

American Nuclear Society

Annual Report



UNIVERSITY OF PUERTO RICO
2021-2022



Prepared by

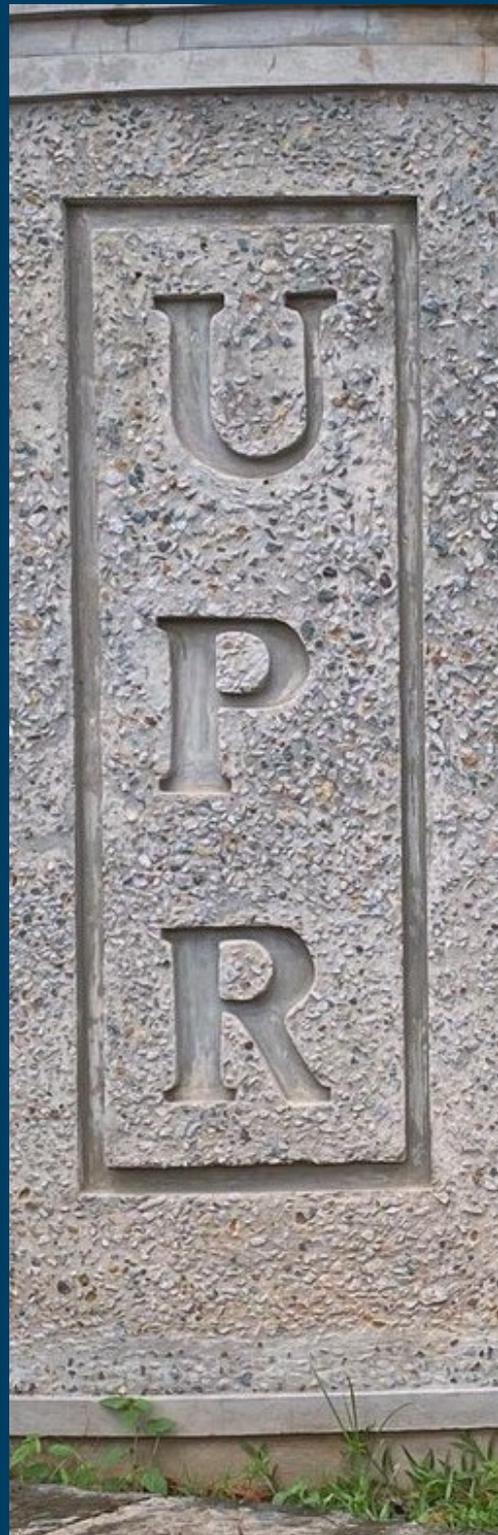
ANS UPRM Student Section



University of Puerto Rico Mayagüez Student Section
American Nuclear Society

This document represents the American Nuclear Society University of Puerto Rico Student Section's 2022 Annual Report, as well as the 2022 Samuel J. Glasstone Award application. This report was completed by the Board of Directors under the supervision of the section's Advisor Dr. Silvina Cancelos during the August 2021 - May 2022 academic term. The document covers all meetings, activities, projects, and finances corresponding to the same term.

Report submitted on May 1st, 2022



Navigating this Document

This report is divided into six main sections followed by an appendix to facilitate accessing information in a straightforward manner. Each primary section represents one of the most important aspects our section would like to emphasize; who we are, section management, finances, activities, and projects. The Appendix contains examples of flyers, sample documents, acknowledgements, and relevant links.

Table of Contents

1. Introduction	5
2. Section Management	7
2.1 Board of Directors	8
2.1.1 Advisors	9
2.1.2 Directors and Officers	9
2.2 Committees	15
2.2.1 Professional Development and Nuclear Outreach	16
2.2.2 Funding and Benefiting Activities	17
2.2.3 Social Activities	18
2.2.4 Social Media and Web Design	18
2.3 Membership	19
2.3.1 Recruitment	20
2.3.2 Demographics	20
2.4 Operations	23
2.4.1 Meetings	23
2.4.2 Code of Conduct	25
2.4.3 Electronic Platforms	26
2.4.4 Social Media Platforms	27
2.4.5 Website	29
2.4.6 Reports and Documentation	30
2.4.7 Challenges	31
2.5 Collaborations	34
2.5.1 Collaborations with Student Organizations	34
2.5.2 Collaborations with Industry	36

Table of Contents

3. Financial Report	37
3.1 Financial Report Summary	38
3.1.1 Income and Expense Break Down	38
3.2 Benefiting Activities	40
3.2.1 Grants and Awards	40
3.2.2 Fundraisers	41
3.2.3 Donations	45
4. Events	47
4.1 Goals	47
4.2 Events	48
4.2.1 Fall 2021 Event Summary	48
4.2.2 Spring 2022 Event Summary	49
4.2.3 2021-2022 Event Descriptions	52
5. Projects	66
5.1 Projects	67
5.1.1 Nuclear Engineering Curricular Sequence (INNU Program)	67
5.1.2 K-12 School Visitation Program	77
5.1.3 Science Coach Program	78
6. Acknowledgements	79
6.1 Acknowledgements	79
6.2 A note from our Board of Directors	81
7. Appendix	82
7.1 Campus Tour	82
7.2 Relevant Links	88
7.3 Uniforms	89
7.4 Promotional Material	90
7.5 Documents	93

Introduction



The American Nuclear Society University of Puerto Rico at Mayagüez Student Section was founded on November 20th, 2019 and has since made great strides towards our mission of educating our community in nuclear sciences. During the 2021-2022 academic year, we have overcome challenges, achieved great feats, and marked a pivotal point in the history of our section.

Student protests between the months of September and March restricted access to the campus, so even though we were ready to begin in-person operations at that time, our plans were adjusted for a hybrid semester. In solidarity with our students,, our section minimized activities involving all members and focused on internal progress within the Board of Directors during the Fall. In spite of the uncertainty, we saw the situation as an opportunity to strengthen our core and work towards our mission with a different approach.

Our biggest achievements during the past 12 months included launching our bilingual K-12 program, offering the first nuclear engineering elective course at the University of Puerto Rico in over 15 years, initiating out Science Coach collaboration, being awarded the First Place of the 2021 ANS Samuel Glasstone Award, and being awarded the ANS NEED Grant.





Introduction

We are moving in the right direction of serving the community as a recognized reliable source of information and as a credible advocate for promoting nuclear sciences.

The nuclear engineering field was strongly present in Puerto Rico during the 1950s-1970s, after which most projects were shut down due to economic and safety concerns. We aim to re-light the passion for nuclear sciences our community once had. Our section's mission is to increase interest in and understanding of nuclear science, engineering, and technology. We strive to educate the local community and to correct common misconceptions deeply rooted in our society. We are greatly committed to working towards this mission by contributing to the seven primary activity areas; Public Information, Community Service, University Service, Professional Development, ANS and Nuclear Industry Support, Social Events, and Section Management.

Some of our future projects include establishing a high school nuclear engineering research opportunities program through a collaboration with Science Coach and bringing a NuScale reactor simulator to the UPRM to support our nuclear engineering minor proposal project.



2. Section Management

DIRECTORS, COMMITTEES, MEMBERS, AND MEETINGS



This section contains a detailed description of our section management strategies and pertinent information regarding any processes or organization protocols that aid in the efficient operation of the student section. The Board of Directors, advisor, and various committees are introduced along with a summary of their responsibilities and roles within the section. The statistical data and demographics of this year's membership will also be discussed, with a special focus information regarding their academic backgrounds. The efficient management of the section could not be achieved without strategic meetings, proper documentation, and collaborations. These structures will also be described. An additional emphasis has been given to the various challenges that our student section was able to manage and overcome throughout the academic year.

2.1 Section Management

DIRECTORS, COMMITTEES, AND ADVISOR

2.1 BOARD OF DIRECTORS AND ADVISORS

At the core of any successful Student Section is effective management. Leadership, honesty, responsibility, reliability, initiative, and integrity are the core values of the ANS UPRM Student Section and must be present at every level, as they are crucial characteristics that define success. To manage the section and pursue our established mission and goals, a Board of Directors and four committees are democratically appointed each year to handle all section affairs.

The central Board's purpose is to guide the section towards our mission and to ensure the quality of the services provided. The Board operates under the supervision of the President and the Advisor, and contributes to all seven activity areas, focusing primarily on Section Management and University Services. The 2021-2022 elections were held on September 14th, 2021. All members of the 2021-2022 Board of Directors have made a commitment to be loyal to the section's values and to carry out their function responsibly. For the 2021-2022 academic term, the Board of Directors is composed of a total of 9 members, of which four hold the title of Directors and five hold the title of Committee Officers. All Directors and Officers actively participate in the section's decision making process during weekly meetings. Each officer manages a committee of up to 16 members, which works towards one crucial goal for the section. Due to an increase in the demands of our services, our section is evaluating expanding to a 5 committee structure; to divide the current Professional Development and Nuclear Outreach Committee into a *University Professional Development and Nuclear Outreach Committee* and a *K-12 Nuclear Outreach Committee*.

In terms of membership, our section currently has 15 ANS national members and 208 friends of ANS, previously referred to as local or non-official members, compared to the previous year's 10 national members and 134 friends of ANS. The steady increase in student and faculty interest demonstrates the demand for nuclear science educational opportunities at the UPRM.

2.1 Board of Directors



2.1.1 ADVISOR

Faculty Advisor, Silvina Cancelos

The Faculty Advisor's role is to provide a direct connection between the Student Section and the university's faculty. The faculty advisor also serves as a consultant on section management and graduate level opportunities for the students. Dr. Silvina Cancelos has been the ANS UPRM Faculty Advisor since 2019, and has continuously supported the growth of the Student Section. She is a professor under the Mechanical Engineering Department, where she conducts research at the Bubble Dynamics Laboratory at the UPRM. Dr. Cancelos has a PhD. in Engineering Physics from the Rensselaer Polytechnic Institute in New York.



2.1.2 DIRECTORS AND OFFICERS

President, Xaymara Medina García

The President's responsibilities involve leading the section towards excellence by working towards our mission and achieving our goals strategically and efficiently. The President is in charge of maintaining efficient communications between the Student Section and ANS at a national level, maintaining a healthy relationship between the Student Section and the University of Puerto Rico, and creating connections between the Student Section and companies, organizations and institutions. They lead crucial meetings, propose projects and motions, foment communication between all members, and approve important paperwork. The President is also in charge of ensuring the progress of our most important university service and outreach programs, including the Nuclear Engineering Curricular Sequence proposal [INNU], the K-12 Bilingual School Visitation Program, the Science Coach collaboration, and the NuScale proposal.

2.1 Board of Directors



Xaymara Medina García is a fifth year Mechanical Engineering student at the University of Puerto Rico. As part of her professional development, Xaymara has participated in multiple internships and CO-OP opportunities with various companies including Collins Aerospace, Boston Scientific, Medtronic, and Pratt & Whitney. Xaymara is proud to represent the Latino community within the nuclear field and provide direction for our team. Some of her hobbies include cooking, visiting new restaurants, and going to the beach.

Vice-President, Desiré Rivera

The Vice-President’s responsibilities consist of aiding the President in the management of the sections’ schedule, membership, collaborations, large projects, events, and progress, as well as overseeing that all officers have the tools they require to execute their functions efficiently. They ensure that the section and officers are following the established protocols, codes of ethics, rules, and bylaws. The vice-president directly oversees the Social Activities and Social Media Committees, as well as the section’s website, social media, and email. This position strongly supports the development and progress of university service and outreach projects including Nuclear Engineering Curricular Sequence proposal [INNU] and the K-12 Outreach program.

Desiré Rivera is a fifth year Chemical Engineering student. She co-founded the Student Section along with the first Board of Directors. She is also the Vice-President of Come Colegial, a local poverty alleviation organization. She has experience in biomaterials research with Cell Manufacturing Technologies, cancer research with the University of Illinois, and process engineering with Eli Lilly. She was awarded an ANS Leadership Commendation in April 2022.



2.1 Board of Directors



Treasurer, Calleb J. Diaz Acevedo

The Treasurer’s responsibilities include managing the section’s bank account, maintaining the section’s finances up to date with all transactions and deposits, creating budgets for a variety of our activities, and writing grant proposals. The treasurer is also in charge of overseeing the Fundraising Committee and providing them with any advice for fundraisers or financial advice to optimize the income and minimize expenses from their activities.



Calleb Diaz is a fourth year Chemical Engineering student. He is currently a member of EPEARLS student at the University of Puerto Rico. This summer he will participate in an internship with Mondelez International and will be participating in a CO-OP with Lilly Caribe next semester.

Secretary, Harry F. Colón Sánchez

The Secretary’s responsibilities include maintaining proper documentation of all section affairs. These include minutes and agendas for all General, Officer, and Board of Director meetings. The secretary ensures that all committees obtain required permits and fill out the required reports for each activity. They are also in charge of managing our electronic platforms, updating the section’s calendar, answering emails, and drafting official



documents. The secretary is in charge of overseeing the Professional Outreach Committee.

Harry is a fifth year Industrial Engineering student at the UPRM. He has worked on nanoparticle research to create a sustainable, eco-friendly fertilizers. He has also used Kano Models and Kansei Engineering to translate customer needs into technical requirements designing a service to eliminate gaps between customer expectations and perception.

2.1 Board of Directors



Social Media and Web Design Officer, Roberto F. Suarez García

The Social Media and Web Design Officer is responsible for leading the Web Design and Social Media Committee. The officer leads all efforts regarding the management of the section's web page and social media platforms and strategically projecting the desired image of the Student Section on the internet. This management involves ensuring that all promotional material is published on time, making stylistic decisions regarding imagery, and approving all modifications to the website.

Roberto F. Suárez García is a fourth year Industrial Biotechnology student pursuing a certificate in Biochemistry. He has worked as a community volunteer for many associations, which included working with patients with severe diseases, cleaning coasts, and fundraising.



Social Activities Officer, Edgeliz Ramos

The Social Activities Officer is in charge of leading the Social Activities Committee, recruiting new members, and developing companionship between students. The officer is in charge of managing meetings, dividing work among members, ensuring the quality and punctuality of the work done, and submitting pre-activity and post-activity reports. She is tasked with creating a safe and fun environment where students can feel comfortable, and providing motivation and emotional support to the other members.



Edgeliz Ramos is a fifth year Chemical Engineering student pursuing two minors in Pharmaceutical Engineering and Office Administration. She is part of the University's guidance students, where she acts as a guide that helps freshmen adapt to college life, and is a liaison between students and guidance counselors.

2.1 Board of Directors



Professional Outreach Officer, Alondra González

The Professional Outreach Officer position is in charge of leading the Professional Development and Nuclear Outreach Committee and developing activities that promote and educate our community regarding nuclear sciences and technologies. The officer is in charge of managing the committee's group chat, scheduling meetings, dividing work among the members, ensuring the quality and punctuality of the work done, updating the Board of Directors on the committee's progress, working on outreach projects, and submitting pre-activity and post-activity reports.

Alondra González is a fifth year Chemical Engineering student. She is also doing a minor in Material and Science Engineering and she is currently the co-Officer of the Outreach Committee. Currently, she is also the co-Treasurer of Material Advantage, a material science organization. She has experience in chemical engineering and material research in UPRM and environmental, health and safety in Lilly del Caribe.



Professional Outreach Officer, Adriana Ramos

Adriana Ramos Correa is a fifth year Chemical Engineering student. She is currently the co-officer of the Outreach Committee since August 2020. She has experience in nanotechnology research with the Materials Department in UPRM with participation in the Puerto Rico Louis Stokes Alliance for Minority Participation (PRLSAMP) and was selected to participate in the Emerging Researchers National Conference in STEM (ERN) with the travel award. She also has Co-Op experience with GE Appliances, a Haier company.



2.1 Board of Directors



Fundraising Officer, Joshua Acosta

The Fundraising Officer is responsible for leading the Fundraising and Benefiting Activities Committee and coordinating the section's sales, fundraisers, competitions, and food drives. The officer is in charge of obtaining required permits, managing the committee's group chat, scheduling meetings, dividing work between the members, ensuring the quality and punctuality of the work done, updating the Board of Directors on the committee's progress, and submitting pre-activity and post-activity reports. The officer is also in charge of maintaining close communications with the Treasurer when handling incoming funds or expenses.



Joshua is a fifth year Chemical Engineering student. He co-founded the Student Section as the first Treasurer from 2019-2020, and held the position of President from 2020-2021. He has experience in material sciences research, process engineering and biopharmaceuticals with AbbVie and Amgen, and will be joining Brown University this summer for an REU in biomaterials.

2.2 Committees

COMMITTEE DESCRIPTIONS

2.2 COMMITTEES

The ANS UPRM Student Section is currently divided into 4 committees, which fulfill a vital role in the section's operation and development. Each committee is overseen by a member of the core Board of Directors, managed by their corresponding Committee Officer[s], and consists of up to 16 active members or friends of ANS that demonstrate interest in contributing to the section's mission and participating in the planning of activities. The requirements to become a committee member are to be enrolled as a student at the UPR and to be in good standing with ANS and the section. Committee members are trained at the start of each semester through an official training session provided by the Board of Directors. All committees hold 1-hour weekly meetings to plan their upcoming activities, prepare relevant documents, complete tasks, and update all members. After each meeting, the Committee Officers are required to update other Officers on their most recent decisions and plans.

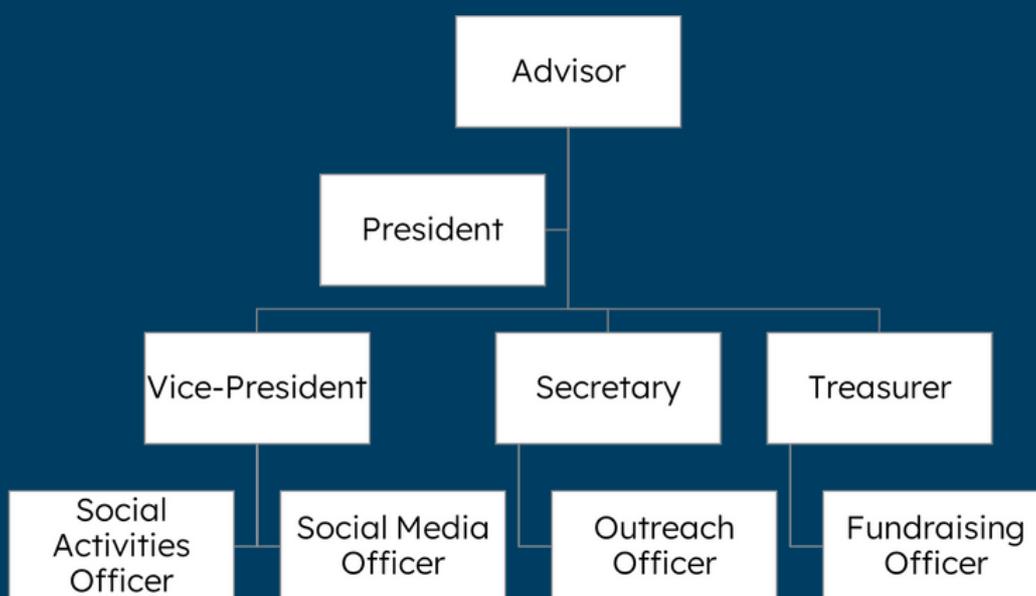


Figure 2.2.1. ANS UPRM Board of Directors Hierarchy 2021-2022

2.2 Committees

2.2.1 PROFESSIONAL DEVELOPMENT AND NUCLEAR OUTREACH COMMITTEE

The Professional Development and Nuclear Outreach Committee focuses primarily on achieving our mission and vision directly by hosting, coordinating, and promoting professional development workshops and educational seminars related to nuclear science and technologies with the goal of providing additional educational and professional opportunities for our community. These include technical webinars, professional development workshops, and recruitment sessions.

The committee is also tasked with educating our next generation of nuclear engineers through our K-12 School Visitation Program, INNU Program, and future collaborations with Science Coach. For these projects, the committee is in charge of all coordination, preparation, execution, and documentation efforts. This includes coordinating activities, reaching out to experts and local schools, preparing audience appropriate bilingual resources, training volunteers, practicing experiments, offering informative sessions, and preparing flyers or other promotional materials. They also represent the Student Section at national events such as Nuclear Science Week and other competitions.

All outreach activities are open to ANS members, friends of ANS, UPR students, and the general community free of cost. The only exception to our open attendance policy are activities held as part of our K-12 program, which are exclusive for K-12 students in participating schools.

The primary activity areas related to this committee are Public Information, University Service, Professional Development, and ANS and Nuclear Industry Support. At the time of this report, the committee is composed of 16 members and friends of ANS led by two Professional Development and Nuclear Outreach Officers. Since last year, this committee has achieved a significant increment in services offered to the community, recognition within our campus, and member participation.

2.2 Committees



2.2.2 FUNDING AND BENEFITTING ACTIVITIES COMMITTEE

The Funding and Benefitting Activities Committee is in charge of all fundraising activities, donations, and grant applications. The primary focus of the group is to support the progress of our mission by ensuring that the section has enough funds for high-quality outreach and social activities. They coordinate, manage, and promote all sales and fundraisers carried out by the section. Besides raising funds, the committee is also in charge of documenting and managing the section's expenses and budgeting.

This committee is especially important to the ANS UPRM Student Section, since the UPRM does not have a nuclear engineering department at the moment of this report, and our section does not receive any funding from our primary institution.

The primary activity areas related to this committee are Social Events and Section Management. At the time of this report, the committee is composed of 2 members and friends of ANS led by our Social Activities Committee Officer.

2.2 Committees

2.2.3 SOCIAL ACTIVITIES COMMITTEE

The Social Activities Committee focuses on recruiting members, coordinating fun social activities, identifying the community's needs, developing team building strategies, and engaging in community service. The committee is also in charge of strengthening our relationship with other student organizations within the university, including The Geological Student Association, Come Colegial, College Students Against Contamination, Students for the Exploration and Development of Space, and the Society of Hispanic Professional Engineers.

The primary activity areas related to this committee are University Service, Community Service, Professional Development, and Social Events. At the time of this report, the committee is composed of 7 members and friends of ANS led by our Social Activities Committee Officer.

2.2.4 SOCIAL MEDIA AND WEB DESIGN COMMITTEE

The Social Media and Web Design Committee focuses on promoting the section and our activities through virtual platforms. The committee is in charge of handling and updating the section's website as well as all social media platforms [Facebook, Instagram, Twitter, LinkedIn, and YouTube]. They support the other committees by promoting their activities. The committee is also in charge of posting fun facts or sharing relevant news articles on all social media platforms.

The primary activity areas related to this committee are Public Information and Section Management. At the time of this report, the committee is composed of 6 members and friends of ANS led by our Social Media and Web Design Committee Officer.

2.3 Membership

MEMBERSHIP, RECRUITMENT, AND DEMOGRAPHICS

During the 2021-2022 academic term, the ANS UPRM section has recruited a total of 208 members and friends of ANS, a total of 74 students more than the registered members and friends of ANS for the 2020-2021 academic term. Of the registered students, 15 are currently active ANS members at a national level, and approximately 50 are considered to be active students within the student section. Most of our membership consists of chemical and mechanical engineering undergraduate students, with an approximately even ratio between members who identify as female and members who identify as male. We hope to continue observing consistent growth in interest over the upcoming years.



2.3 Membership

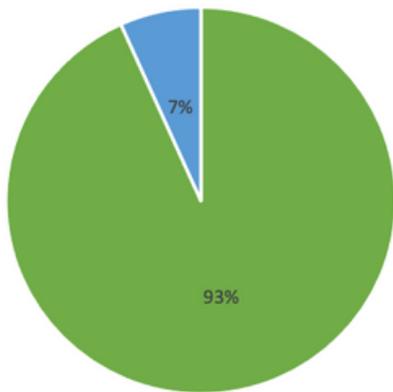
2.3.1 RECRUITMENT

Multiple strategies were employed to recruit new members during this academic term. Info-Sessions and Info-Tables were held each semester, where the section got the opportunity to present itself to the student body and the general public, highlight planned events, and answer questions. Another frequent strategy used was sending promotional emails to the entire student body through a platform the UPRM has titled “*Cartero*”, or “*Mailman*” which is used to promote academic opportunities to all students and faculty members with an email address ending in @upr.edu. Finally, collaborating with other student organizations helped increase our visibility within the community. At the moment of registering as a friend of ANS, all of our recognized section members and local friends of ANS are required to fill out a short google form and provide some general demographic and contact information.

2.3.2 DEMOGRAPHICS

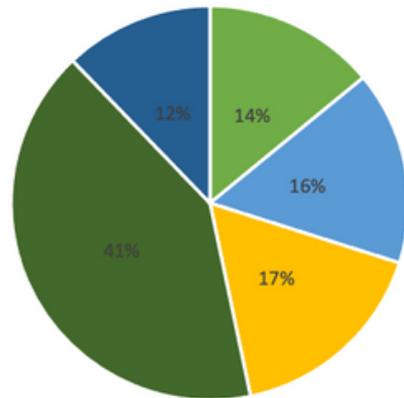
The distribution of enrollment of our students is very diverse, and we have observed interest in nuclear sciences from multiple branches of STEAM. Most of our members, about 76%, are part of the Engineering Department, and 23% are enrolled in a different area of STEM, including agronomy, geology, chemistry, and physics. Only about 4% of our members and friends are pursuing business administration, art, language, or other studies. Within the members enrolled in an Engineering major, 37% of them are enrolled in the Chemical Engineering curriculum, while 27% are enrolled in Mechanical Engineering. Nonetheless, we have members from all engineering majors offered at the UPRM. We are proud to say that 44% of our members and 55% of our Board of Directors are females, which is partially due to the high percentage of female engineering students enrolled at the UPRM (the UPRM's Chemical Engineering department has 55% female students.) It is also important to note that the average engineering curriculum at the UPRM is 6.7 years long (160-190 credits), so most of our students (58%) who identify as juniors and seniors will not necessarily be graduating in the upcoming year.

2.3 Membership



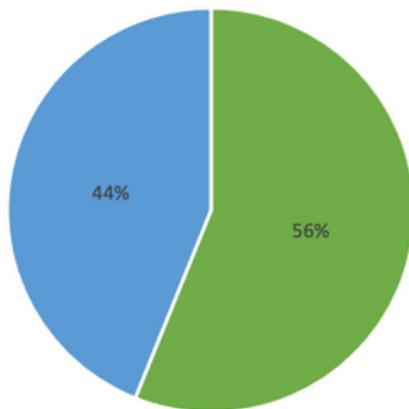
■ Local ■ National

Figure 2.3.1: Member distribution by membership type



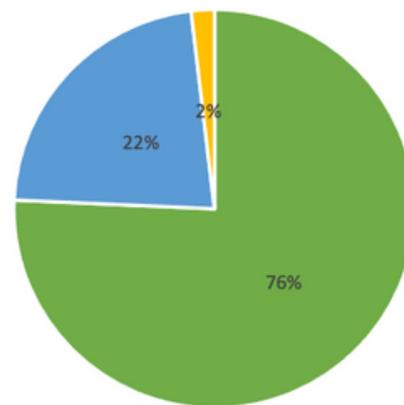
■ 1st year ■ 2nd year ■ 3rd year ■ 4th year and up ■ Graduate

Figure 2.3.2: Member distribution by class standing



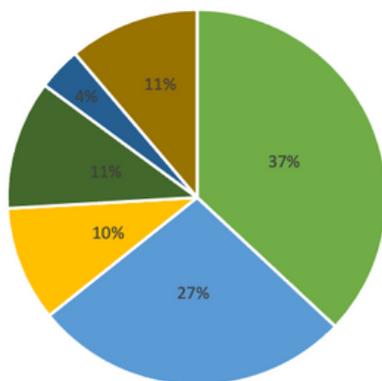
■ Male ■ Female

Figure 2.3.3: Member distribution by gender



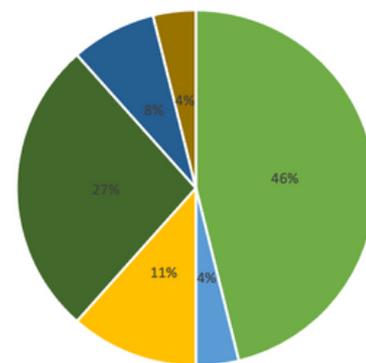
■ Engineering ■ Science ■ Other

Figure 2.3.4: Member distribution by major



■ Chemical ■ Mechanical ■ Industrial ■ Electrical ■ Civil ■ Computer

Figure 2.3.5: Member distribution by engineering field



■ Physics ■ Agronomy ■ Chemistry ■ Natural Sciences ■ Business Administration ■ Geology

Figure 2.3.6: Member distribution by major (non engineering)

2.3 Membership



Our section is accepting friends of ANS and committee members year round on a rolling basis. Among the friends of ANS, our section currently has a total of 50 active students who participate regularly. The criteria for a student to qualify as an active member or friend of ANS are demonstrating strong interest in the nuclear science field, assisting at least half of our meetings and events, and being in good standing the the section.

Currently, there are a total of 31 active committee members. The active status of a committee member is determined by their assistance and participation in meetings and events. A student must have participated in at least 50% of the committee meetings and activities throughout the semester to be certified as a committee member at the end of each semester. Committee members have the option to leave a committee or change committees at the end of each semester.



2.4 Operations

ADMINISTRATION, SOCIAL MEDIA, AND CHALLENGES

2.4.1 MEETINGS

Effective and efficient communication between the section’s leadership positions and the section’s membership is crucial for the successful pursuit of our mission. Our Student Section takes this very seriously, so we have created a schedule of frequent Board of Directors and Committee meetings to address this. Due to the ongoing Covid-19 pandemic, all meetings were held online during this academic term. The platform that was used most frequently for our regular meetings was Google Meets, although on several occasions the platforms Zoom and Microsoft TEAMS were used to accommodate external guests. Some meetings, such as committee meetings, were scheduled as often as once a week, while others were scheduled a few times per year, depending on their purpose and attendees. In order to concretely establish the purpose of each meeting, the required attendees for a meeting, and the frequency of that type of meeting, a classification system developed in the previous term was used. Our main types of meetings were classified as Board of Directors Meeting, Officers Meeting, Advisors Meeting, General Meeting, Committee Meeting, and External Meeting. These meetings can then be subclassified by category between Planning and Strategic Meetings, Problem Solving Meetings, and Emergency Meetings. These categories are specified on the title and invitation of every meeting in order to give all attendees a good idea of what to expect.

2.4 Operations

Board of Directors meetings require the presence of the President, Vice-President, Treasurer, and Secretary. During these meetings, which are held every three weeks, the Board has the opportunity to decide the direction in which the section will be moving and the next crucial steps to achieve these goals. Officer meetings were held on a weekly basis, and required the assistance of the central Board of Directors as well as all Committee Officers. These meetings serve as a way to update everyone on the most recent developments of the section and a way to agree upon an official plan for the upcoming weeks. Advisor Meetings are held between the Board of Directors and our Advisor, as needed, to seek advice and recommendations from more experienced personnel. Committee meetings are held each week by the Committee Officer and their corresponding members in order to handle all relevant affairs. External meetings refer to any meeting held with a collaborator that is not affiliated with the section, and are held when needed. The frequency of our meetings and their duration varied throughout the academic year due to inconsistencies in electrical power services and student protests.

All Board of Directors and General Meetings were structured in a similar manner, most often providing general information and updates about each committee, followed by any announcements or relevant information provided by the president and/or vice president. External meetings were most often coordinated with professionals from various companies, school directors, or other student organizations. Committee meetings were much more focused, and their main purpose was the planning and discussion of each individual committee's activities and projects.

The following table summarizes the types and frequency of the meetings held by the section. The section as a whole held a total of 146 meetings without including events. Since most of these consisted of committee meetings within the section, the work was evenly distributed amongst everyone. Each Director and officers attended a total of approximately 40 meetings per year, while the average committee member attended about 20. It is important to note that all Directors are Officers, but not all Officers are Directors.

2.4 Operations

Table 2.4.1 Meetings held during the 2021-2022 academic term

Type	Attendees	Duration	Frequency	Total Held
Officers Meeting	4 Directors 5 Committee Officers	1.5hrs	Once a Week	28
Advisor Meetings	1 Advisor 9 Officers	1hr	As Needed	4
Committee Meetings	Committee Officer Committee Members	1hr	Once a Week	26 per Committee
External Meetings	Varies	1hr	As Needed	10

2.4.2 CODE OF CONDUCT

ANS members are committed to learning about science, engineering, and technology, as well as their applications and appropriate use. With that purpose in view, members are expected to serve and honor their careers through honesty, impartiality, respect, justice, responsibility, and integrity while keeping our community's and environment's best interest at heart. In order to ensure the appropriate handling of section affairs in a safe and professional environment, we continue to honor the American Nuclear Society UPRM's Code of Conduct. This set of rules or guidelines must be followed by all members and friends of ANS in order to maintain good standing with the section. Failure to comply may result in a warning, removal from any officer position, a revoked local membership, or any other repercussion determined necessary by the Board of Directors. These consequences depend on the rules violated, the severity of any accusations, and the available evidence. A copy of the Code of Conduct has been attached to the end of this document, see Appendix.

2.4 Operations

2.4.3 ELECTRONIC PLATFORMS

All official communications from the Student Section to members of ANS, friends of ANS, other organizations, university faculty, and external sources are done through the official ANS UPRM email (ansuprm@gmail.com). Only the four members of the central Board of Directors have direct access to this email account and are able to draft and send communications. Committee Officers are allowed to send official communications indirectly through this account, by sending a draft of the message they wish to send to our official email, and asking one of the Directors to forward the communication to the corresponding mailing list. Our Student Section also has several non-official email accounts used for the handling of internal affairs. These include a social media email (anssocialmedia@gmail.com) and a treasurer's email (ansuprmtreasurer@gmail.com).

The official email account is also tied as the owner of our official Google Drive, which stores all of the section's documents. The Google Drive has two primary folders, one for the central Board of Directors, and one for all Officers and Committees. Access to the drive is given to all officers at the beginning of the academic term. Access to the drive is given to the committee members as needed, pertaining to the committee in which they participate. Some examples of the documents that can be found in the database are officer handbooks, membership information, agendas and minutes, flyers for activities, PowerPoint presentations, official certifications and permits, financial information, and activity reports.

For official communications with our members, three primary platforms are currently in use: G-mail, WhatsApp, and Discord. All activities, events, surveys, and important information is communicated to all members via e-mail as needed. In addition to this, 122 out of 208 of our members are currently a part of our WhatsApp group chat, where we share reminders of our activities, real-time updates of our events, educational videos or links, and answer questions. Our Discord server, The ANS Base Camp, has five virtual rooms (The α -Particle Room, β -Particle Room, the X-Ray Room, the γ -Ray Room, and the Nuclear Energy Lounge) that are used for game nights, murder mystery nights, team building nights, and act as a casual virtual hang-out spot for all members.

2.4 Operations

2.4.4 SOCIAL MEDIA PLATFORMS

The ANS UPRM Student Section currently has 5 official social media accounts, which are used to promote the section’s events, be accessible to the public, share relevant articles, and network. The platforms used during the 2021-2022 academic term were Facebook, Instagram, Twitter, LinkedIn, and YouTube. All of the social media accounts are managed by the Social Media and Web Design committee. This responsibility includes updating the banners or covers during special dates, drafting promotional posts, creating content, uploading infographics or content, responding to messages, accepting friend requests, and generally interacting with other accounts on each platform. Our profile picture for all accounts is our official logo (see Figure 2.4.1).



Figure 2.4.1. ANS UPRM Student Section Logo

Table 2.4.2 Social Media Following as of April 2022

Platform	Account Name	Followers
Facebook	American Nuclear Society UPRM Student Section	126
Twitter	@ANS_UPRM	74
Instagram	ans_uprm	143
LinkedIn	American Nuclear Society UPRM Student Section	92
YouTube	American Nuclear Society UPRM	10

2.4 Operations

Our section's social media following has steadily increased over the last 12 months. As of April 30th, 2022, we have 126 followers on Facebook (compared to 84 followers on April 2021), 74 followers on Twitter (compared to 52 followers on April 2021), 143 followers on Instagram (compared to 95 followers on April 2021), and 92 connections on LinkedIn (compared to 67 followers on April 2021). This data has been summarized in Table 2.4.2. This accounts for approximately a 30% increase in followers across all social media platforms, with the exception of our YouTube account which remained inactive during the year. We project a steady increase in our social media following of approximately 25% each year for the next few years, as new members enter the section and senior members graduate and leave the section.

All social media platforms are managed by our Web Design and Social Media Committee. The committee is in charge of designing posters and flyers for these social media platforms and our website, as well as printable promotional material for in-person activities. Figure 2.4.2 shows our official brochure for the 2021-2022 academic term. More images of the promotional material created by the committee, as well as a higher resolution image of this brochure can be found in the Appendix of this report.



Figure 2.4.2. Official Student Section Brochure 2021-2022

2.4 Operations

2.4.5 WEBSITE

The section’s website is managed by the Social Media and Web Design Committee, with support from the Board of Directors. Our website can be accessed through the following link <http://student.ans.org/uprm/>. The website consists of a Home page, Officers page, Events page, Newsletter page, Get Involved page, Awards page, and a Contact Us page. The Home page contains a brief introduction to our Section, our Mission, and a brief introduction to ANS in general. The Officers page contains general information and a picture of each member of the current Board of Directors and our Advisor. The events page contains the promotions for all our upcoming events and is updated on a monthly basis. The Newsletter page currently contains our Student Spotlight, where we highlight the achievements of our most outstanding students. The awards page will contain information about competitions where the Student Section participates, grants, and other awards or recognitions. The Contact Us page contains general contact information. Updating our website has been a challenge during the last year, since none of our members have previous experience working with WordPress. For the upcoming 2022-2023 term, our section hopes to provide formal training in WordPress for the future Social Media and Web Design Committee members, to optimize the website editing process.

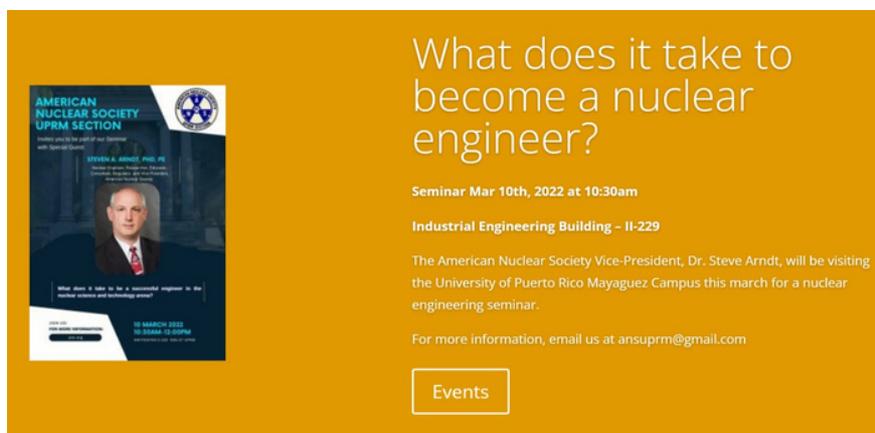


Figure 2.4.3. Screenshot of the Events section of our web page



2.4 Operations

2.4.6 REPORTS AND DOCUMENTATION

All committee officers are required to submit pre-activity reports and post-activity reports before and after each event. These reports contain a summary of the event, logistics, permits, relevant links, budgets if applicable, the amount of participating volunteers, attendance, and any relevant financial information necessary to replicate the activity in the future. These reports also give the Board of Directors a clear summary of the event proposed and the outcome, once the event has taken place. All reports follow the same format and are saved to our Google Drive in order to maintain organized and complete documentation. A template of these reports has been attached in the Appendix of this report.

In addition to reports, our section uses agendas and minutes to keep track of the information discussed during meetings. All agendas, minutes, letters, reference documents, templates, images, passwords, and more are carefully organized within our Google Drive.

2.4 Operations

2.4.7 CHALLENGES

Since our section's establishment, we have faced multiple challenges, which can be classified into four primary categories: infrastructure, financial, social, and situational.

Infrastructure

In 2017, two years before our student section was founded, Puerto Rico suffered the effects of the Cat. 3 Hurricane Maria. While the short-term effects of this event did not affect our section, the long lasting damage to our infrastructure has led our section to depend on an unreliable power grid. Small power outages are a frequent occurrence and a minor inconvenience. However, on April 6th, 2022, a fire in a power production plant in Puerto Rico knocked the island's already frail power grid off-line for a week. This type of event does heavily affect our operations, as it leads to activities being cancelled or postponed. Unfortunately, there is little our section can do to mitigate this issue. For this reason, we try to be flexible whenever possible to accommodate for last minute changes in our activities rather than cancelling any events. Our members have been very understanding of this and frequently accommodate to these changes.

Financial Challenges

The University of Puerto Rico does not have a nuclear engineering department, which is why we are registered under the mechanical engineering department. For this reason, funding for nuclear engineering projects, courses, and research is scarce. In addition to this, in the last five years, the UPRM has had approximately 50% of its budget cut. Currently, student organizations in our campus do not receive any funding or sponsorship from the university to carry out activities and events. To overcome this, our section dedicates a large amount of time and energy to fundraising activities, grant applications, and developing good budget management strategies to fund our outreach efforts. We are grateful for the support we have received from the students and faculty at the University of Puerto Rico who participate in our sales, donation collections, and other fundraising events.

2.4 Operations

Social Challenges

The topic of nuclear science and technology, particularly nuclear energy, is a difficult subject to bring up within the Puerto Rican community. When asked about nuclear sciences, the first three words that are brought up in conversations with the community are usually "Chernobyl", "explosion", and "bomb". This stems from a deeply rooted fear of the word "nuclear" in our community, where the topic is oftentimes treated as a taboo. Educating a community that has already made up it's mind and believes that nuclear sciences are dangerous has its difficulties. Our approach has recently shifted, from simply increasing the availability of reliable information to listening to the communities concerns and addressing them first. We have identified that a primary fear is that a natural disaster could cause a nuclear disaster in Puerto Rico, so we have recently prioritized webinars and events that concern this topic.

However, not everyone is open to join the conversation. Another challenge we have faced is that a segment of the community, including groups of students and professors within our university, is actively anti-nuclear. For this reason, our student section has been barred from participating in some educational events within our university, particularly those related to sustainability or environmental sciences. Discrimination against nuclear sciences is not new in Puerto Rico, and it is an occurrence that our section had anticipated as it is a symptom of the wide-spread cultural fear and incomprehension that our student section aims to combat. Our section is constantly brainstorming ways to overcome these setbacks with long term solutions to build a future where nuclear sciences are no longer stigmatized and nuclear science advocates are no longer silenced.

2.4 Operations

Situational Challenges

As it is well known, the Covid-19 pandemic has affected the world since 2020. Our student section is no exception to this. While in-person activities continue to be limited due to safety precautions, our section has done its best to leave a visible fingerprint on our campus through frequent in-person sales, info-sessions, and info-tables. Online activities have become our newest standard. This has increased the difficulty of recruiting new members, as it is harder to get student's attention through the internet. However, through extensive social media campaigns and strategic utilization of institutional emails, our section has managed to recruit over 200 members during this academic term.

During 2021-2022, multiple student protests took place at seemingly random intervals between the months of September and December. These events led to an unreliable access to campus facilities, as access to the campus was restricted by the protestors. Even though our section was ready to begin in-person operations for the first time ever during the fall, our plans were adjusted for a primarily online semester. In solidarity with our students, our section minimized activities involving all members and focused on internal progress within the Board of Directors. This included strategizing, planning activities for the following semester, researching information, networking, and organizing documentation. In spite of the uncertainty, our section saw the situation as an opportunity to strengthen its core and work towards our mission with a different approach.



2.5 Collaborations

2.5.1 COLLABORATIONS WITH STUDENT ORGANIZATIONS

Throughout the academic year, the Student Section has interacted and collaborated with multiple other student groups that share common interests. Our primary contact with other student groups interested in nuclear sciences are Students for the Exploration and Development of Space [SEDS], Women in Physics [WIP], Society of Physics Students [SPS], Alpha Astrum, Society of Hispanic Professional Engineers [SHPE], and American Chemical Society [ACS]. These organizations are frequently invited to our Outreach Activities and Social Events, and our members are frequently invited to their own events.

Students for the Exploration and Development of Space is an organization composed of primarily physics and engineering students interested in all things space. Our collaboration primarily relies on invitations to educational webinars, professional development activities, and Among Us game nights. Together, ANS and SEDS are exploring the applications of nuclear science and technologies in space exploration.

2.5 Collaborations

An important connection of our section is “Come Colegial”, which roughly translates to “Eat, College Student”. This student organization provides free groceries and free meals to students in need. We at ANS UPRM believe that all students require and deserve a safe and stable environment where their basic needs are met, in order to thrive and succeed as professionals. To support this cause, every year we support this organization through our community service efforts by sponsoring free meals. This year, we donated a total of \$225 to sponsor 50 meals to help students in need.

Another important connection is Triple C, also known as “Colegiales Contra la Contaminación” which translates to “College Students Against Contamination”. Their mission is to lower contamination in and around our campus and to mitigate global warming as much as possible. Our collaborations with Triple C revolve around promoting eco-friendly behaviors and educating our community about their carbon footprint and various forms of clean energy. Our section strongly believes in being environmentally friendly, so this year we decided to celebrate Earth Month with our friends at Triple C through a Pro-Earth Puppy Picnic and Dog Show.

Our most recent connection is the Sociedad Geológica Estudiantil (SGE) which translates to “Geological Student Society”. Their mission is to promote the importance of geological sciences in our environment and to educate our community on this subject. Our collaborations revolve around organizing webinars, scientific panels, and activities where we can educate the community on Puerto Rico's geological and geographical characteristics and how they would impact the potential implementation of a nuclear energy generation system on the island.

2.5 Collaborations



2.5.2 INDUSTRY COLLABORATIONS

Since the founding of the Student Section, we have had frequent communication with the Nuclear Alternative Project (NAP). NAP is a non-profit organization composed of Puerto Rican engineers who strive to educate Puerto Rico about advanced nuclear reactors and nuclear energy. They try to have as much contact as possible with the general public to bring information about the possibility of switching to a more reliable source of energy for the island. Both NAP and ANS UPRM have similar goals about educating the public regarding the benefits of nuclear sciences to a modern society. NAP has supported our Student Section constantly by providing subject-matter experts and speakers, inviting students to educational webinars, and pushing our section into the light of a bigger audience within Puerto Rico. We have meetings with the Leadership Board of NAP as needed to update them on our projects and general status and to support each other in the pursuit of our common goals.

Companies and national laboratories including General Electric, Exelon Corp., Constellation, and Naval Nuclear Lab frequently collaborate with us for short activities including webinars, meet and greets, as well as recruitment sessions. We are constantly looking to expand our network and collaborate with a greater amount of companies, laboratories, and professionals within the industry.

3. Financial Report

INCOME AND EXPENSES



The ANS UPRM Student Section’s finances are handled by the Treasurer, Calleb J. Diaz Acevedo, the Officer of Fundraising and Benefitting Activities, Joshua Acosta, and the Fundraising and Benefitting Activities Committee. The Treasurer directly receives monetary donations and payments, keeps an organized record of all income and expenses, and manages the section’s bank account. The Officer of Fundraising and the Fundraising Committee are in charge of organizing all fundraisers for the section and collecting donations for community service activities. Our Student Section does not receive funding from the University of Puerto Rico as of May 2022. The source of income for the 2021-2022 academic year were the fundraisers carried out by the committee, the monetary compensation of the Glasstone Award, and the NEED grant awarded by ANS. For the period between September 2021 and May 2022, the ANS UPRM Student Section had a net profit of \$897.13.

Income	Cost of Goods Sold	Operating Expenses	Net Profit
\$3,200.00	- \$1,124.69	- \$1,178.18	= \$897.13

Figure 3.1.1. Net Profit for Academic Year 2021-2022

3.1 Financial Report Summary

3.1.1 INCOME AND EXPENSE BREAK DOWN

The financial report is divided into three main sections: Income, Operating Expenses, and Investments. The income segment is composed of all the revenue obtained during the academic year. Direct public support references the monetary amount donated by individuals for events like Come Colegial's food drives or the Clean Air Initiative. Entry fee refers to income originated from events that require a registration fee, for example the Dog Show. Food sales refers to revenue from the sale of prepared foods or beverages. The Rewards from Awards refers to monetary aid from grants or awards given to the student section. Finally, the T-Shirt sales account has the revenue from merchandise sales such as T-shirts or stickers.

Table 3.1.1. Income for Academic Year 2021-2022

ACCOUNTS	Sep 01, 2021 to May 01, 2022
Income	
Direct Public Support – Individual Contributions	\$147.00
Entry Fee	\$50.00
Food Sales	\$1,299.00
Rewards from Awards	\$1,100.00
T-Shirt Sales	\$604.00
Total Income	\$3,200.00

Operating expenses refers to the money used to pay the student section's events. Bank account fees refers to payments to maintain the ANS UPRM bank account. Equipment refers to the purchase of radiation measurement equipment, like the HT-M2 Microwave Leakage Detector. The K12 Materials account refers to the total expenses from K12 activities. These include: printouts, candy, equipment for demonstrations, and among others. Non-Profit Student Organization Donations refers to monetary donations made by our section. The Printing and Reproduction Expense account refers to the purchase of several brochures and flyers used in many of our activities. Finally, the Supplies Expense account refers to reusable materials that were purchased.

3.1 Financial Report Summary

Table 3.1.2. Operating Expenses for Academic Year 2021-2022

Operating Expenses	
Bank Account Fees	\$3.35
Equipment	\$34.46
K12 Material	\$583.72
Non -Profit Student Organization Donations	\$350.00
Printing and Reproduction Expense	\$127.11
Supplies Expense	\$45.65
Total Operating Expenses	\$1,144.29
Net Profit	
As a percentage of Total Income	\$897.13 28.04%

The Investments or Cost of Goods Sold section contains the cost of purchasing products to be sold and payments to other student organizations for shared expenses for mutual events. The Ingredients Cost contains the costs related to the purchase of ingredients used to prepare food for a fundraising event, like the bake sale. The Payment to Collaborators account shows the reimbursements made to other organizations to pay for half of the shared expenses of a collaborative event. Prepared Food section has the expenses incurred when prepared foods are bought for a fundraising event. Finally, the Shirt Manufacturing Cost section contains the cost of manufacturing t-shirts, button-up shirts, and ANS stickers to be sold.

Table 3.1.3. Investments for Academic Year 2021-2022

Cost of Goods Sold	
Ingredients Cost	\$124.72
Payment to Collaborators	\$33.89
Prepared Food	\$456.97
Shirt Manufacturing Cost	\$543.00
Total Cost of Goods Sold	\$1,158.58
Gross Profit	
As a percentage of Total Income	\$2,041.42 63.79%

3.2 Benefiting Activities

3.2.1 GRANTS & AWARDS

Glasstone Award

The ANS UPRM Student Section is extremely honored and grateful to have been awarded the prestigious Glasstone Award for our endeavors during the 2020-2021 academic year. A total of \$600 were awarded to our section to continue supporting our outreach efforts and section operations.

Award Recipients

Samuel Glasstone Award (ETWDD)	
2021	University of Puerto Rico at Mayagüez (Best Section) University of Illinois, Urbana Champaign (Second Place) University of New Mexico (Third Place) Oregon State University (Honorable Mention)

Figure 3.2.1. 2021 Glasstone Award Recipients

Nuclear Engineering Education for the Disadvantaged (NEED) Grant

Our student section was awarded \$500 from NEED Grant funding to kick-start our outreach activities, member recruitment, and K-12 School Visitation Program. As of April 2022, over 230 K-12 students across two schools have been impacted K-12 activities. The events were conducted at *Winnies Active Learning Kids School (W.A.L.K.S./W.E.B.S.)* and *Escuela Especializada Bilingue Alcides Figueroa*. Brochures, flyers, and promotional materials were printed to promote the student section to the UPRM community. They were used at multiple activities to promote the section. A recruitment session has been planned for August 2022 to motivate freshmen to join the section. During the year, a total of \$650.47 were spent in K-12 outreach activities, which averages out to a little under \$2.75 per student.

3.2 Benefiting Activities

3.2.2 FUNDRAISERS

Brownies Sale

In October 2021, the section performed its first in-person fundraising event ever. During this small event, brownies were sold on campus. This fundraising event was performed as a test, as it served as a great way to practice how to coordinate a successful fundraiser while following university regulations and to learn which are the best spots to set up a stand. The sale generated a profit of \$13.32.



Figure 3.2.2. Bags containing 3 mini brownies were sold for \$1

Valentine's Day Sale

On February 14, 2022 the section carried out a homemade cake pop, cupcake, and brownie sale. Various volunteers from our section and Board of Directors got together during a weekend to bake and decorate baked goods by hand for a total of 60 hours in preparation for this activity. The sale was announced through our social media, email, and our group chat. A pre-order was done through google forms and delivered in campus. A total of 72 homemade cupcakes, 235 cake pops, and 54 brownies were sold for a total profit of \$397.28 dollars.

3.2 Benefiting Activities



Figure 3.2.3. Valentine's Day Bake Sale

ANS UPRM Official Shirt Sale

In March 2022 the student section decided to get new t-shirts for sale and new official button-up shirts for the members of the Board of Directors. A total of 14 button-up shirts were sold for \$26 a piece and 15 T-shirts were sold at \$15 a piece for a total profit of \$48. Some shirts are still left in inventory, which will be sold during the next semester. ANS UPRM Logo stickers are also for sale.



Figure 3.2.4. T-Shirt, Button-up Shirt and ANS Stickers for Sale

Pizza Sale

In March 2022, the section carried out a pizza and soda sale on-campus. The sale was announced through our social media, email, and our group chat. A total of 11 cheese and pepperoni pizzas were sold for \$2 per slice for a total profit \$134.71.

3.2 Benefiting Activities



Figure 3.2.5. Pizza Sale Images

Don Frappe Sale

A total of 100 refreshing frappes from the very popular local restaurant Don Frappe were sold during the Pro-Earth Picnic. The frappe flavors sold included: Ferrero, Cheesecake, Nutella, Strawberry, Fruits, Piña Colada, and Oreo. The sale was held in front of the Mangual Coliseum to maximize the amount of students that could see the stand. This fundraising yielded a profit of \$195.



Figure 3.1.9. Don Frappe Stand and Promotional Images

3.2 Benefiting Activities

During April 2022 we collaborated with Hope for a Rescue and Colegiales Contra la Contaminación (College Students Against Pollution) to promote environmental awareness to students of UPRM. The activity include kiosks selling plants and second hand clothing. Additionally, donations for the Clean Air Initiative were collected. Finally a dog show and frappe sale was hosted by our organization. Approximately 100 people participated in the 6 hour event.

Dog Show

A dog show was celebrated during the picnic. This activity was made in collaboration with the student organization Hope for a Rescue. A 10 dollar entry fee was collected for each participant. The dogs were evaluated in the following categories: "The Chunkiest Dog", "The Fluffiest Dog", "The Fastest Dog", "The Best Dressed Dog", "The Coolest Trick", "The Dog that looks the most to its owner". Each category hold unique prizes like: dog treats, PetSmart gift cards, and a free photoshoot for the puppy. Approximately 25 persons participated on this event.



Figure 3.1.8. Dog Show and Merch Stands

3.2 Benefiting Activities

3.2.3 DONATIONS

Come Colegial Food Drive

In April 2022, our section led a food drive, where both food and monetary donations were collected. The donations were employed to sponsor free lunches for the general UPRM student community in collaboration with Come Colegial. Our section was able to sponsor 50 free meals with a total donation of \$225 partially sponsored by the collected donations and partially sponsored by the section's funds. The free meals are scheduled to be distributed on May 12, 2022 during Come Colegial's "Final Feliz" end of semester activity.

Jesus de Nazaret Orphanage Donations

A donation drive was performed by the section during the month of April 2022. This drive's main purpose was to collect cleaning supplies, medicine, clothes, and toys for a local children's orphanage. A total of 35 items were donated thanks to our kind members.

Clean Air Initiative

To celebrate Earth Month, during the month of April 2022, our student section collected donations aimed to help the environments. Participants had the option to donate 1 dollar for one of the following: plant 1 tree, remove 1 pound of trash from the oceans, prevent 1 Ton CO2 from entering the atmosphere, remove 1 Ton of CO2 from the atmosphere, remove 1 Ton of other greenhouse gasses from the atmosphere, promote the use of clean energy. A total of \$125 in donations were collected to help the environment. These donations were distributed among other non-profit organizations to help the environment.

3.2 Benefiting Activities

These donations allowed us to plant 34 trees through Team Trees, remove 27 pounds of trash from the ocean through Team Seas, prevent 1.7 Tons of CO₂ from entering the atmosphere through Burn Stoves, remove 1,140 pounds of CO₂ from the atmosphere through the Wren project, remove 1,500 pounds of other greenhouse gasses from the atmosphere through Trade Water, and donate \$15 to advocate for legislation that promotes clean energy generation (solar, wind, and nuclear energy) through the Clean Air Taskforce.

A screenshot of a Google Form titled "Saving Planet Earth - ANS Clean Air Initiative". The form has a green header with a landscape illustration of trees and a butterfly. The text on the form reads: "Celebrate this Earth Month with the ANS Clean Air Initiative!", "Donate today to save the planet. As little as \$1 can make a huge difference.", "Choose how you wish to help the planet:", and a numbered list of six options: 1. Plant a tree, 2. Remove trash from the oceans, 3. Prevent CO₂ from entering the atmosphere, 4. Remove CO₂ from the atmosphere, 5. Remove other greenhouse gasses from the atmosphere, and 6. Promote clean energy.

Figure 3.2.6. Clean Air Initiative Promotional Image and Google Form

4. Events

ACTIVITIES AND EVENTS



4.1 GOALS

During the 2021-2021 academic term, courses were held in a hybrid manner, switching from remote online learning to in-person courses as needed. Due to the pandemic, Covid-19 safety precautions were followed. Due to frequent student protests and an island-wide power outage, access to university facilities was unreliable, which affected several activities. This modus operandi brought challenges in terms of creating meaningful relationships and impactful interactions with our student body, as well as fostering a fun and educational environment for everyone. As a team, the section brainstormed ideas and created a strategic interactive online event plan to promote student participation and motivation.

4.2 Events

Our goal was to offer a wide variety of activities that encompassed the 7 areas of service established by the ANS. Thanks to the help of our committees we were able to divide the activities and provide quality events all year round. All activities were carried out by either the Board of Directors or one of the section's committees. The Social Activities Committee focused on Social Events such as game nights and movie nights, as well as Community Service. The Outreach Committee focused on Public Information, University Service, and Industry Service through educational or Professional Development activities. The Fundraising Committee, Social Media Committee, and Board of Directors focused on supporting the section through Section Management.

4.2.1 FALL 2021 EVENT SUMMARY

This section compiles all activities and events held by the ANS UPRM Student Section during the 2021-2022 academic term. The following table summarizes the events held in the Fall 2021 semester.

Table 4.2.1. Event Table for Fall Semester 2021 Part 1

Event	Committee	Area of Service	Modality	Date	Attendance	Cost/Profit
Elections	Board of Directors	Section Management	Virtual	Sep. 14th	28	\$0
NAP Webinar - Radiation: Risks, Mitigation, and Realities	Outreach Committee	Public Information, University Service, Nuclear Industry Support	Virtual	Sep. 29th	63	\$0
Exelon Meet and Greet	Outreach Committee	Professional Development, Nuclear Industry Support, University Service	Virtual	Sep. 30th	16	\$0

4.2 Events

Table 4.2.2. Event Table for Fall Semester 2021 Part 2

Brownies Sale	Fundraising Committee	Section Management	In-Person	Oct. 18th	24	+\$13.32
Mission Fission Competition	Outreach Committee	Social Event	Virtual	Oct. 18th	6	\$0
Team Building Night	Social Activities Committee	Social Event, Section Management, Professional Development	Virtual	Oct. 19th	20	\$0
Power and Energy: Exelon Webinar	Outreach Committee	Public Information, University Service, Nuclear Industry Support, Professional Development	Virtual	Oct. 21st	9	\$0
Nuclear Reactors: NAP	Outreach Committee	Public Information, University Service, Nuclear Industry Support	Virtual	Oct. 21st	22	\$0
The Future of Nuclear Energy: GE Hitachi Webinar	Outreach Committee	Public Information, University Service, Nuclear Industry Support	Virtual	Oct. 22nd	18	\$0
Among Us Game Night	Social Activities	Social Event	Virtual	Oct. 22nd	23	\$0
K-12 School Visit: WALKS/WEBS	Outreach Committee	Public Information	In-Person	Dec. 2nd	92	\$414.28

Seven primary activity areas; Public Information, Community Service, University Service, Professional Development, ANS and Nuclear Industry Support, Social Events, and Section Management.

4.2.2 SPRING 2022 EVENT SUMMARY

This section compiles all activities and events held by the ANS UPRM Student Section during the 2021-2022 academic term. The following table summarizes the events held in the Spring 2022 semester.

4.2 Events

Table 4.2.3. Event Table for Spring Semester 2022 Part 1

Event	Committee	Area of Service	Modality	Date	Attendance	Cost/Profit
Virtual Info Session	Outreach Committee	Section Management, Public Information	Virtual	Feb. 3rd	34	\$0
Valentine's Day Sale	Fundraising Committee	Section Management	In-Person	Feb. 14th	80	+397.28
NAP Webinar - Aurora Advanced Reactor	Outreach Committee	Public Information, University Service, Nuclear Industry Support	Virtual	Feb. 16th	25	\$0
Bubble Dynamics Lab Webinar	Outreach Committee	Public Information, University Service	Virtual	Feb. 22nd	23	\$0
Info-Table	Outreach Committee	Public Information, Section Management	In-Person	Feb. 24th	75	-\$127.11
T-Shirt Sale	Fundraising Committee	Section Management	Hybrid	March	24	+\$48 (ongoing)
Orphanage Donations Collections	Social Activities Committee	Community Service	Hybrid	March	2	\$0
Technology For Gen IV Reactors Webinar	Outreach Committee	Public Information, University Service, Nuclear Industry Support	Virtual	Mar. 3rd	21	\$0
Resume Workshop	Outreach Committee	Professional Development, University Service	Virtual	Mar. 3rd	20	\$0

4.2 Events

Table 4.2.4. Event Table for Spring Semester 2022 Part 2

Resume Workshop SHPE, AICHE, and V2A Consulting	Outreach Committee	Professional Development, University Service,	Virtual	Mar. 10th	20	\$0
Movie Night	Social Activities	Social Event	Virtual	Mar. 15th	12	\$0
Nuclear Energy in a Geological Context Scientific Panel	Outreach Committee	Public Information, University Service, Nuclear Industry Support	Hybrid	Mar. 17th	25	\$0
NNL Info-Session	Outreach Committee	Public Information, University Service, Nuclear Industry Support	Virtual	Mar. 24th	60	\$0
Pizza Sale	Fundraising Committee	Section Management	In- Person	Mar. 29th	50	+\$134.71
INNU Info Session	Outreach Committee	Public Information, University Service	Virtual	Mar. 31st	14	\$0
Clean Air Initiative	Fundraising Committee	Section Management	Virtual	April	23	\$125
K-12 School Visit: Alcides Figueroa	Outreach Committee	Public Information, Community Service	In- Person	Apr. 5th	156	-\$236.19
ANS 2022 Student Conference	Board of Directors	Section Management	In- Person	Apr. 14th- 16th	4	\$0
ANS President Webinar	Outreach Committee	Public Information, University Service, Nuclear Industry Support	Virtual	Apr. 19th	17	\$0
Frappe Sale	Fundraising Committee	Section Management	In- Person	Apr. 21st	100	\$195
Earth Picnic	Social Activities Committee	Social Events, Section Management	In- Person	Apr. 21st	100	\$0

4.2 Events

Table 4.3.3. Event Table for Spring Semester 2022 Part 3

Dog Show	Social Activities, Fundraising Committee	Community Service, Social Events	In-Person	Apr. 21st	25	\$16.11
Green Energy Webinar With CCC	Outreach Committee	Public Information, University Service, Nuclear Industry Support	Virtual	Apr. 26th	22	\$0
Geo-Fest	Board of Directors	Public Information, University Service	In-Person	Apr. 28th	15	\$0
Come Colegial Free Lunch	Social Activities	Community Service, University Service	In-Person	May. 12th	100	-\$225
Initiation	Social Activities	Section Management, Social Activity	In-Person	TBD	-	-

Seven primary activity areas; Public Information, Community Service, University Service, Professional Development, ANS and Nuclear Industry Support, Social Events, and Section Management.

4.2.3 2021-2022 EVENT DESCRIPTIONS

This section compiles a description of the most important events which the ANS UPRM Student Section hosted or was invited to participate in during the Fall 2021 term.

Elections

The 2021-2022 ANS UPRM Student Section Board of Directors Elections were held on September 14th. On this date, the members of the 2020-2021 Board of Directors stepped down from their positions and the new 2021-2022 Board of Directors stepped up to take on the new academic year. The elections were held through a google form, managed by the section's previous President and Vice-President. All members were given the opportunity to nominate themselves or their peers for any of the positions available, and to submit a written statement of why they were interested in the position and a summary of their qualifications. A total of 28 members and friends of ANS cast their votes in these elections.

4.2 Events

Nuclear Alternative Project Webinars

The Nuclear Alternative Project (NAP) is a non-profit organization that brings together Puerto Rican engineers from across the U.S. nuclear industry under one mission - to study and educate the alternative of advanced reactors for Puerto Rico. NAP is composed of reactor operators, designers, consultants, all working in the U.S. nuclear industry, born and raised in Puerto Rico, and giving their skills to pave the way for a strong and modern Puerto Rico.

NAP frequently hosts educational activities and webinars regarding nuclear energy and technology completely free of cost and accessible to the public through Facebook live and other virtual platforms. The primary goal of these webinars is to start the conversation, and to educate the Puerto Rican community on a variety of topics regarding nuclear energy advancements and the possible future implementation of modular nuclear reactors in Puerto Rico. All students from our student section are invited to participate in all their webinars and scientific panels. Their current CEO, Jesus Núñez, has been very supportive of ANS UPRM and frequently volunteers as a speaker for webinars and scientific panels hosted by our student section.

Some of the topics discussed in this year's webinars include:

- The Aurora Advanced Reactor
- Radiation: Risks, Mitigation, and Realities

Meet and Greets and Recruitment Sessions

Meet and Greets as well as Recruitment Sessions are very similar events, where students have the opportunity to network with professionals within the nuclear field that are looking to hire interns, CO-OP students, or entry-level full time positions. These events allow students to learn what the day-to-day life of a nuclear professional looks like, what career options are available, and ask all their questions. The student section collects resumes from interested students and makes them accessible to recruiters.

4.2 Events

Team Building Nights

The purpose of our Team Building Night activities is to foment team work, promote leadership, practice in group problem solving, and provide all members and friends of ANS a chance to get to know other members in a fun, safe, and educational atmosphere. This year, the events were held virtually. They consisted of various games and competitions that involved dividing the group into smaller teams that compete to achieve a similar goal.

One of our frequently played games, called “WIN-WIN” consists of dividing the group into two teams, who need to obtain the greatest amount of points. The game consists of 6 rounds, where each team has three minutes to pick a color, either red or black. The points awarded at the end of each round depend on the choice of both teams. If both teams choose Black, both teams win the same amount of points. If one team chooses Black, and the other team chooses Red, the team that chose Red will gain points while the team that chose Black will lose points. However, if both teams choose Red, they each lose the same amount of points. The game gets interesting as both teams try to use reverse psychology on each other, however, both teams are working towards the same goal and the game can only be won when the teams understand the meaning of teamwork and trust.

Another crowd favorite is the game ‘Aliens have landed’. The premise of the game is that aliens have landed on planet earth and they do not speak any of our languages, so each team has 20 minutes to find 5 images to explain to the aliens what our student section is about. The group is usually divided into teams of 5, and at the end of the game each team may present their images to the group along with their explanations of why the images were chosen. All games are designed to promote teamwork and develop a friendly environment. These activities were one of our most successful events in terms of team bonding, and remain our most requested activities.

4.2 Events

Webinars

During the 2021-2022 academic year, our section hosted multiple webinars related to nuclear science and technology with guest speakers from our university or various companies, including General Electric and Exelon Corp. Most webinars were related to the science behind nuclear energy generation and its possible applications in Puerto Rico. Most events were held after hours, at a time where most students would be available to attend. Some webinars were provided in English while others were provided in Spanish. All webinars are completely free of cost and open to the community.

Game Nights

During the academic year, our Social Activities Committee hosted several game nights to encourage socializing, relaxation, and fun. Each semester, our Student Section puts in the extra effort to create an energetic and positive environment to help reduce our student's stress levels, because maintaining an enjoyable environment as well as making new friends while studying from home are important for our student's development and mental health. Some of our favorite games have included Among Us, Trivia - Kahoot, and JackBox Games. However, our most requested activity is our Murder Mystery Night. For this activity, each guest is assigned a character with a predetermined personality and script, which are created by our Social Activities Committee members. Once each guest has introduced themselves to the group and read their script, it is up to the guests to ask questions and investigate who is the culprit.



Figure 4.2.1. Among Us Game Night Poster

4.2 Events

Info-Sessions and Info-Tables

Toward the beginning of each semester, our section hosts info-sessions and info-tables to present itself to the student community and recruit more members. For our info-sessions, a virtual meeting is held, where the Board of Directors presents a short 15 minute presentation on *who we are* and *what we do*. Then, all attendees are encouraged to ask questions and join ANS. For our info-tables, a highly transited spot is selected to set up a table with a PowerPoint presentation, promotional brochures and flyers, stickers, and candy or snacks. Most students who pass by our table have not heard about ANS, so this is a great way to become more visible to the student community.



Figure 4.2.2. Info-Table set-up including posters, flyers, stickers, and presentation

Resume Workshops

As a way to help students in the section become stronger candidates for scholarships, internships, CO-OPs, and other career development opportunities, our section hosted a Resume Workshop and Review. Attendees were highly encouraged to bring their resume or CV for feedback from our speakers during the breakout sessions. During the workshop, three different presentations with three different points of view were provided. A general introduction was provided by students from our Student Section,

4.2 Events

based on general information from trusted sources readily available online. After our introduction, two guest speakers provided their insight on how to produce a high quality resume. Lisa Marshall, from North Carolina State University, gave recommendations from an academic advisor's perspective. Towards the end of the workshop, attendees. Lisa Marshall, from North Carolina State University, gave recommendations from an academic advisor's perspective. had the opportunity to break into small groups for interactive discussions and a free review of their resumes. The goal was for all students to polish their resumes for the upcoming virtual job fairs and to learn how to create a high quality eye-catching resume in the future.

Movie Nights

Movie nights and watch parties are held multiple times a semester by our Social Activities Committee , and serve as an easy way for students to relax and have fun. The movie selection for these activities are educational yet entertaining. Watch parties are generally held on Fridays or weekends after 6pm for the convenience of the members. Movies are live streamed for free and students have access to a live chat where they can speak to each other.

Vice-President Campus Visit and Seminar

This year, the ANS UPRM Student Section proudly hosted the current ANS vice-president, Dr. Steven Arndt. During his visit, our section coordinated a campus tour, a photo session, a meeting with our student section's advisor Dr. Silvina Cancelos, as well as a meeting with the University of Puerto Rico at Mayaguez's chancellor, Dr. Agustín Rullán. During these meetings, the growing student interest in nuclear science and technology as well as future section growth opportunities were discussed. Later in the day, Dr. Arndt offered an insightful presentation on important nuclear technologies (including nuclear reactor simulators), nuclear engineering careers, and what it takes to become a successful nuclear professional.

4.2 Events

Our students were pleased to have the opportunity to speak to Dr. Arndt and our section would love to host more ANS members from across the United States in the future. The event was such a success, that the UPRM published an article on their website which has 439 views.

<https://www.uprm.edu/portada/2022/03/18/cientificonuclearvisitaelrum/?fbclid=IwAR1o6DF5vybKnnnwKNzT8n9eqyogo9bHqUosnZyleqjlu3ZZgOUnK2KGB0>



Figure 4.2.3. Images from Dr. Arndt's Visit to the UPRM

4.2 Events

Nuclear Energy in a Geological Context Scientific Panel

Our section has identified that one of the major concerns in our community regarding nuclear energy, is that a natural disaster could potentially cause a nuclear disaster if nuclear energy is implemented in the island's power grid. To address this concern, the section organized an interactive student panel in collaboration with the Sociedad Estudiantil Geológica and five speakers, all experts in different areas related to the topic. The panel was held in a hybrid manner. Some of our speakers and attendees joined us in person, while others joined us virtually. The activity was broadcasted on Facebook live.

Our speakers for this event included Dr. Víctor Huérfano, the director of Puerto Rico's "Red Sísmica", the Puerto Rican equivalent to the USGS; Jesús Núñez, nuclear engineering expert and CEO of the Nuclear Alternative Project; Cristina Maldonado, a professor at the UPR; Efraín Torres, engineer and nuclear energy subject-matter expert; and Danny River, mechanical engineer and Puerto Rican power grid expert.

Throughout the panel, a progression of related topics was discussed. Our speakers talked about how earthquakes happen in Puerto Rico and how they can affect infrastructure, the history of nuclear energy in PR, the current power grid in Puerto Rico, different types of nuclear reactors that could be suitable for Puerto Rico, how PR's geological and geographical characteristics can affect the construction of a nuclear reactor, and relevant safety regulations that would apply to a potential nuclear reactor in Puerto Rico. Towards the end of the activity, students were able to ask questions.



**Figure 4.2.4. Flyer for the
Nuclear Energy in a Geological
Context Panel**

4.2 Events

ANS 2022 Student Conference

This year, the ANS UPRM Student Section participated in its first Student Conference since the section was founded in 2019. Four members from our section traveled to the University of Illinois at Urbana Champaign to participate in the phenomenal networking opportunities, career development opportunities, research and poster presentations, seminars, meetings, tours, and much more. Our members also had the chance to tour Constellation's Dresden Nuclear Power Plant, which served as an exceptional learning opportunity for our students, given that there are no active nuclear power facilities in Puerto Rico.

Our section was invited to present at the SSC meeting, where we had a chance to talk about our section's progress, challenges, and lessons learned. Our Vice-President, Desiré Rivera Borges, led this presentation. Later during our stay at the conference, she received a special recognition for her hard work since the day our student section was founded as she was awarded a Commendation for Student Service and Leadership.



Figure 4.2.5. ANS Student Conference and Dresden Nuclear Power Plant Visit

4.2 Events

Nuclear Naval Lab Info-session

During the UPRM's latest career week leading up to a job fair, a series of student protest restricted access to the campus. This led to several events, primarily meet and greets and recruitment sessions, to be cancelled or postponed at the last minute. This included Nuclear Naval Lab's info-session. To prevent this from happening, our section arranged a last-minute change from an in-person activity to an online activity to ensure that our students would still have the chance to participate in this event and to help our friends at the NNL through the inconvenience. The event was a success.

Webinar by Steve Nesbit

Our section was proud to host the current ANS president, Dr. Steve Nesbit, for an insightful online webinar about nuclear reactors, nuclear energy, waste management, and the applications of nuclear power generation technologies to Puerto Rico. Members had the opportunity to interact with Dr. Nesbit and ask their questions. Our section hopes to keep the tradition of a yearly presidential webinar alive.

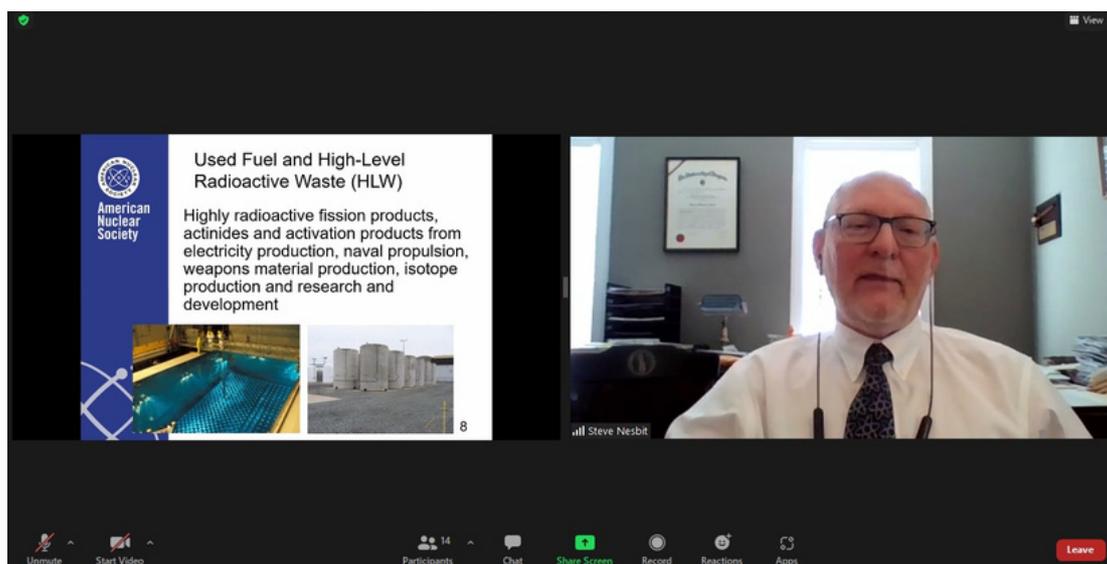


Figure 4.2.6. Screenshot of Steve Nesbit's Webinar

4.2 Events

Clean Air Initiative

Earth Month is one of the most important events for our Student Section, as protecting the environment is one of our values. To help the planet, in addition to hosting multiple environmentally oriented webinars and activities, our section started the ANS UPRM Clean Air Initiative. This initiative consisted of a campaign to collect monetary donations to help the environment. A total of \$125 we collected to plant trees, clean the oceans, and remove greenhouse gases from the atmosphere. We hope to make this a yearly event.



Figure 4.2.7. Banners for the Clean Air Initiative

Energy Generation Technologies: Renewable, Nuclear, and Fossil Panel

The guest speakers for this event were Dr. Agustin Irizarry and Katherine Torres. Dr. Irizarry obtained a bachelor's in Electrical Engineering in UPRM, a master's in University of Michigan Ann Arbor and a PhD in Iowa State University, and spoke about fossil fuels and renewable energy, specifically solar, wind and wave energy. Katherine Torres spoke about nuclear energy, she has a bachelor's in Chemical Engineering in UPRM and she is currently the online work control manager at Hope Creek Nuclear Generating Station in New Jersey.

4.2 Events

Pro-Earth Picnic

As part of Earth Month 2022, our section hosted and coordinated a picnic with two other student organizations which were Triple C and Hope for a Rescue. This picnic consisted of outdoor games, board games, thrifted clothes booth, hand crafted jewelry, food and drinks. Every student organization set up their booths and provided a variety of products for sale. Along with the picnic, a dog show was hosted to help raise funds for an environmental charity donation.

Dog Show

An Earth Week dog show was hosted with the Pro-Earth Picnic form which all proceedings were gonna be donated to a charity. A total of 6 dogs were registered to compete in a total of 6 categories. The categories consisted of tricks, speed, fashion, owner look-alike, fluffiness, and chunkiness. There were three judges selected from the participating student organizations and prizes were awarded to the winners of each category. The awards ranged from stickers to a professional dog photo shoot.



Figure 4.2.8. Flyer for the Pro Earth Picnic & Dog Show

4.2 Events



Figure 4.2.9. Photos of Dog Show Participants and Product Stands

4.2 Events

Geofest

In April 2022, our student organization was invited by the *Sociedad Geológica Estudiantil* to participate in their biggest event "The Geofest". Our section set up an info table where students could learn more about the organization's activities and goals. Membership flyers and informational brochures were given to students interested in the nuclear sciences. Additionally, a small presentation of the section's goals, projects, and previous webinars was offered by volunteers from our section's Board of Directors. Students also had the opportunity to ask questions about nuclear sciences and their role in the world. Some of the discussed topics included: The B.O.N.U.S. Reactor in Puerto Rico, Small Scale Reactors, how did the Nuclear Regulatory Commission (NRC) react to the Fukushima nuclear accident, and many more. This type of activity helps increase our visibility within our campus and reach out to a greater amount of students and student organizations.



Figure 4.2.10. ANS UPRM Geofest Info-table

5. Projects

PROJECTS



All of the section's affairs are classified as events or projects. While events are oftentimes short, one day activities, our projects consist of long term initiatives or activities that require large amounts of planning and group efforts. All projects carried out by the section aim to pursue our mission to educate the community on nuclear sciences, engineering, and technologies throughout an extended period of time. All of these endeavors contribute to creating easily accessible bilingual information and debunking stigmas about nuclear science. Our projects are open for anyone from the student section to participate, meaning that they receive support from all four committees, the Board of Directors, advisor, and friends of ANS that are not necessarily linked to any committee.

5.1 Projects

Table 5.1.1 Projects for 2021-2022 Academic Term

Project	Type	Date	Committee	Budget
Nuclear Engineering Curriculum Sequence	Professional Development, University Service	2020-2025	Board of Directors	\$0
Nuclear Science Week	Public Information, Professional Development, ANS/Industry Support	October	Nuclear Outreach	\$0
K-12 School Visitation Program	Public Information, Professional Development, Community Service	December & April	Nuclear Outreach	\$650
Science Coach	Public Information, Professional Development	Preparations Ongoing	Nuclear Outreach	\$0

5.1.1 NUCLEAR ENGINEERING CURRICULAR SEQUENCE [INNU PROGRAM]

The University of Puerto Rico does not currently have a Nuclear Engineering department. While other campuses offer some nuclear medicine courses, no UPR campus offers other nuclear science, nuclear engineering, or nuclear technology courses. Our Student Section has identified over 95 students interested in pursuing some sort of nuclear science or engineering studies within our community, and we believe that these students deserve an opportunity to pursue these dreams. For these reasons, the primary project of the ANS UPRM Student Section is the development of a Nuclear Engineering Curricular Sequence in the University of Puerto Rico at Mayaguez. This project is known as INNU for its acronym in Spanish, Ingeniería Nuclear.

5.1 Projects

The University of Puerto Rico offered a selection of nuclear engineering courses and carried out important nuclear research during the 1950s-1970s. After this time, most projects were shut down due to economic and safety concerns. Our section aims to relight this passion by educating the community and bringing back some of these programs. The INNU project consists of demonstrating our student body's interest in nuclear sciences and presenting a set of proposals leading up to a Nuclear Engineering Curricular Sequence program at the UPRM. The INNU project initiative is an on-going long term project that currently consists of two thrusts and a plan divided into 4 phases.

Phase 1. Year 2020-2021

Phase 1 consisted of providing our student body with a series of orientations about career options within nuclear sciences as well as the courses that the students would be interested in taking. During this time, the section focused on developing a good standing with the student body, gathering resources, networking, and recruiting students. During this phase, the section also developed a clear idea of what we would like the program to be like.

The nuclear engineering Curricular Sequence would consist of a total of 12 approved credits in any of the INNU courses of the following list, or 9 credits complimented by 3 credits of COOP in the nuclear industry. The requirement for all proposed courses will be differential equations [MATE4009].

1. *Introduction to Nuclear Science and Engineering* (3 credits). This course will serve as a general introduction to the field of nuclear sciences. It will cover material in atomic and nuclear physics, radiation, nuclear energy, nuclear reactors, radiation safety, fusion and fission.

5.1 Projects

2. *Radiological Safety and Radioactive Waste Management* (3 credits). General principles of radiation and radioactivity and their interaction with matter and biological systems will be emphasized. Specific areas include protection methodology, radiation dosimetry, systems for personnel monitoring, waste disposal procedures and regulations as well as long term risk analysis. Topics on radioactive waste management practices will include areas such as waste categories, potential sources, treatment and disposal methods, waste minimization and transportation practices. In addition, general issues or concerns on nuclear energy safety and management will be addressed.

3. *Nuclear Power Plant Engineering* (3 credits). This course will provide students with a sound understanding of nuclear energy and power plants, including nuclear fuels, cycle analysis, component design and performance, plant operation, control, economics, environmental impact, and future or emerging technologies.

4. *Nuclear Power Plant Simulator* (3 credits). This course will serve as an introduction to real world nuclear power plant operations. It will provide students the opportunity to practice operation of a nuclear power plant system on a nuclear power plant simulator. Students are expected to: gain knowledge of all major and auxiliary systems, and controls in a typical nuclear power plant; gain experience in start-up and shut-down operations of all major systems; gain experience in handling major disturbances; get a hands-on appreciation for safe nuclear power plant operations. NuScale Power has shown interest in implementing a simulator at the UPRM for the purpose of this course. Multiple grants will be needed to fund this project.

5. *Materials and Heat Transfer Applications in Nuclear Reactor Systems* (3 credits). The heat transfer component will focus on general thermodynamic considerations, heat generation in reactors, heat transfer from fuel elements, heat flow by conduction, heat transfer to coolants, boiling heat transfer, nuclear superheat, and thermal design of a reactor. This course will also focus on material candidates for application in different nuclear reactor components and their properties, strength requirements and other high temperature properties, interaction of these materials with radiation.

5.1 Projects

6. *Reliability and Safety Analysis* (3 credits). This course focuses on the theory and models that are used for reliability, risk, and safety analysis of large operating systems typical of the nuclear, petrochemical and chemical industry.

7. *Introduction to the Analysis and Design of Nuclear Plant Structures* (3 credits). The course will cover the required seismic analysis and corresponding design considerations needed to generate plans for construction of safe structures to house nuclear power plants.

Phase 2. Year 2021-2022

We are currently in Phase 2 of the project, which consists of demonstrating to the UPRM the volume of undergraduate students interested in pursuing nuclear engineering studies to justify the proposed program. As part of submitting this formal proposal to the university's Department of Engineering, the Student Section must prove an outstanding amount of interest from its students. Since our establishment, the ANS UPRM Student Section has been tracking the growing interest of students in taking courses in the curriculum. This is currently being done through a series of surveys, in which we identified 96 students interested in taking nuclear science or engineering courses and determined which specific courses are in demand.

The following charts represent the results obtained from the most recent survey. The survey obtained 96 responses from active undergraduate students within our campus. Students were asked to rate their probability of enrolling in the INNU Curricular Sequence if the program is established. Students rated this likelihood on a scale from one to five, one being very unlikely, and 5 being extremely likely. A total of 27 students rated the probability of enrolling in this curricular sequence as likely, while 22 of these students rated this probability as extremely likely. Only 5 students rated their probability as unlikely, and the remaining 4 students are still neutral or undecided.

5.1 Projects

96 responses

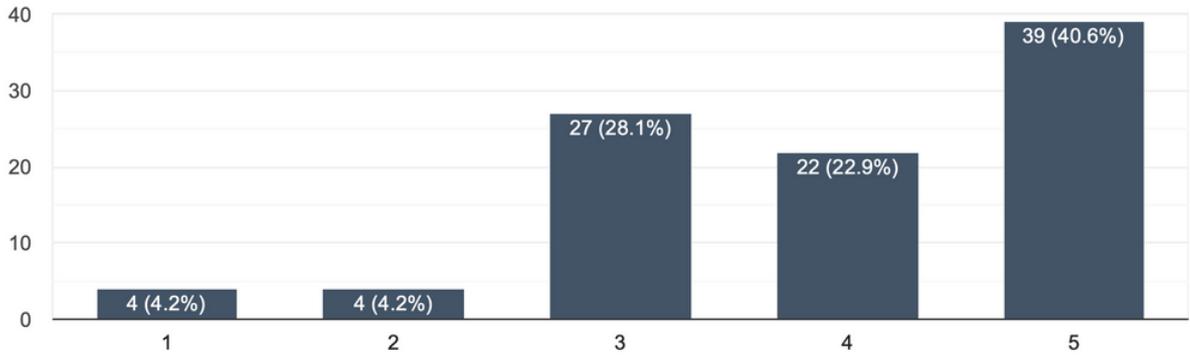


Figure 5.1.1. Self-Reported likelihood of enrolling in Curricular Sequence

Students were also asked to rate their likelihood of enrolling in each individual course proposed by the section. The survey contained a brief description of each course, so that students could make an informed decision. The course with the most prominent interest was Introduction to Nuclear Science and Engineering, with a total of 96 rating their likelihood to take this course at a 5/5. Followed by the Nuclear Plant Engineering course with a total of 39 rating their interest with a 5.

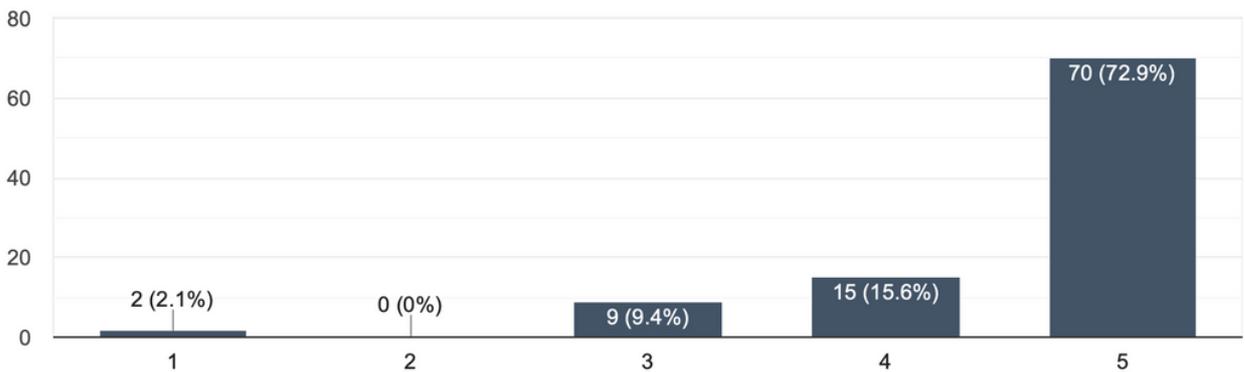


Figure 5.1.2. Self-Reported likelihood of enrolling in the Introduction to Nuclear Science and Engineering 3 credit course

5.1 Projects

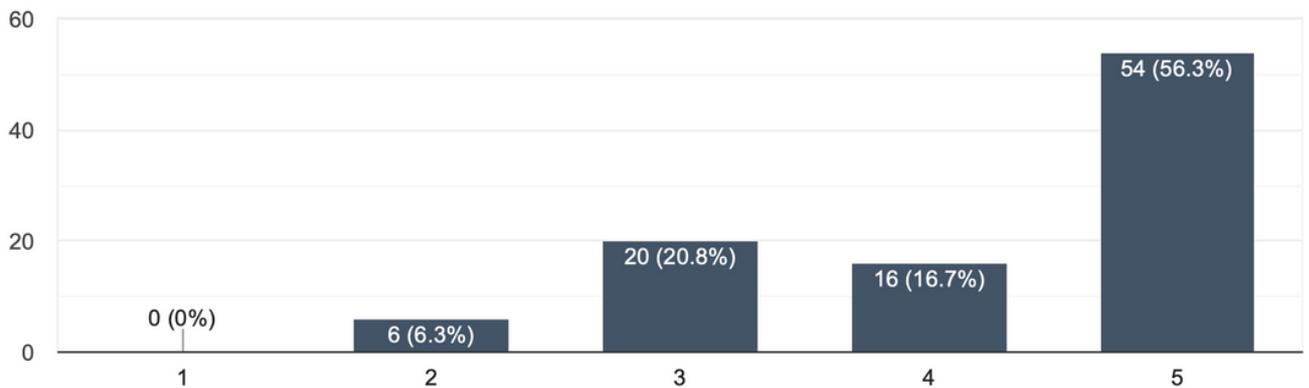


Figure 5.1.3 Self-Reported likelihood of enrolling in the Radiological Safety and Radioactive Waste Management 3 credit course

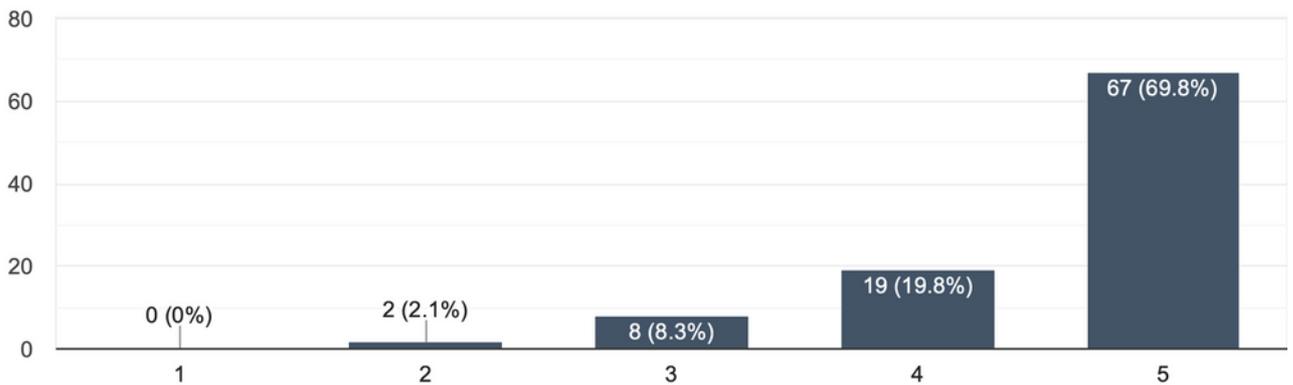


Figure 5.1.4 Self-Reported likelihood of enrolling in the Nuclear Power Plant Engineering 3 credit course

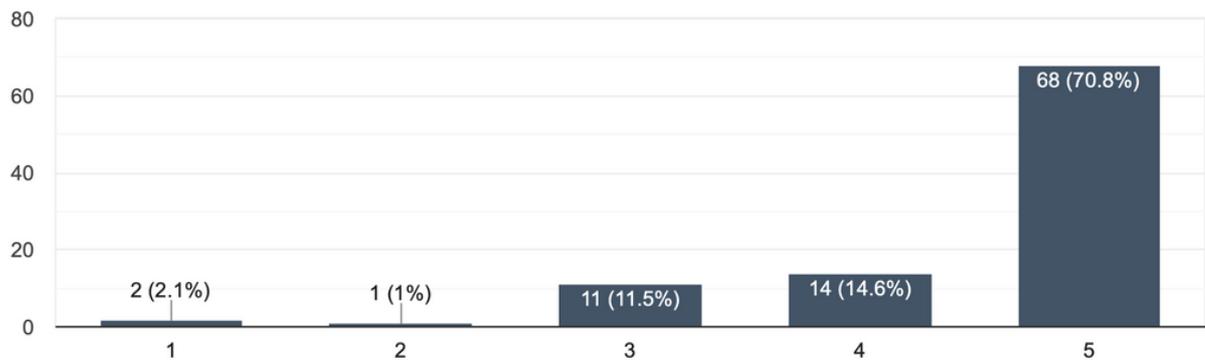


Figure 5.1.5 Self-Reported likelihood of enrolling in the Nuclear Power Plant Simulator 3 credit course

5.1 Projects

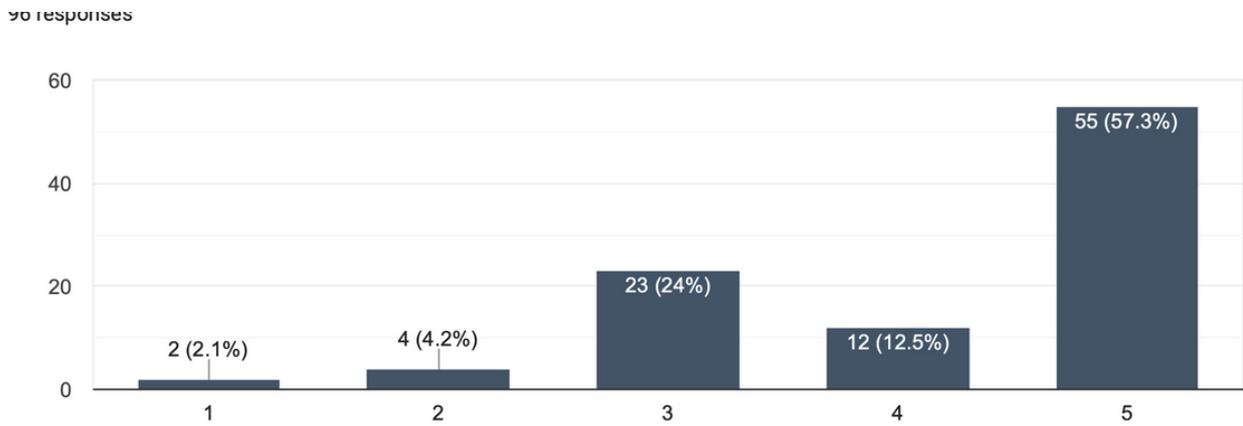


Figure 5.1.6. Self-Reported likelihood of enrolling in the Materials and Heat Transfer Applications in Nuclear Reactor Systems 3 credit course.

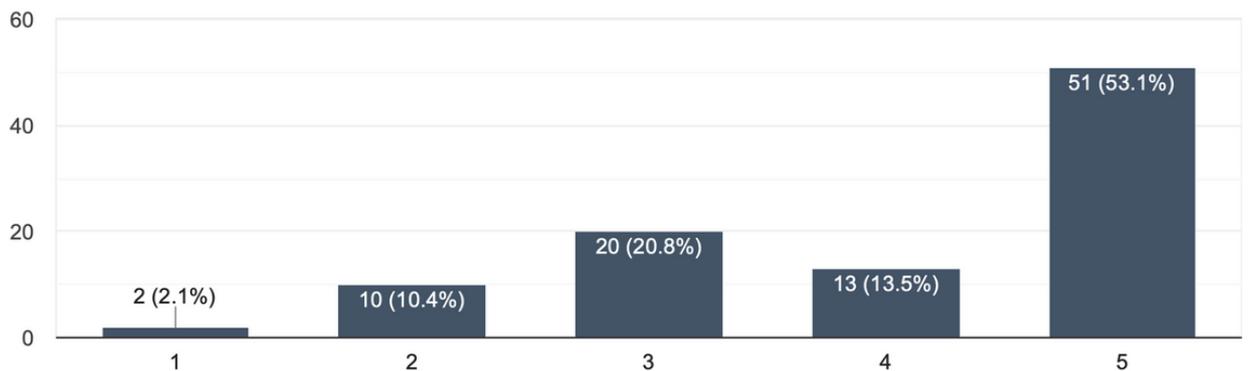


Figure 5.1.7. Self-Reported likelihood of enrolling in the Reliability and Safety Analysis 3 credit course.

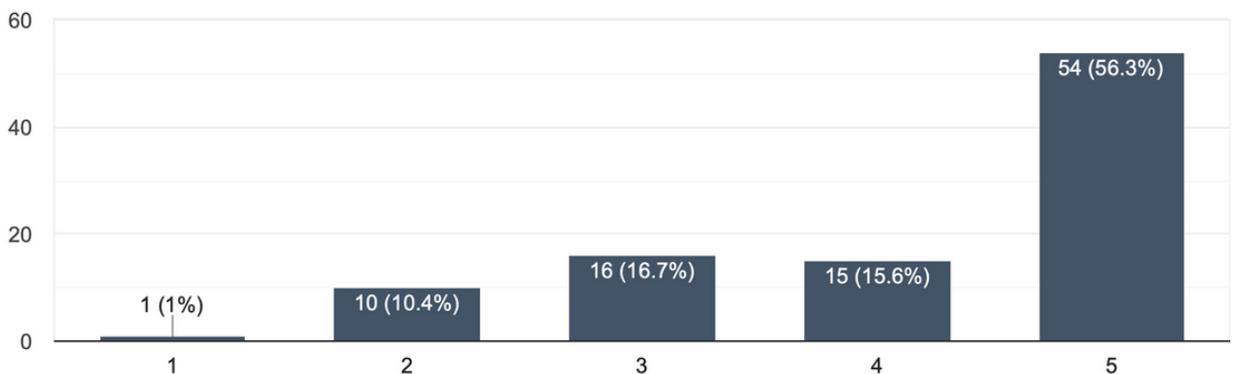


Figure 5.1.8. Self-Reported likelihood of enrolling in the Introduction to the Analysis and Design of Nuclear Plant Structures 3 credit course

5.1 Projects

As part of the survey, all participants were asked to provide their interest in obtaining graduate degrees in Nuclear Engineering. This demonstrates a higher commitment and interest of the students to obtain education and knowledge on nuclear sciences. 31% of students are interested in pursuing graduate studies in nuclear engineering, while a surprising 62% are still undecided. These results highlight the importance of our mission, as students tend to be uncertain of these types of decisions due to lack of information. Establishing these undergraduate courses within the university would greatly benefit these students by providing them a thorough understanding of the field and creating a smoother transition into graduate schools for their Masters and Doctorate degrees.

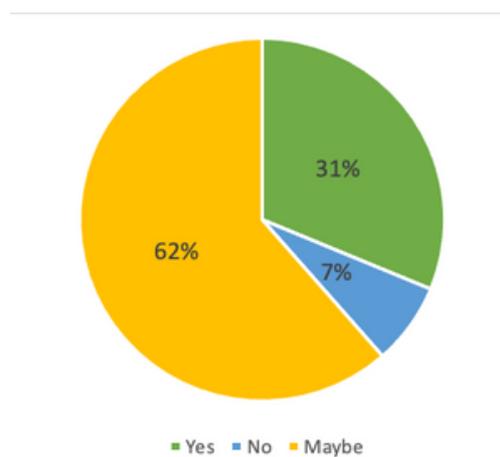


Figure 5.1.9. Students interested in pursuing graduate studies in nuclear engineering.

The results obtained from this year's survey demonstrated an increase in interest for these courses compared to last year, where a total of 96 students filled out the survey. The interest in both the Student Section and in the INNU program are expected to continue increasing at a slower rate over the following months, as the section continues to make itself known within the campus and recruit new students. These results will be shared with the UPRM along with our first proposal. The latter is a short term proposal asking the university to offer two introductory nuclear engineering courses as electives open to all STEM majors. This proposal will consist of a specific request justified by the statistics from the most recent surveys which demonstrate the student's interest in the program, letters from professors interested in the initiative and willing to give the courses, the list and description of suggested courses, and other supporting information. The goal of this first proposal will be to have the university provide at least 1-2 elective courses each semester starting in January 2022.

5.1 Projects

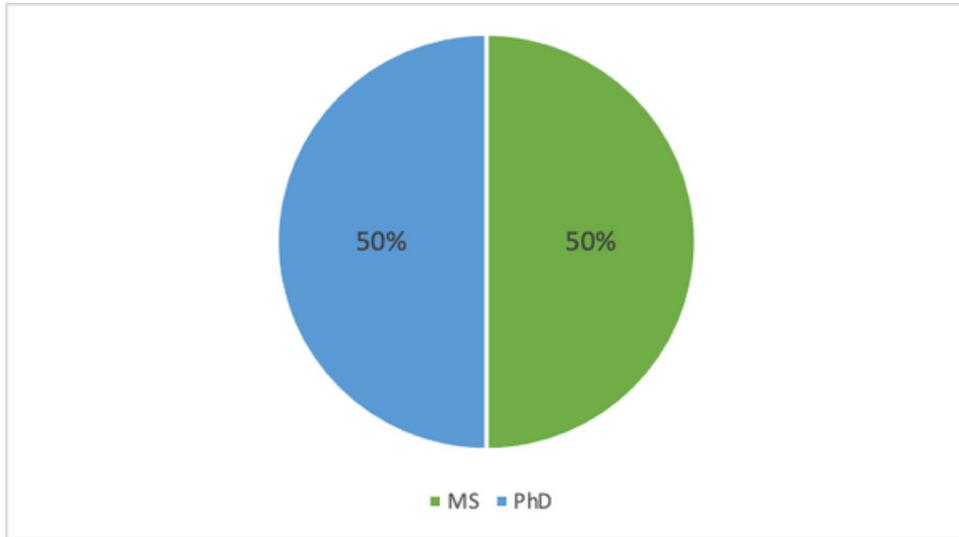


Figure 5.1.10 Degree that students are interested in pursuing

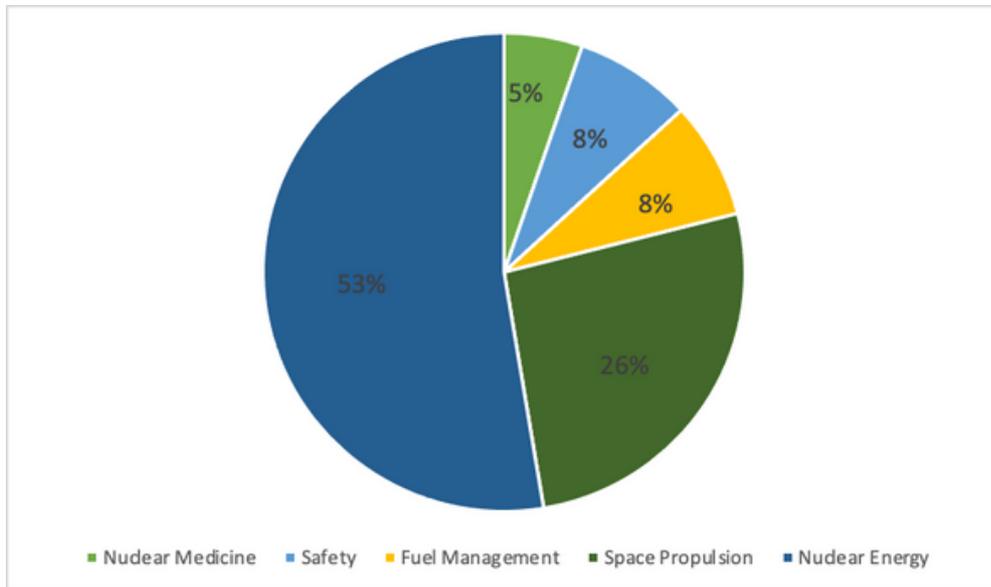


Figure 5.1.11. Students interested in branches of Nuclear Engineering

5.1 Projects

Phase 3. Year 2022-2023

Phase 3 is conditional to the approval of the first proposal. This phase consists of performing a thorough evaluation of student enrollment and achievement in the courses being offered at the moment. If student enrollment matches the university's expectation of at least 25 students per section, and a high percentage of these students approve the courses, then a new selection of elective courses can be offered in the following semester. The section will support students enrolled in these classes by providing access to additional resources, organizing study sessions, and getting involved in their professional development.

Phase 4. Year 2023-2024

Phase 4 is conditional to the success of Phase 3. After various courses have been successfully given for at least 3 semesters, with appropriate amounts of enrollment and achievement, the student section can move on to the second proposal. This proposal would serve as an official petition to officially establish the Nuclear Engineering Curricular Sequence. The second proposal will be the 12 credit INNU Curricular Sequence Program proposal. The goal will be to formally establish a nuclear engineering Curricular Sequence at the UPRM. This proposal is planned to be submitted at least one year after the nuclear engineering electives are offered, so that the Student Section can justify the need for the program with the statistics from the students enrolled in and approving nuclear classes. In the future, the success of the project could imply the expansion of the program into a Nuclear Engineering bachelor's or master's degree offered by the university.

5.1 Projects

5.1.2 K-12 SCHOOL VISITATION PROGRAM

The Professional Development and Nuclear Outreach Committee currently leads our K-12 School Visitation Program. The program consists in offering children in elementary, middle, and high school an interactive workshop where they can acquire a basic knowledge and understanding of Nuclear Sciences. This project is partially funded by the Nuclear Engineering Education for the Disadvantaged (NEED) Grant. As of April 2022, 238 K-12 students, in 6 different groups, across two different schools have been impacted. The impacted schools were Winnies Active Learning Kids School (W.A.L.K.S./W.E.B.S.) and Escuela Especializada Bilingue Alcides Figueroa.

The purpose for this program is to educate children about the exciting field of Nuclear Sciences and Engineering, and to eliminate the negative stigma we have found to exist at a very early age. Our program is prepared to manage children in any of three categories: Kinder to Fifth grade, Sixth to Ninth grade, and Tenth to Twelfth grade. For each group, volunteers from the committee prepare an age-appropriate workshop consisting of a presentation in the school's language of preference, audiovisual resources, interactive activities, and a hands-on experiment to engage with them. Each activity is adjusted to the amount of students in each group and any allergies of any volunteer or child. Each presentation and experiment is followed by either a Trivia or a comprehension worksheet to review learned concepts from the lesson. Teachers are encouraged to participate in each activity.



Figure 5.1.12. K-12 Activities with Students at the Escuela Especializada Bilingue Alcides Figueroa

5.1 Projects

5.1.3 SCIENCE COACH PROGRAM

The Science Coach program is an advanced authentic research professional development program that has been engaging 6th-12th grade students in the process of scientific inquiry since 2007. The Science Coach program teaches students to choose questions of personal interest, create procedures to test hypotheses, arrive at answers with validity, and build confidence in solving real world problems. It enables teachers to help students through these research projects with the help of specialized training and additional resources. The purpose of the program is to inspire students to pursue careers in STEM, a goal in which they have an 89% success rate. The program has a number of benefits including job-embedded mentorship, free access to research resources, flexible program implementation and access, and professional compensation for teachers.

Our student section is collaborating with Science Coach to bring high school level research projects to schools in Puerto Rico. Our section networks with schools and teachers as part of our K-12 program and recommends them for the Science Coach program. Teachers have the opportunity to choose a group of students to participate in the program, after which the students can create their own research projects. Science Coach helps teachers find funding for their projects, while ANS UPRM will help provide general guidance, support, translation support, and connections with local laboratories and subject-matter experts. This part of the project is expected to launch as a pilot project in August 2022.

In addition to acting as an additional support group for participating schools in Puerto Rico, our student section is also designing, in collaboration with Science Coach, a nuclear science and engineering curriculum that participating students can follow to develop their projects within the nuclear sciences field. This program will be the first nuclear science and engineering official Science Coach resource, which will become available to all schools once it has been approved. Following the program's approval, we plan to translate the curriculum into Spanish, and publish the first bilingual Science Coach curriculum. This part of the project is expected to launch in August 2023 (for the English version) and August 2024 (for the Spanish version).

6.1 Acknowledgements

American Nuclear Society

We would like to formally acknowledge Steve Nesbit, Steven Arndt, Aubrey Whittington, Amanda Bachmann, Samuel Dotson, and everyone else at the American Nuclear Society at a national level that have given the extra mile to help support our student section. From offering their valuable time to speak to our students, to helping our section coordinate events and get involved, the ways in which the ANS community has supported our section are endless. We are incredibly grateful to be included as a part of the nuclear community.

Dr. Silvina Cancelos, University of Puerto Rico

We would like to formally acknowledge Dr. Silvina Cancelos, our current advisor, for the incredible contributions she has made to the student section and the INNU program. Dr. Cancelos has been with our section from the very beginning, bringing guidance and wisdom while navigating the natural rough waters of the formation of a new section. In addition to this, Dr. Cancelos volunteered to teach the first nuclear engineering course at the University of Puerto Rico at Mayagüez in over 15 years. This incredible feat marks the birth of a new era at the University of Puerto Rico, and plants the seed for a future Nuclear Engineering (INNU) program at the UPRM. There is a long way to go, but this course marks a huge step in the right direction. A warm thank you from all the students at ANS UPRM.

Jesús Núñez, Nuclear Alternative Project CEO

We would like to formally acknowledge Jesús Núñez for being remarkably supportive of our student section. Jesús frequently volunteers as a guest speaker at our bilingual webinars and scientific panels. He has provided a much needed reliable source of information for students at the UPRM through the Nuclear Alternative Project and his involvement with the ANS UPRM Student Section.

6.1 Acknowledgements

Donald Hoffman, American Nuclear Society

We would like to formally acknowledge former president of the American Nuclear Society, Donald Hoffman, for his contributions to this Student Section. In October of 2019, Hoffman attended a conference in Puerto Rico where he met several students from the University of Puerto Rico. Mr. Hoffman was welcoming and kind in educating students about ANS, and pitched the idea of open a student section at the University of Puerto Rico. These students later became the founders of the ANS UPRM Student Section. Without Donald Hoffman's initial inspiration, our founders would not have learned about American Nuclear Society, and our student section would not have been created at that time. We are truly grateful for the opportunity we have been given.

Exelon Corp. and Constellation Energy Corp.

We would like to formally acknowledge the kind scientists, engineers, and employees at *Exelon Corp* and *Constellation Energy Corp* for their support. Exelon has provided multiple contacts and speakers for our webinars, recruitment sessions, and other activities over the last two years, a role that is now fulfilled by Constellation Energy Corp. These outreach efforts are incredibly important to provide educational and career development opportunities for our students. We are grateful for the support and we look forward to collaborating with them again in the future.

University of Illinois, Urbana Champaign

We take our hats off to the University of Illinois for their outstanding work at coordinating this year's student conference. We look forward to hosting a student conference in the future, and the U of I Student Section has set an excellent example for us to follow.



6.2 A Note From our Board of Directors

As the 2021 Samuel Glasstone Award Winners, we are incredibly honored to be a part of American Nuclear Society and glad to have the opportunity to apply for this award once again. We would like to give a special thanks to everyone at American Nuclear Society and at the University of Puerto Rico in Mayaguez that has contributed to the development of our student section during the past 12 months, since none of our accomplishments would be possible without this support. It is an honor for us to be part of such a strong community of people who share the same love for science and education.

We hope that our community continues to grow in numbers as the passion for nuclear sciences continues to grow in our students' hearts. We at ANS UPRM are committed to honor the nuclear community through passion, progress, innovation, inclusivity, and diversity for years to come. We are proud to represent the Puerto Rican community and to be part of 1 ANS.

Our inspiration for this year's annual report was the beauty of our campus, which we had been unable to visit for a very long time due to the Covid-19 pandemic. We decided to share this beauty with everyone at ANS through vivid and colorful images scattered throughout our report, as well as a short campus tour located in Section 7.1 of the Appendix.

