General Meetings

Our section held bi-weekly general meetings. General meetings communicated information on upcoming events that our members may have missed in our Slack workspace or weekly Newsletter. Before each meeting, the executive board created a Google Slides presentation to keep the meeting organized and present necessary information.

Several meetings were used to host professional and social events. At the first General Meeting, each executive member introduced themselves to the section. Other social events included a group vision board presentation, a group PowerPoint night, and a Jeopardy game about our executive members. For professional meetings, we had new faculty come to speak about their research and opportunities for students. We also had Nathan Ryan introduce himself and talk about ANS national and how our members could get involved. These events counted as Professional points for our attendance system. Lastly, we had meetings for our banquet awards, constitutional amendments, and section elections.



Figure 7: Example overview slide from a general meeting.



Figure 8: UIUC's Prof. Novak giving a presentation as a guest lecturer at a general meeting.

#### 3.3 Communication

This year, one of the goals of the UIUC student section was to make it easier for both members and non-members to get involved. We sought to accomplish this goal by utilizing multiple communication channels and encouraging members to reach out to the executive board.

Our student section utilizes several different platforms to relay information to our members so they can be up to date with everything going on. The primary form of communication used is the weekly newsletter. This is sent out every Sunday evening and details all events in the coming week. Depending on the size of the event we give notice several weeks in advance such as the student conference. While the newsletter is packed with information about all the events happening, the newsletter is not enough. On a monthly average, there is around a 28% open rate from our 595 subscribers. We also use another platform called slack to make sure all members can stay up to date.

Slack is our section's formal communication platform between our general members and executive board. Here we talk about upcoming events as described on the newsletter and members are welcome to ask questions to the section officers. A great thing about slack is that members can choose what channels to be a part of. This allows for our members to get notifications for specific events they may be interested in and not be overwhelmed. One of the most notable channels we have on the slack is "administration". This is the main chat where the executive board discusses meeting times and other important matters. This channel is open to everyone and allows general members to get a peak at what might be planned in the future. Other popular channels are "outreach," where we advertise upcoming outreach events and signup sheets; "opportunities," where board members and graduate students share openings for internships, jobs, and or anything else related to professional development; and "underclassmen-round-table," where pictures, notes, and meeting times are shared for the Underclassmen Round Table. In general, not a day goes by without a message being sent in the slack, whether it be an announcement or an update to a future event. The use of slack has greatly improved our planning and communication with our executive and general members.



Figure 9: Example of the ANS-UIUC Slack Channel

For more casual conversations with others we have a discord server. Here people talk to each other in a casual environment and post nuclear related memes. Along with those people use discord to play games together and to help each other with homework. We also use discord as another platform for communication by sending out announcements here as well as slack. There is also the Students at ANS discord server which we have used to have virtual game nights with other sections.

Another important form of communication our section maintains is our website (https://ans.npre.illinois.edu). This is particularly useful for communicating with those outside our organization and makes us accessible to the general public. The website includes a number of items such as a live calendar, Member of the Month awards, recent professional and outreach events, our event attendance form, executive board contact information, newsletters, general meetings slides, and links to our social media.



Figure 10: Example of the ANS-UIUC Website

The Member of the Month award is given to a general member who demonstrates outstanding work and dedication to the section for that month. The award is voted on by the executive board. We believe this award gives members something to strive for and rewards the members who have been putting in great effort into our section.

For greater community outreach, and to stay connected with our current and former members, we primarily utilize Instagram and Facebook. With 364 Instagram followers and 622 Facebook followers we maintain a wide reach. We regularly post regarding current and upcoming events and garner 100+ interactions per month, per platform. We also regularly reach 400+ accounts per month. In addition, we often share humorous images for "Meme Monday" and repost relevant nuclear science content

In addition, we have continued the use of our TikTok account. With the growth of our Underclassmen Round Table, we tasked a small group of underclassmen students with the goal of creating relevant content to inform others on nuclear science. We have posted 4 TikToks this year, some of which garnered 1,000+ views, and intend to continue trying to make nuclear go viral.

#### 3.4 Constitution Changes

While the executive board last year completed a major revision of our constitution last year, there were still issues that needed to be addressed. This included amending minor details with our new election system, formally introducing a clause for special elections in case an executive position becomes open, and adding a new position called the "Project Development Chair." Additionally, the bylaws for all student sections were amended and our section needed to formally adopt them as well. This resulted in the inclusion of a cover page, table of contents, and reformatting the layout of our constitution. These changes were implemented following Constitutional procedure: the executive board approved the changes by a  $\frac{3}{4}$  majority, followed by a  $\frac{2}{3}$  majority vote of dues-paying members at a general meeting.

The main reason for the introduction of the "Project Development Chair" was the growth seen in the UCRT. The new direction our IVP took the UCRT significantly improved our retention with freshmen. However, this resulted in fewer events with other RSOs. Introducing the Project Development Chair allows for the continued growth of UCRT while resuming our events with other RSOs.

#### 3.5 Student Section Committee Meetings

Our section attended the Student Section Committee (SSC) Meetings at the Annual Meeting, Winter Meeting, and Student Conference. Additionally, our members attended many of the SSC's topic-specific meetings, including one focused on social media and another about constitutional changes. The social media meeting included one of our current members, Nathan Ryan, and two of our alumni, Amanda Bachmann and Katie Mummah. Many of our current members also serve on SSC, including Jeremy Mettler, Nathan Ryan, and Jake Mitstifer.

#### 3.6 ANS Student Discord

With feedback from our members, and expressed interest from other student sections, a member of our section set out to create an unofficial Discord server for all student members of ANS with the intent of developing a casual and conversational space to develop student-student relationships across the country. As of this report, it has over 380 students from over 35 schools. With representatives from 10 schools serving as admins on the server. The space has evolved to host spontaneous game nights, cool resource sharing, resharing of nuclear news articles (of course), and so much more. This platform has been an integral information-sharing tool for conferences this year as well as a tool for general communication between members from across the nation. We hope that this Discord server continues to grow in the future so that we can increase our connections with students in other ANS sections.

#### 3.7 Funding & Financial Planning

In the 2023-2024 year, the ANS-UIUC funds came from ANS National's reimbursement for the previous year's student conference, among other awarded funds from ANS National. Multiple projects were also co-funded by the University of Illinois Urbana-Champaign's Women In Nuclear section and the Grainger Engineering Council of Presidents for outreach events. With these exceptional funds, we held many events for our members such as visiting Fermilab and the Dresden Generating Station. Additionally, we funded our transportation and lodging for the student conference, which is included in the expenditures. Compared to last year, travel and lodging for the student conference did cost significantly more for our section due to the distance. However, this portion of expenditures will be partially reimbursed by ANS National with the remaining being reimbursed by the Nuclear, Plasma, and Radiological Engineering Department in Grainger Engineering. Through the ANS Local and Student Sections Strategic Fund initiative, we funded the Underclassmen Roundtable, and continually hosted happy hours for our members to socialize with each other and staff. We also hosted Missouri S&T's student section, the University of Michigan's student section, the University of Wisconsin's student section, and Purdue University's student section to visit our university.

This year, we also funded the design and purchasing of t-shirts that we wear at outreach events and day-to-day. We worked with a local artist to create a simple design that captures elements of nuclear energy and displays a positive outlook of nuclear energy to those who see us wearing them in public. Additionally, we funded our long-desired tent and tablecloth. This allows us to create a more professional table at recruiting events and reverse career fairs with companies.

Total Income	\$23,587.11
Total Expenditures	\$27,437.57
Balance for Next Year's Board	\$15,267.93

Table 1: Summary of Yearly Budget for 2023-2024

The investments in our tent and tablecloth in addition to the rising cost of sending our members to the student conference do result in our expenditures being larger than our income. As mentioned before though, the student conference cost will be reimbursed partially by ANS National with the remaining being reimbursed by the Nuclear, Plasma, and Radiological Engineering Department. This reimbursement will account for a significant portion of our expenditures. The tent and tablecloth investment will benefit our section for numerous years as they will attract both new members and companies to our booths and tables.

Events were planned initially at the beginning of each semester and then further developed a month before the event, with a maximum spending threshold set monthly. With this planning, we were able to ensure our funds can maintain their current presence long into the future of our section.

#### 3.8 Elections

This was our section's second year using our new election system. We decided to use ranked-choice voting to eliminate the need for tie-breaking votes and speed up the elections. A Google form was created to collect results, with responses tied to students' University ID Numbers to ensure only dues-paying members were voting while maintaining voting anonymity. Tallies were calculated automatically using Google Sheets and verified by hand. This year has an increased number of candidates running for each position compared to last year in addition to a new position but still ran extremely smoothly.

Elections for the 2024-2025 school year were held on April 17. The new ANS-UIUC board is listed below:

Riley Trendler - President Nicholas Norman - External Vice-President Piper Fernau - Internal Vice-President Mia Sawkiw - Outreach Chair Jack Gerrity - Project Development Chair Adam Rousseau - Secretary Arnav Goyal - Treasurer Collin Jeckell - Public Relations Chair Harrison Brosius - Social Chair

#### 4.1 University, College, and Department Cooperation

Our section maintains a strong relationship with the Nuclear, Plasma, and Radiological Engineering (NPRE) department at Illinois. Many events are co-hosted with the department, such as seminars, luncheons, and the annual awards banquet. The department helps fund many off-campus events including our travel to the ANS student conference. With their support and assistance, we have interacted with prospective students, invited industry professionals for talks, and been able to interact with our engineering community at the University of Illinois Urbana-Champaign. This year, we also were able to help with the SPEED-Interchange, a department-hosted event with companies attending to recruit interns and new employees. We helped with attendance tracking and providing engagement with visiting company representatives.

Additionally, our student section is recognized as an official registered student organization (RSO), both at the University and the Grainger College of Engineering level. Our section is eligible to obtain funds from a pool of money set aside by the Student Organization Resource Fee (SORF) at the University level, while we can also obtain funds from the Grainger Council of Presidents (CoP) at the College level. CoP works to improve the communication between engineering RSOs and between the Deans and the RSOs. Being registered at these levels enables the section to participate in events that allow us to advertise our society throughout the year. Some of these events include E-Night, an event for engineering RSOs to reach out to all engineering students, and Engineering Open House, which allows RSOs to advocate for themselves to the entire community of all ages. Additionally, being a good-standing RSO of CoP allows the section to make use of special events and awards given out by the College of Engineering that help with educational outreach and recognizing our members. We can advertise events to other engineering RSOs, making it possible for us to foster relationships with other STEM majors as well as allow a wider platform to advocate for nuclear energy. This year, ANS-UIUC began utilizing these opportunities to create social events with other engineering RSOs. These sorts of connections are made easy due to the involvement of ANS-UIUC at a department, college, and university level.

#### 4.2 Collaboration with Women in Nuclear

Every year our student section collaborates closely with the Women in Nuclear (WIN) student section on campus. We frequently work together at the department level for when professionals or companies visit. We also hold joint social events including the Curtis Apple Orchard event and the Friendsgiving potluck. However, the biggest point of collaboration between the two organizations is with outreach. For the Nuclear Science Week, Green Quad Day, Sustainapalooza booths, and the Engineering Open House event, the ANS and WIN sections share tables, trivia, prizes, and volunteers. These outreach events are much more successful with the interdepartmental collaboration with WIN due to an increase in the number of volunteers and an increase in resources for volunteers and visitors.

### 4.3 Quad Day

Before our academic year begins, the university hosts the annual Quad Day. Quad Day is meant to allow new and old students to explore the various RSOs here on campus. This year was the first time we actively participated in Quad Day, having a booth on the Quad. This was part of our initiative to recruit members other than just engineers. We had a tent, our nuclear trivia cards, and banana suits. This combination drew in many interested students because of the shade, free candy for answering trivia questions, or asking why we were bananas. We found this very successful in drawing in a large crowd in our first few meetings and will continue to advertise our section there.



Figure 11: Our Section recruiting at Quad Day

### 4.4 E-Night

Similar to Quad Day, E-Night is a recruiting event for RSOs specifically for engineers. We brought the tent, nuclear trivia cards, banana suits, and our previous model reactor. While we have had good engagement before at this event, adding the model reactor brought many prospective members to our table. The model reactor was only created the previous year, and while improvements were needed for the model, it demonstrated our section's goal of creating a project-based committee. The model also became very eye-catching as many associate the cooling towers with nuclear power. Using that attention, we discussed where the nuclear reaction was occurring and talked about our other projects. This success led us to bring our model reactor to similar events.



Figure 12: Our Section engaging with engineering students at E-Night

### 4.5 Students for Environmental Concerns

As part of our effort as a section to become more involved in sustainability efforts on campus, three of our board members (our President, External Vice President, and Outreach Chair) attended a barbeque hosted by Students for Environmental Concerns (SECS) in September. At this event, our representatives networked and talked with various leaders from sustainability-focused organizations on campus. This event was a great opportunity for us to develop relationships with some of the more influential folks on campus when it comes to sustainability and green energy, and we look forward to furthering these relationships as we expand our connections with sustainability efforts on campus.

Two representatives from our student section (our External and Internal Vice President) attended the SECS Friendsgiving and talked with several leaders of on-campus green RSOs around a bonfire. Our section is trying to expand our presence on campus as a green RSO, and meeting with officers of green RSOs at this event was important for working toward this goal. We hope to further grow these connections and utilize them to plan joint events in the future.

#### 4.6 Illini Democrats Presentation

Collaborating with other organizations is an integral part of the ANS-UIUC student section. It is especially important to our student section when this collaboration involves important outreach opportunities. The ANS-UIUC student section was invited to speak with the Illini Democrats through an SECS contact. Our section eagerly accepted and the outreach committee focused heavily on crafting a descriptive but not convoluted presentation about nuclear power in the United States, in Illinois, and on campus. The presentation covered important Illinois-specific nuclear power facts, including the recent overturning of the nuclear moratorium in Illinois and the strong use of nuclear power in the state. The presentation also involved important information regarding the plans for a microreactor to be built on the UIUC campus in the next decade. This presentation opened the door for an important discussion to begin. The outreach committee and executive board members who presented successfully answered and addressed all questions

and concerns they were presented with. After the presentation and discussion, the Illini Democrats members left feeling more comfortable with the idea of nuclear power, and a strong connection between the two different RSOs was built.

## 4.7 Joint Happy Hour with Illinois Space Society

Our student section held a joint happy hour with the Illinois Space Society to make friends with other engineering students on campus and talk about our mutual interests. The NPRE department and the Aerospace Engineering department share the same building on campus, so it was also important for our executive boards to meet each other and brainstorm ideas for joint events. Multiple ISS members and our own were interested in nuclear space propulsion, which gave us the idea of holding a joint speaker event sometime in the future. Our next executive board is working with the next ISS board to plan more joint events and build relationships between our organizations.

## 4.8 IlliniFest

Illini Fest is an annual campus-wide event where admitted students and their families have a Q&A with current students in their major. The current students answer questions that the admitted students may have and in some cases give some guidance. For NPRE we also show off labs where students can participate in research on campus. A few officers of our ANS student section spoke with admitted students and their parents about campus life, classes, and research.



Figure 13: Jake and Harrison working the NPRE Booth at IlliniFest

#### 5.1 Lab Tour Series

Last spring, our section held a few tours of nuclear science research laboratories for members of ANS, but the attendance was poor. This fall, we held two tours near the beginning of the year to gather a large crowd of freshmen interested in research. The first lab tour was of the Synthesis, Plasma, Energy, and Conversion Laboratory (SPEC Lab). It was scheduled immediately after a required class for freshmen, and we amassed a group of 30 freshmen. Given that the freshmen class is only 50 students, this tour had 60% of the freshman class attend. The tour was successful and freshmen asked a lot of questions. The second lab tour was of the Multiphase Thermo-fluid Dynamics Laboratory, and students learned about thermal hydraulics research occurring at the university. Freshmen toured several other nuclear science labs as part of one of their required courses, so only two lab tours were held by our section.

### 5.2 Undergraduate Research Panel

In addition to our lab tour series, our section set up an undergraduate research panel. This included four students, three being undergraduates from the three concentrations, being panelists about their undergraduate research experience. This was moderated by a sophomore on the executive board who asked about their research, how they got involved, and how they balance their school and personal lives with research. 15 freshmen attended the panel, who then got to ask questions for the panelists. The freshmen who attended found the panel helpful as they could ask about the different types of research and hear honest opinions from various undergraduates.

### 5.3 Python Workshop

Our section held an introductory Python workshop to teach interested freshmen in the nuclear engineering department about the basics of Python. This was advertised as an ANS event and also gave credit for an outside-of-class event for an introductory first-year engineering course. Approximately twenty freshmen attended this 2-hour workshop. At the end of the workshop, attendees were shown some example problems in nuclear engineering that can be solved with Python, such as plotting the activities of different isotopes in a decay chain. Our student section believes it is important to educate underclassmen on skills like this so they are prepared for their classes and can use them for projects, such as the projects in the Underclassmen Round Table.

### 5.4 CAD Workshop

To prepare students to model 3D files for Underclassmen Round Table Projects, a CAD workshop was held. Students who attended the workshop were instructed in the basics of Fusion360 – a 3D modeling software. Students were instructed – using basic modeling tools – on how to design a Lego brick and were then challenged to design their own

creations. This workshop was a great success, as many students who attended were able to use their gathered skills to design models for our Engineering Open House Exhibit.

## 5.5 Resume Workshop

To prepare students for the College of Engineering Career Fair in Fall 2023, we held a resume review workshop, in which students could bring their current resumes for review, or garner assistance in writing a resume from scratch. This workshop was essential for many Freshmen, who had previously never needed a resume. As a result, our student body was prepared to put their best foot forward at the Career Fair and to impress prospective employers.

### 5.6 SULI Info Session

Dr. Lauren Garrison, a University of Illinois alumnus, previous SULI intern, and previous SULI application reviewer, presented to our section over Zoom on the SULI application process. Drawing from her previous experience as an intern and application reviewer, Dr. Garrison highlighted the importance of finding a niche to apply for, how to tailor one's resume and cover letter, and how to reach out to prospective employers. Dr. Garrison is currently an employee at Commonwealth Fusion Systems (CFS), and also talked to our section about CFS – what they do, and how to apply to internships.

## 5.7 Y-12 Info Session

In the Fall, we were visited by three delegates from the Y-12 National Security Complex, one of whom was a UIUC alumnus. They presented in person to our section on the history of Y-12, what Y-12 currently is working on, and how to apply for internships. The topics covered were quite interesting, including nuclear criticality accidents and other stories about nuclear accidents. Our student body was very interested in the material covered, and various safety-related careers within the Y-12 complex.

### 5.8 Constellation Info Session

This year, our section hosted representatives from Constellation on several occasions. Constellation – the largest nuclear utility in the country – holds a strong relationship with our section, with multiple members going to work for them each year. Every semester, Constellation sends delegates to talk to our members about internship and job opportunities as well as inform us about the nuclear energy industry as a whole.



Figure 14: UIUC alumni presenting at the Constellation info session

## 5.9 Student Conference Preparation Presentations

To prepare members for the ANS Student Conference, a member of our section, Nathan Ryan, presented about how to write an abstract. He talked about ANS formatting guidelines and how to create accessible graphics for color-blind readers. Later, he also presented about the creation of presentations for the student conference. This included using fewer words on a slide to prevent overwhelming the audience and using transitions to allow the audience to pay attention to both the slide and the presenter.

### 5.10 Ken Peterson Visit

On April 16th, we were lucky to have Ken Peterson, the President of ANS National, visit our campus. At lunch, he sat down with the department student leaders, including ANS and WIN executive members, to talk about his professional experience. This was useful for those entering the nuclear industry and for our sections to learn about contacts to reach out to. Later in the day, he held a round table open to the department to hear students' opinions and concerns. This was extremely beneficial as international students voiced their worries about job opportunities and plasma consternation students shared their lack of engagement from ANS National. Afterward, our UCRT was able to show the demonstrations they built using ANS funds and thank Mr. Peterson. He was thoroughly impressed with our work and expressed interest in helping other student sections set up a similar program to our UCRT.



Figure 15: Ken Peterson sitting down with student for a round table

#### 5.11 Scholarships and Internships

Members of the section are updated biweekly at general meetings on current scholarship and internship opportunities. Due to these highlights, 12 members of our section received the NEUP Undergraduate Nuclear Leadership Program Scholarship, as well as many other grants and internship opportunities. We also have had an immense number of scholarships and awards granted to our students this year.

Brady Moore, a senior and our former Internal Vice-President, is the valedictorian of the College of Engineering and was awarded the Harvey Jordan Award for his academic excellence. Ethan Nicolls, a senior and our current Social Chair, was a runner-up for the valedictorian of the College of Engineering and was awarded the Henry Ford II Scholar Award. Arnav Goyal, a freshman and our future Treasurer, was the Kay Simmons-Kappes Outstanding Student Contribution Scholarship for his academic excellence and research.

Below is a list of our members who have received various ANS awards for their academic work:

ANS Undergraduate (Sophomore) Scholarship Jack Gerrity, Arnav Goyal, Owen Strong

ANS Undergraduate (Junior/Senior) Scholarship Piper Fernau

William R. & Mila Kimel Nuclear Engineering Scholarship Riley Trendler

> ANS Graduate Scholarship Ethan Nicolls

Hans P. Loewen Memorial Scholarship Emily Gillmore

## 6 Trips, Visits, & Conferences

A core pillar of our ANS student section is the opportunities available to the students to take off-campus trips, enrich their understanding of the industry, expand their exposure to National Labs, and become more involved with the national organization. These trips specifically help students grasp the opportunities available to them post-graduation and often help students refine their future career interests.

#### 6.1 University of Wisconsin-Madison and Purdue University Visit

In March, we invited our friends from the ANS student sections at the University of Wisconsin-Madison and Purdue University for a weekend of professional development, social events, and tours. This weekend was an amazing opportunity for our sections to network and get to know each other. We showcased our department and the wide range of research opportunities that our students and faculty are involved in.



Figure 16: University of Wisconsin and Purdue Students at Alma Mater

#### 6.1.1 Game Night

On the first night of the visit, members from our student sections met up in our student lounge to participate in a multitude of games and activities. We played board games, card games, and video games on the Nintendo Switch. This event was a great way for our visitors to relax after driving, but also to get to know each other better and develop relationships. It was an extremely successful event that helped to kick off the weekend on a fun and positive note.



Figure 17: University of Wisconsin and Purdue Game Night

#### 6.1.2 Tours and Presentations

During our visit, we conducted a series of research lab tours where we showcased two of the most established laboratories in our department: the Center for Plasma and Materials Interactions (CPMI) and the Radiation Detection and Imaging Laboratory. On these tours, students got an inside look into the various experiments being conducted and devices in the labs. Students saw the Hybrid Illinois Device for Research and Application (HIDRA) fusion device at CPMI, various plasma and materials experiments, and several detectors and imaging experiments.

Also during our visit, we hosted a series of presentations to showcase some of the amazing research projects that our three sections are conducting. We heard from our very own graduate student, Jeremy Mettler, who is earning his PhD conducting research with atmospheric pressure plasmas. We also heard from Jonah Lau (Purdue) and his research on creating a virtual radiation detection lab and a virtual reality reactor control application. Finally, we heard from Michael Schlicting (Wisconsin) and his research on planning and placing high-speed rails. Ultimately, these tours and presentations were a great way for all of the students from each of the sections to learn more about the amazing research that our students are conducting. It was also a great opportunity to further connect and develop relationships.



Figure 18: University of Wisconsin and Purdue touring CPMI

#### 6.1.3 Atomic Hope Viewing

Before the visit, our executive board reached out to Generation Atomic, a grass-roots advocacy group, to perform a screening of their film. After the presentations, while members ate dinner provided by our NPRE department, they watched a screening of the documentary Atomic Hope. This film went through the beginnings of Generation Atomic, and their journey from state-level marches to international sustainability conferences. The documentary also explored the different groups within nuclear advocacy and how they each push for the same goals through different means. While we did not have time to discuss the film formally, it caused many members to think about the different nuclear advocacy groups and talk about which advocacy method is best.

#### 6.1.4 Bowling Outing

The last part of this weekend's visit was an outing to the local bowling alley with all three student sections. Students spent the evening having fun while bowling and sharing food and drinks. This was a great way to end the weekend and continue developing friendships with each other while participating in a fun physical activity.



Figure 19: University of Wisconsin and Purdue bowling with ANS-UIUC

## 6.2 Dresden Tour

This April, 15 of our students attended a tour of Dresden Generating Station. On this trip, our students were led by several reactor operators and reactor engineers. We were shown inside the decommissioned Unit 1 containment building, as well as inside the primary containment for the Unit 2 and 3 reactors. In addition, the tour guides showed us the spent fuel pool, the control room, and the turbine and generator hall. All of the students were provided lunch and got the chance to ask the tour guides any questions about the plant or their careers. This event was a great opportunity for our students to network with real professionals and to learn more about what it means to work in the nuclear industry after graduating college. Our section looks forward to visiting more plants and laboratories in the future.



Figure 20: ANS-UIUC students on Dresden's refueling floor

#### 6.3 ANS National Annual Meeting

This past summer, ANS-UIUC continued its strong presence at the ANS Annual meeting with our outreach and external vice president in attendance in addition to 8 other members of our section. Former president of our section (Jeremy Mettler) moderated the wildly popular Early Career Faculty in Nuclear Survival Guide panel, former PR chair (Nathan Ryan) co-hosted the SSC meeting, and former student conference chair Amanda Bachmann finished her final meeting as the Student Director of ANS. Our members engaged fully in the conference, building connections with Christina Leggett (who would later come to speak to our chapter's outreach committee), alumnus Lauren Garrison, and Uchenna Ezibe among so many more.

The annual meeting was a valuable opportunity for our students to work on their networking skills, learn about potential career opportunities, engage in technical and advocacy-related conversations, and generally gain industry experience by interacting with professionals. We look forward to continuing our involvement in the upcoming ANS Annual meeting this summer by encouraging even more of our younger members to attend as a part of the student program.



Figure 21: UIUC members attending the ANS Annual Meeting

#### 6.4 ANS National Winter Meeting

Several undergraduate and graduate members of our student section attended the 2023 ANS Winter Conference and Expo in Washington D.C. Before the conference, six ANS-UIUC members attend the Young Professional's Congress (YPC), actively taking part in developing their professional skills and networking with other students and young career professionals. One of our members (Nathan Ryan) came up with the theme, helped name the sessions, shaped the content of the topical, organized the team challenge, shepherded the high school attendees, ran the raffle, coordinated the media, came up with and executed the outreach wall, and created the schedule draft for the event.

During the conference, our members networked with industry professionals, other student sections, and policymakers. We made connections in particular with the Purdue, Reed, and Michigan sections. These led to several of our Spring events with these sections, which helped bring together the midwestern nuclear student community. Our students also attended the Student Section Committee Meetings on the first day.

Additionally, Ethan Nicolls, Galen Selligman, and Jake Mitstifer, started their time as Young Member Divisoin Liasons. This initiative was created by Nathan Ryan and is a subcommittee of the SSC. The purpose is to allow students to engage with their respective technical committees and give a voice to the younger generation of nuclear engineers.



Figure 22: UIUC Professors, Students, and Dr. Katy Huff meeting for breakfast

On Thursday, our members went to the Hill as part of the Congressional Meetings event. There, members met with their local representatives' staffers, including both the House and Senate. After the meetings, they attended a dinner with ANS National members and Hill staffers. This resulted in further connections with industrial professionals in addition to advocate groups.



Figure 23: ANS-UIUC members advocating for nuclear science spending (Left to Right) Nathan Ryan, Galen Selligman, Dilan Kurukulasuriya, Jake Mitstifer



Figure 24: Nathan and Galen meeting with Representative Bill Foster, who represents Argonne National Labs and Fermilab

#### 6.5 Penn State Student Conference

#### 6.5.1 Planning

With such a large incoming freshman class and the amazing work that was being done in UCRT, our new and returning members were excited to attend the student conference this year! Our External Vice President, President, and Treasurer worked together to secure hotel rooms, process a bus rental, print out posters, and ensure that all students fulfilled university requirements for university-funded travel. The status of each of these was updated weekly at our executive meetings. We used a Slack channel to communicate updates and new information to the students attending the conference, which was open to all students. We worked with our department as well to help organize volunteers for a department booth to encourage prospective graduate students to attend the University of Illinois.

#### 6.5.2 Attendance

This year, we had 29 students attend the student conference, which was less than last year, but still impressive considering that most of our members were helping out with the Engineering Open House, which occurred on the same weekend. We reached these numbers because of our dedicated executive board members who went to nuclear engineering classes and promoted the conference. Each member attending completed seven hours of events with us, including three which were outreach and two professional. The students attending were either part of the 13 different research presentations or were volunteering at our department's booth. Of these 13 presentations, our student section brought home two awards: one for the best undergraduate presentation in Fusion and Plasma Physics, and another for the best graduate presentation in Reactor Physics.

Additionally, two ANS-UIUC members participated in conference panels this year. Dilan Kurukulasuriya was part of "The Big IDEA: Student Perspectives and the Future Workforce," a panel exploring the inclusion, diversity, equity, and accessibility issues facing the nuclear workforce from the perspective of students. Jeremy Mettler joined the "How to Write a Student Conference Proposal" panel, helping student sections who want to host the Student Conference write their bid by giving advice and answering their questions. Both panels were very well attended, as both are important topics for student sections and their members.



Figure 25: ANS-UIUC members at the Student Conference with Dr. Katy Huff

## 7 Outreach Events

Our student section realizes that nuclear outreach and advocacy is critical, not only for the success of our section but for the success of the nuclear field and industry as a whole. Accordingly, we devote a notable amount of our time to planning and facilitating outreach events for our members and the local community. Although being a general ANS member can be a fair time commitment, we encourage our especially advocacy or outreach-oriented members to join the Outreach Committee in addition to being a general member. The outreach committee organizes and executes all of the outreach events for our student section through bi-weekly meetings. These meetings were often less populated than general meetings, but they were incredibly energetic. The outreach committee meetings serve as an open space for members to brainstorm and collaborate on the best ways we can share nuclear knowledge and awareness with our community and specific groups. The Outreach Committee is especially useful for first-year students to get a taste of the leadership and responsibility expected at a collegiate and more professional level.

The UIUC student section of ANS finds outreach to be one of the most important aspects of our organization. As nuclear engineers and scientists, not only are we inherently excited to share our work with the general public, but we think it's important for climate change efforts as well. Nuclear energy has massive potential as a low-carbon energy source, and this knowledge is often underappreciated. In the subsequent subsections, we'll discuss some of the outreach events we organized for the 2023-2024 school year to promote public awareness of the power of nuclear energy. In a broader vein, many of our outreach efforts are geared toward increasing public knowledge of nuclear science in general. This includes plasma and fusion sciences, radioisotope applications, and fission concepts. Overall, we have very active outreach participation within our section, and it's a branch of our organization that we're excited to continue growing in the future.

#### 7.1 Outreach Guest Speaker: Christina Leggett

During the academic year, the outreach committee wants to invite different outside speakers over Zoom to become more educated about outreach techniques and specific topics. In the fall semester, the committee met with Christina Leggett. Christina Leggett works at Booz Allen Hamilton and is a member of the ANS Board of Directors as of 2022. Christina talked to the outreach committee about the nuclear fuel cycle and how to answer questions and concerns regarding the cycle. She met with the committee two weeks before Nuclear Science Week, helping prepare the committee for the big outreach event and for difficult questions they may be asked.

#### 7.2 Outreach Guest Speaker: Arun Venugopal

In the spring semester, the committee met with Arun Venugopal. Arun is an eighth-grade physical science teacher at Memphis Rise Academy in Memphis Tennessee. Arun was a speaker at the 2023 ANS Student Conference and the ANS at UIUC student section remained in contact with him in the following year. Arun helped the outreach committee

prepare for the Boy Scouts event in the spring. He provided an important perspective on how young students may receive information and what they may find the most engaging. Arun helped the committee find a successful schedule for the event as well as gave very influential advice to the committee about how to talk to young students about a complex topic and keep them interested. Bringing Arun and Christina in during the two different outreach committee meetings was very successful and gave the committee members a new and different perspective regarding outreach. The speakers' advice and comments allowed the committee to plan and facilitate highly successful outreach events following the meetings.

#### 7.3 Nuclear Engineering Student Delegation

In the last five years of the Nuclear Engineering Student Delegation (NESD), at least one UIUC student or alumni has been a part of the delegation. Three of those delegations had two members from our section. Those who are strong advocates in our section plan to continue this tradition with five students applying this year and one returning. One of our previous NESD delegates, Nathan Ryan, created a handbook for future delegations to give them insight into the process, a jump start on the jargon, and tips about communicating with lawmakers that is being reviewed by the current leadership and will hopefully be incorporated going forward.



Figure 26: (Left to Right) Nathan Ryan and Nataly Panczyk standing outside of the Capital before talking with representatives and staffers

### 7.4 Nuclear Science Week

Nuclear Science Week is a national event that was held from October 15-21, 2023. This event was a great opportunity for our student section to engage with ANS members and community members through several outreach events. The week began with an outreach meeting and ended with a multi-section trip to Fermilab with the Missouri Science & Technology's Student Section and the University of Michigan's Student Section.

#### 7.4.1 Monday and Tuesday: Outreach meeting and Cookie Decorating

The week began with an outreach committee meeting on Monday to help prepare for the rest of the week. The following day followed strongly with a cookie-making social event where members were invited to help decorate cookies to be handed as prizes out at our booth event. This event was joined by the potential UIUC mascot, the UIUC Kingfisher. This was a great way to get our members excited about the week and was also a casual and fun way to get new students involved with our student section!



Figure 27: UIUC's Kingfisher decorating atom-themed cookies

#### 7.4.2 Wednesday: Green Quad Day Booth

Following this, we spent the next day manning a booth on UIUC's Main Quad, where we offered prizes (including our decorated cookies and candy) for individuals willing to play our trivia Plinko game and answer some questions about nuclear science. This event was a large collaboration with the UIUC Women in Nuclear student section as we shared responsibilities and outreach techniques to make the event as successful as possible.

Due to weather-inflicted rescheduling this year, UIUC's Green Quad Day fell on the same day as the Nuclear Science Week main quad outreach event. Green Quad Day is a campus-wide event for sustainability-registered student organizations on campus. The event is put together to advocate to the UIUC community about the importance of green energy and a cleaner environment. This allowed us to stress the importance of nuclear energy as a safe and clean alternative to fossil fuels, while other sustainability-based organizations on campus spread awareness about nuclear science.

We love this particular outreach event because it jumpstarts excellent conversations and piques interest in nuclear, regardless of an individual's background. These are the kinds of conversations that get the public involved and aware of nuclear energy and technology. Overall, this event was a major success for our student section!



Figure 28: ANS and WIN running a booth on the quad for NSW

#### 7.4.3 Friday: MS&T Game Night

To finish the week, we welcomed our friends from the ANS student section at Missouri University of Science and Technology (MS&T) to our campus for a weekend of fun events. On the first night of their visit, members from our student section and the MS&T students met up in our student lounge to participate in a multitude of games and activities. We played board games, card games, and video games on the Nintendo Switch. This event was a great way for all of us to relax at the end of the week, but also to get to know each other better and develop relationships. It was an extremely successful event that helped to kick off the weekend on a fun and positive note.

#### 7.4.4 Saturday: MS&T and University of Michigan Fermilab Visit

On Saturday, we traveled with our friends from MS&T and met the ANS student section at the University of Michigan at Fermilab for a tour and visit. On this trip, we not only toured their numerous facilities and research buildings, but learned about their amazing research in high energy physics, particle physics, and accelerator engineering. This tour was an amazing experience for our students because they were able to see some of the state-of-the-art research facilities that they could have the chance to work in later on in their careers. We also got to speak to researchers and staff about their experience working at a national laboratory and about their careers as a whole. Overall, it was a privilege to visit this amazing laboratory and learn more about the research being conducted on their campus.



Figure 29: ANS-UIUC at Fermilab with Missouri Science & Technology and University of Michigan

#### 7.4.5 Saturday: Dinner with MS&T and University of Michigan

After a long day of learning and sightseeing, we organized a dinner for our visiting friends. We had a blast drawing on the glass boards and discussing the amazing research conducted at Fermilab. Because of dietary restrictions, we provided vegan and vegetarian options, and the three sections had a wonderful dinner together. Overall, this dinner was a chance to connect with some fellow student sections and to recollect about the informative and interesting day we had.



Figure 30: ANS-UIUC hosting dinner for Missouri Science & Technology and University of Michigan

### 7.5 Boy Scouts - Nuclear Merit Badge

In March, the ANS at UIUC student section taught a class on nuclear science at the Holy Cross Merit Badge Seminar, giving the Boy Scouts their Nuclear Science Merit Badge. The ages of the scouts that were in attendance ranged from 8-17, which is a demographic that we cannot reach as often. There were two sessions of four hours a piece, giving a total of eight hours of teaching from the ANS-UIUC volunteers. Throughout the class, scouts learned what makes up an atom, what radiation is and how to detect it, how nuclear fission works, how a nuclear power plant functions, and the benefits of nuclear energy. The scouts made model atoms with styrofoam balls and toothpicks, saw radiation detection in real-time with the Geiger counter, and helped finalize the construction of a cloud chamber. As the class progressed, the scouts asked many questions about nuclear energy, which allowed members of our student section to address misinformation the scouts had heard and go more into detail about things the scouts were interested in. Overall, we received great feedback from not only the scouts but also parents who were in the rooms with the scouts supervising. This event was a great way for us to spread nuclear knowledge in our local community and help instill a passion for STEM-related topics in this younger age range.



Figure 31: Piper presenting to Boy Scouts

### 7.6 Illinois Nuclear Moratorium Letter Writing

On August 11, 2024 Illinois Governor J.B. Pritzker vetoed Illinois Senate Bill 76 (SB 76) which would have removed the moratorium on new construction of both advanced and traditional large-scale nuclear reactors. This veto had the potential to be very impactful to the Illinois nuclear industry. At the very beginning of the fall semester the outreach committee began advocating for nuclear reactors in the state of Illinois by reaching out to state representatives and senators. The outreach committee members each individually reached out to about fifteen representatives and senators total. The emails sent to the representatives and senators called for them to support overturning the veto on SB 76, or to support bringing a new bill to either floor to overturn the nuclear moratorium. The committee members received several responses back showing bi-partisan support

for the overturning of the moratorium. The outreach committee members also worked hard to encourage people outside of the committee and outside of ANS to support this effort. They encouraged the new people to fill out a form with Generation Atomic which sent an email for them with their information included. After the veto in August, the Illinois Senate House Bill 2473 (HB 2473) again in early November. The bill overturned the nuclear moratorium for small modular nuclear reactors with a maximum generation capability of 300 megawatts. This bill passed both the house and the senate and was signed into law by Governor J.B. Pritzker on December 8, 2023 and will go into effect in 2026. The outreach committee was excited to be a part of this important moment and was grateful for how well-received all of their advocacy efforts were.

#### 7.7 Planned: Engineering Open House (EOH)

The largest and most heavily attended outreach event this year was Engineering Open House (EOH). EOH is a massive annual event put on by students in the Grainger College of Engineering at UIUC, and it highlights student research, registered student organization activities, and college-wide activities as well. Over 30,000 attendees visited EOH over its two-day period in 2024. Since EOH draws in a lot of locals and families, our student section loves to highlight the engaging demonstrations produced by our department to not only raise awareness about nuclear science, but also to serve as recruitment for prospective future students. This year, the sub-committee called the Underclassmen Round Table worked tirelessly throughout the semester to create three brand-new demonstrations and rebuild one older demonstration for this event. These four demonstrations are discussed in Section Management, but each demonstration is mentioned here as well.

The fusor was a wildly successful exhibit that caught a lot of attention from students and adults. We showed off three types of plasmas (air, argon, and CO2) by changing the gas inside the chamber. Figure 32 shows the fusor with a blue CO2 plasma. An attractive poster accompanied the fusor and is pictured in Figure 33. The purpose of the fusor was to introduce the concept of nuclear fusion to attendees. We explained how nuclear fusion differs from nuclear fission, and discussed the different fusion reactor concepts and the current state of fusion. Fusion will play an increasingly important role in the landscape of nuclear energy in the future, so our section wanted to educate the public about it and show them what a fusion reactor could look like. A photo of a family learning about the fusor is shown in 34. A photo of the custom "T" shaped fusor grid for "Illinois" is shown in Figure 35.



Figure 32: Fusor glowing with blue plasma



Figure 33: Mia Sawkiw explaining the plasma physics of the fusor to Ken Peterson



Figure 34: Stephen Armstrong demonstrating the Fusor to a family



Figure 35: The Illini wire inside the Fusor

The second demonstration was the model PET scan, which was a great tool for teaching about the radiological and medical side of nuclear science. In years prior, our section lacked any radiological demonstration, so this demonstration had a major impact on what we could share about nuclear science. Attendees interacted with the associated poster through a matching game of photos of different medical scanning devices and their names. The poster is shown in Figure 36.



Figure 36: Kenneth Burnett explaining how PET scans work to high school students

The third demonstration was a model boiling water reactor (BWR). A model reactor was built last year, but it was not as large, engaging, or aesthetically pleasing as this year's model reactor. This model reactor was also scaled correctly, so attendees could learn that the reactor core is quite small relative to other components at nuclear plants. Animated LED strips that represented flowing water captured the attention of attendees and drew in crowds. A group of young attendees gathered in front of the model reactor is shown in Figure 37. The model reactor poster is shown in Figure 38. The model reactor was a great way for our section to explain how reactors work and why they are so safe.



Figure 37: High schoolers surround to hear how nuclear power plants work



Figure 38: Ken Peterson listening to the Model Reactor presentation

A cloud chamber that was built last year by the Underclassmen Round Table was modified this year to show trails more frequently. A photo of the cloud chamber is shown in Figure 39. The cloud chamber was a fantastic way to visualize radiation and express to attendees that radiation is not inherently dangerous. A beloved professor in the nuclear engineering department, William Roy, stayed for the entire two days of EOH to explain radiation and show off uranium samples. Attendees were surprised to learn that natural uranium can be held and is not inherently dangerous as long as it isn't consumed.



Figure 39: UCRT testing the cloud chamber

There were several other demonstrations beyond those that were built or revamped by the Underclassmen Round Table. Another plasma exhibit named DC Glow drew in big crowds and gave our members the chance to explain the basics of plasmas. A photo of an audience in front of DC glow is shown in Figure 40. DC glow also illustrated the concept of magnetic confinement that is so important to fusion reactors. An arc being bent by a magnet is shown in Figure 41.



Figure 40: Brady Moore demonstrating DC glow to young students



Figure 41: DC Glow being manipulated with magnets

The mousetrap reactor is a classic EOH demonstration for our section and gives a physical example of the chain reaction that occurs in fission reactors. A photo of the mousetrap reactor is shown in Figure 42. ANS and WIN members would set up dozens of mousetraps, load them with ping pong balls, and then draw in a large crowd to explain fission chain reactions. A volunteer from the crowd would drop a ping pong ball into the mousetrap reactor and a rapid burst of ping pong balls would ensue. Children were very excited by this exhibit. Members of our section then explained that these chain reactions are controlled extremely carefully in fission reactors so the neutron population does not grow exponentially with time.



Figure 42: Galen Selligman explaining a chain reaction before setting off the Mouse Trap Reactor

In addition to these demos, ANS and WIN had a table of Geiger counters and dosimeters where we showed how radiation can be detected from sources like 1930s Fiestaware. Members put their hands in front of the plates as an example of radiation shielding. Dosimeters were handed out and attendees got to calibrate their dosimeters to see their dosage over time. A photo of attendees interacting with this table is shown in Figure 43.



Figure 43: ANS and WIN handing out dosimeters and demonstrating Geiger counters

EOH went exceptionally well this year and allowed our section to show off nuclear science to thousands of attendees over two days. Our ANS student section even got collegiate recognition winning 2nd place for the best Registered Student Organization exhibit for the DC Glow exhibit. A photo of this award is shown in Figure 44. Unfortunately, EOH was the same weekend this year as the ANS Student Conference, so our section was split between these two important events. Many of the freshmen who spent the entire year working on new exhibits for EOH through the Underclassmen Round Table attended the conference and could not present their hard work. However, the members who stayed behind for EOH were able to amass enough volunteers to staff all of our exhibits. Our student volunteers gained valuable outreach experience by talking to a variety of people who came through our exhibits, and we loved talking to young students about the fun side of nuclear science! Ultimately, EOH was a fantastic outreach opportunity for our student section, and we cannot wait for next year.



Figure 44: 2nd place award for Outstanding RSO exhibit for the DC Glow

#### 7.8 Sustainapalooza

This year for Earth Day, we participated in a large event on the main quad called Sustainapalooza. This event had environmental student organizations, small businesses, and many people excited to help the earth. We partnered with Women In Nuclear to have a combined table devoted to nuclear science, displaying our model reactor, nuclear trivia, and a painting station.

During Underclassmen Roundtable, a group built a model nuclear reactor, with 3Dprinted components, animated lights, and movable generator and control rods. This display certainly grabbed people's attention who passed by, which was a great segway into the rest of the table's attractions.

Nuclear trivia is a fun way to connect with people and see how the public perceives nuclear energy. We gave away a lot of candy prizes and dispelled plenty of misconceptions people had about nuclear energy.

Painting petite planter pots might not seem related to nuclear science, but it was a great way to have a captive audience to talk about nuclear with as people painted fun designs. This was also a great fundraising opportunity and one we will likely expand upon in the future.



Figure 45: ANS and WIN at Sustainapalooza



Figure 46: A group of students painting miniature pots with ANS

One final aspect of Sustainapalooza that hasn't been mentioned yet is our group of banana advertisers who engaged in plenty of mischief to direct attention back to our booth. Banana costumes are the perfect outfit for outreach events like this because they are absurd and get people to ask why we are wearing them. This sets up a discussion about radiation and nuclear science nicely and is a great way to get conversations started. So our bananas ran around the quad, stacked themselves into a human pyramid, and climbed a tree to draw more eyes to nuclear.



Figure 47: ANS-UIUC members forming a banana pyramid

#### 8.1 Summer Engagement

During the summer, there were a substantial number of student section members who stayed on campus over the summer to take courses and work research positions. Because of this, we were able to keep Happy Hours ongoing. These Happy Hours were at various bar & grill-style restaurants around the Champaign-Urbana area, which enabled us to explore the place we call home. These summer-time events bolstered member engagement going into the 2023-2024 academic year. Additionally, a group of our members decided to dress appropriately for the double feature of Oppenheimer and Barbie.



Figure 48: ANS-UIUC members attending the Oppenheimer and Barbie double feature

## 8.2 Beginning of the year BBQ

At the beginning of every year, we host a BBQ event on the lawn of Talbot Laboratory, the building in which our nuclear department and student lounge are located. The purpose of this event is to get the freshman engaged and familiar with the existing members of the American Nuclear Society, as well as the NPRE department faculty. All of the existing student section members (undergraduate and graduate) and our other peers in the major are encouraged to come to this event and converse with each other and the freshmen. It is purposely scheduled to start right after NPRE 100, the orientation class that all freshmen in NPRE are required to take. The academic advisor who leads the class, Becky Meline, encourages and leads the students over to the event, where grilled food, drinks, snacks, and games are ready for them. Unfortunately, because of the extreme heat, we pivoted to hosting the event inside Talbot Lab and grilled all the food beforehand. Despite the weather canceling our games, we saw record turnout among freshmen and existing members.



Figure 49: NPRE students and faculty joining us for our beginning BBQ

## 8.3 Friday Happy Hour

Perhaps the most cherished social pastime of the ANS-UIUC section is Friday Happy Hour at Legends, a local restaurant and bar (not 21+ exclusive). Happy hour is where students and professors alike meet at 4:00 pm to relax, enjoy good company, play endless pool, and indulge in appetizers and drinks. Happy hour has proven to be a low-pressure environment bringing excellent opportunities for students to mingle and become acquainted with faculty in the department, or even their student peers. Many times these events led to students learning more about professors, their research, and the many research opportunities that they offer. Happy hour has been and hopefully always will be a place for underclassmen, upperclassmen, graduate students, faculty, and staff to enjoy themselves at the end of each week.



Figure 50: ANS members and NPRE faculty relaxing at Happy Hour

### 8.4 Coffee Chats with Faculty Advisor

In the second semester, our faculty advisor restarted Professor Madicken Munk hosting coffee chats in her office in Talbot Laboratory every Friday for an hour before our usual Happy Hour. This was to include more of our members who are not fans of the more crowded and lively Legends Bar & Grill. She provided coffee to those who brought mugs, and we chatted about various topics and how our week had gone. These conversations are a great way for students to relax at the end of the week and to connect. Professor Munk is a great faculty advisor to our student organization, and our members love going to speak with her every week.

### 8.5 Curtis Apple Orchard

Every year, we organize a trip to a local orchard named Curtis Apple Orchard and Pumpkin Patch with WIN. Here we picked apples, selected pumpkins to carve for later, and shopped at the store full of local produce. This is one of the bigger social events that we set up in the fall semester. For this event, we are fortunately able to carpool thanks to a mix of graduate and undergraduate students having cars.

Later in the day, we set up a BBQ where everyone can socialize and carve pumpkins they picked out. People also brought food and snacks to share with everyone. We start a campfire for people to sit around and talk with each other. These events are always a highlight of the semester and something to look forward to each year.



Figure 51: ANS-UIUC members posing on the iconic giant rocking chair at Curtis Apple Orchard.

### 8.6 Virtual Game Nights

In previous years, we have hosted virtual game nights with the student section from MS&T along with other sections. This year, we continued this tradition with MS&T and the University of Michigan, holding a few virtual game nights with them. In these events, students played friendly games together online while chatting and getting to know one

another. We used the ANS Student Discord, allowing more student sections to join. Using these events, we created environments where friendships were formed, allowing students to make connections ahead of the Student Conference, and easing the nervousness of meeting new people at the conference.

## 8.7 Roller Skating and Laser Tag

In November, our group had an outing to a local roller rink/arcade! Our group spent a Saturday afternoon having fun while roller skating and participating in laser tag. This event was a great way for our members to blow off some steam and relax before a long week of exams and classes. These social events are fun for our members because they are relatively inexpensive and very accessible! This event in particular was also a great opportunity for our students to get to know each other better and do some light nuclear outreach, because of our banana costumes!



Figure 52: Members and Bananas outside of the skating rink

## 8.8 Friendsgiving

We co-hosted the annual Friendsgiving event with WIN and the Graduate Student Advisory Council (GSAC) in November before everyone headed home for fall break. As usual, it was hosted in the Talbot Laboratory Student Lounge and was a potluck-style dinner. This year's event was a huge success, with more members from all three student sections showing up and bringing food than ever before. Everyone was able to socialize and have an amazing time gorging on our Thanksgiving feast.

## 8.9 Movie Night

Several times throughout the year, we have held movie nights in our student lounge in the Talbot Laboratory building. At these events, we invite students in our department to come, hang out, and decompress with us as we watch family-friendly movies. Movies included Spirited Away, Polar Express, and The Nightmare Before Christmas. These were fun events that brought our members together, helping them engage with one another more effectively and take a breather from the gauntlet of the semester.

## 8.10 White Elephant & Ginger Bread Reactors

On the weekend before finals week, students in our section came together to throw a White Elephant gift exchange. Gifts included a bag of flour, a mini trampoline, and books (the theme being gag gifts). Following the White Elephant gift exchange, our members organized into several groups and competed to build the "best" (most structurally sound) gingerbread structures. However, instead of the traditional gingerbread houses, we made the competition nuclear-themed. Each group was tasked with assembling their favorite nuclear reactor and/or nuclear power plant out of gingerbread. Notable entries include an upside-down gingerbread house filled with mini candy beads (a "pebble bed reactor") and a gingerbread "boat" (the "Russian floating power plant") with gingerbread "operators". These activities united our students in fun, stress-free, and holiday-themed activities before the demanding days of finals arrived. This was also the last formal social event of the fall semester, so it was the last time many students saw each other for over a month during winter break.



Figure 53: The gingerbread "Russian floating power plant"

## 8.11 Finals Goodie Bags

The Thursday before finals start, known as Reading Day, we make small goodie bags for our student section members and give them out in the Student Lounge as a way to say thank you for a fantastic semester and to wish them luck with their finals. The goodie bags typically have pencils, candy, snacks, mints/gum, stickers, etc. They are always a big hit with the members and a good morale boost for finals.

### 8.12 Ice Skating

Enjoying the winter weather while it lasted, our section went to our local ice arena for an open skate day. There, we had several members of differing skills, both newcomers and

veterans, skate along with each other. We even caught up with past members when we found them skating! Overall, everyone had a great time falling and getting back up on the ice. Similar to our rollerskating event, this is a great way for our members to connect with a seasonal, low-cost event. Additionally, we wanted to support our local ice arena because it going to close at the end of this year. However, through a ballot initiation and the support of RSOs like ourselves, the ice arena will stay open and free for UIUC students.



Figure 54: ANS-UIUC members taking a break from the ice skating rink

## 9 Attendance

To track attendance and designate "Active Members", our section utilizes an attendance point system. Members who attend section events log attendance via a Google Form and get awarded one point for each hour of the event. To ensure that our Active Members were attending a wide range of events, we created different categories of points: Outreach, Professional, and General. Outreach points were awarded for any outreach events, while Professional points were awarded for events with a focus on professional development. General points were awarded for non-social events that did not fall under the first two categories.

To be an active member for a given semester, students needed to earn 3 Outreach Points and 2 Professional points, and have a combined total of 7 attendance points from all categories. Benefits of active membership include letters of recommendation from our faculty advisor, eligibility to run for the executive board, and free travel for long-distance events, such as our Fermi National Lab tour or the ANS Student Conference.

#### 9.1 Analysis of Attendance Data

This year, we had 122 different members come to events, this includes both graduate and undergraduate students attending these events. This is a 25% increase from the previous year. Out of all these students, 42 of these students gave 10 or more hours to ANS. Additionally, over 75% of these students attended outreach-related events. This year we logged a total of 1156 hours from our members. This is a 32% increase from the previous year. Of those hours outreach made up 587 (50%) hours and professional made up 318 (27%) hours. We find these statistics to be quite significant as class sizes for NPRE are usually 30 people with the recent incoming freshmen class being 50 people. ANS has been to get large portions of the department involved in section events.



Figure 55: **ANS-UIUC Logo** - Designed by Nathan Ryan, we embraced the Kingfisher movement early on in 2020 and now this has become one of the NPRE department's logos



Figure 56: **Oppenheimer & Barbie Double Feature -** A group of students in the movie theater as they prepare to watch the double feature



Figure 57: Quad Day - Our members Angie Tomita and Jake Mitstifer, dressed in banana outfits, with the Kingfisher mascot



Figure 58: Beginning of the Year BBQ - NPRE students and faculty sheltering inside from the heat and enjoying grilled hamburgers, veggieburgers, and hot dogs



Figure 59: Happy Hour - A few of our members enjoying some cheesy fries and relaxing at Legends on a Friday



Figure 60: Cookie Decorating with the Kingfisher - After decorating a few cookies, Jake Mitstifer and the Kingfisher took a quick photo as Jake wore the UIUC 2022 Student Conference shirt



Figure 61: Fermilab Tour - A group of ANS-UIUC and Missour Science & Technology members examing the interactive model of Fermilab



Figure 62: Ginger Bread Reactors - A few UIUC WIN members joining us for our Gingerbread competition



Figure 63: **Boy Scouts -** A group photo of those volunteering for the first shift at the Boy Scout's Holy Cross Merit Badge Seminar



Figure 64: Student Conference: Three Mile Island Tour - Ethan Nicolls standing next to the Emergency Core Coolant Systems controls for Unit 2



Figure 65: **Dresden Generating Station Tour -** A group photo of those who went on the Dresden Tour with a reactor model behind them



Figure 66: Dresden Generating Station Tour - A few of our members kissing the used fuel dry casks



Figure 67: **Sustainapalooza** - ANS-UIUC members in their outreach shirts engaging with passing students and explaining nuclear power generation with our model reactor



Figure 68: **Sustainapalooza** - A group of our members dressed in banana suits to bring attention to our booth. Here, they are carrying one of the bananas and encouraging students to vist our booth



Figure 69: Sustainapalooza - A group of our members dressed in banana suits to bring attention to our booth. Here, they are performing a skit where they keep slipping on each other



Figure 70: Sustainapalooza - A group of our members dressed in banana suits to bring attention to our booth. Here, they climbed a tree near our booth to gather attention and direct students to our booth