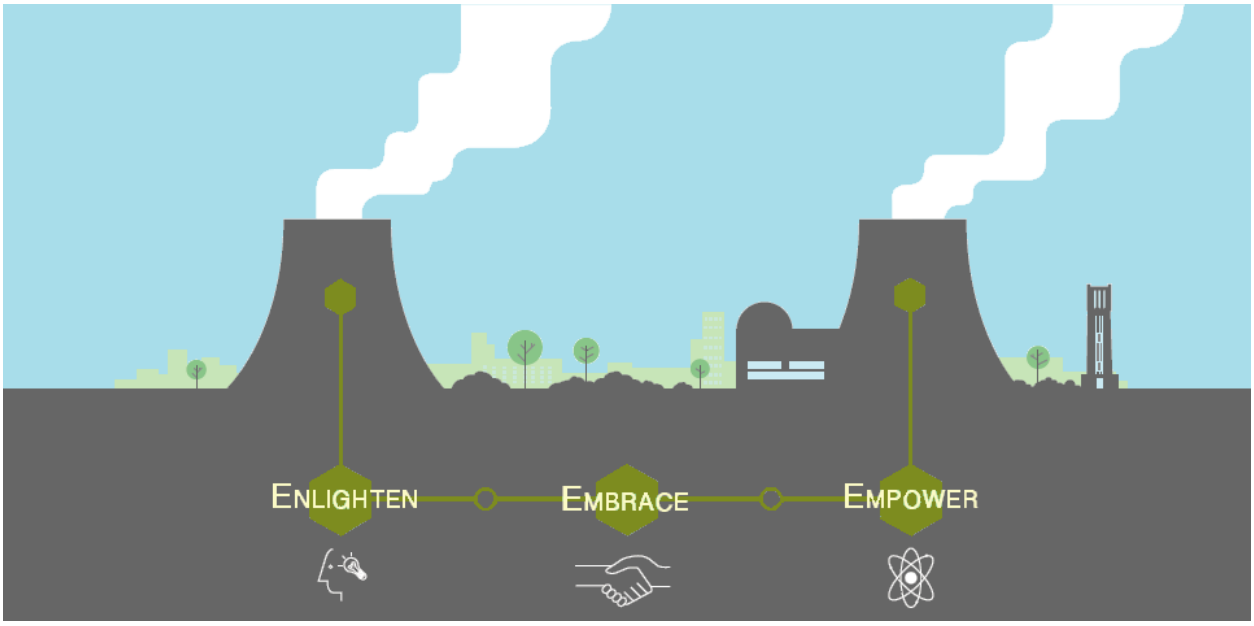
2019 American Nuclear Society
Student Conference Proposal



Presented By:

American Nuclear Society
North Carolina State University

October 2, 2017

Student Sections Committee
c/o ANS Headquarters
555 North Kensington Avenue
La Grange Park, Illinois 60526

Dear ANS Student Conference Committee,

The ANS Student Chapter at North Carolina State University presents this proposal to host the 2019 ANS Student Conference in Raleigh, North Carolina. NC State's Department of Nuclear Engineering has grown tremendously in the past 5 years, and we feel confident in our ability to successfully host this event. We have based our proposal not only on the success of our nuclear academic program, but also past activities since hosting the ANS Student Conference in 2001.

NC State has been a pioneer in the field of nuclear engineering education with the 1st university research reactor in the world. Today, we are the lead university in the Department of Energy-funded Consortium for Advanced Simulation of Light Water Reactors (CASL) project as well as the US Department of Energy National Nuclear Security Administration-funded Consortium for Nonproliferation Enabling Capabilities (CNEC). In addition, our department has consistently ranked in the top ten among nuclear engineering programs and is led by accomplished and seasoned faculty members.

In considering a theme for this conference, we reflected upon the "Not-In-My-Backyard" mentality that has been plagued our industry's growth. It is necessary to spread awareness about the advantages of nuclear technology as well as positively interact with the community around us. Equipping young nuclear scientists and engineers to communicate effectively is an integral part of our professional development. Our theme, "**Enlighten. Embrace. Empower.**" focuses on the three different goals to build upon the progress in our field. It is our hope that highlighting these important objectives will help break through the stigmas the nuclear industry faces.

We appreciate your time and consideration of our proposal and look forward to providing a unique opportunity for the professional development of our industry's future leaders.

Sincerely,

John Pashby
Conference Co-Chair

Ishita Trivedi
Conference Co-Chair

Enlighten Embrace Empower

Our theme “Enlighten. Embrace. Empower.” is a mantra applicable unifying students and professionals in the field and assisting the public in understanding the contributions of nuclear science and technology. The nuclear industry is a robust, developing field spanning the globe. There are continuing obstacles that face our community, such as the “Not In My Back Yard” (NIMBY). One way to challenge this and other obstacles is a three-step approach embodied in the phrase ‘Enlighten. Embrace. Empower’.

The first part of this approach is Enlighten. Embodied in this phrase is the paramount focus of education and awareness: outlining the advantages that outweigh the risks associated with having a nuclear power plant or other facility in our backyard. Enlightening our neighbors opens communication and enhances the move to understanding, accepting, and embracing the technology. This approach includes advocacy, nuclear policy, and political action. With a more informed community, together we will empower the world with nuclear energy.

The second part of the three-step approach strategy is Embrace – understanding and welcoming the value added nature of nuclear science and technology in medicine, nonproliferation, nuclear materials, and more. The goal of this step is to emphasize that our nuclear world that walks us through our daily life.

Finally, empowering young professionals to embrace and enlighten themselves and others, moving us forward nationally and internationally.

NC State’s ANS Student Chapter will use this three-prong approach to help our nuclear industry to continue its march forward for the advancement of society. NC State’s position within North Carolina and the Southeast allows for an incredible opportunity to have this conversation. Our technical sessions, workshops, and panels will fall into the theme of ‘Enlighten, Embrace, Empower’. We are excited to host the 2019 Student Conference.

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About Central North Carolina

Raleigh: The City of Oaks

Figure 1. Raleigh City Skyline

As the capital of North Carolina, Raleigh has consistently been ranked one of the top cities in America for its historical attractions, public education, music and the arts, as well as cuisine. Raleigh is also the principle corner city of the widely known Research Triangle that has dramatically increased the population of the region through vibrant economic activity.

Established in 1792, Raleigh was one of the first planned state capitals in the United States of America. The city's grid-like design was based upon plans from Philadelphia and the early planning has proven to facilitate significant growth of the city. Raleigh is known as the "City of Oaks" due to the abundance of old oak trees throughout the city. Within city limits, one can find dozens of museums, hundreds of businesses and restaurants, and thousands of acres of parks. Raleigh lies comfortably in east-central North Carolina between the hills of the Piedmont and the Atlantic plain that allows the city and its surroundings to enjoy a more subdued subtropical climate compared to most of the southeastern United States.

The city has an elaborate primary and secondary education system with a mixture of private and public institutions within the Wake County Public School System, multiple magnet schools, and a host of private/religious establishments, all which feed into the various higher education institutions in the region The area is home to several higher-level institutions with NC State University as its engineering flagship. Other notable institutions include Shaw University, the first historically African-American college, established in 1865. Other higher education institutions include Meredith College, William Peace University and Wake Technical Community College. This breadth, as well as depth, in terms of education has resulted in Raleigh being repeatedly reported as one of the most educated cities in the United State based on residents holding college degrees.

Some of the cultural, social, and historic sites include the Duke Energy Center for the Performing Arts. The Center is home of the North Carolina Symphony and the Carolina Ballet, along with host for various classical, theatrical, and musical events throughout the year. Various museums exist within the city – the NC Museum of History, NC Museum of Natural Sciences, NC Museum

of Art, and the Contemporary Art Museum. Live Nation and Red Hat operate two large outdoor music amphitheaters in Raleigh - Walnut Creek Amphitheater and Red Hat Amphitheater - that can accommodate thousands of attendees and often host shows from headlining artists from across the country. Raleigh, like the state, has historically been an agriculturally focused and the city has been the site of the North Carolina State Fairgrounds since 1928, but has hosted the state fair in some capacity since 1853. The city contains more than 8,000 acres of parkland, interconnected by trails and greenways that spread across the city.

The Triangle

Figure 2: Centennial Campus

NC State in Raleigh is one educational anchor of the Research Triangle, others include Duke University in Durham and the University of North Carolina in Chapel Hill. The combined academic presence has led to a heightened popularity of collegiate sports, with teams frequently competing against one another in national tournaments. The Research Triangle Park (RTP), one of the largest research parks in the world, employs nearly 50,000 people in over 200 companies (includes IBM, RTI International, Credit Suisse, and Cisco) within the fields of microelectronics, telecommunications, biotechnology, chemicals, pharmaceuticals, and environmental science. Other notable companies include Duke Energy, SAS Institute, General Electric-Hitachi, BASF, and Red Hat. The Research Triangle has been responsible for the region being one of the fastest growing communities in the United States – a 50% growth from 2010 to 2030. The communities within the Research Triangle have appeared on multiple rankings for business opportunity, best places to live, and smartest cities over the past 15 years. And various industries invest more than $296 million in research and development in universities in The Triangle.

North Carolina is also noted for being favorable to nuclear energy – the primary share of the state's electricity generation. The three nuclear power plant sites operating in North Carolina include Brunswick, McGuire, and Shearon Harris. The Shearon Harris Nuclear Power Plant is located 20 miles outside of Raleigh and provides a significant share of electricity for the rapidly expanding Research Triangle. The importance of nuclear power in the state combined with accelerated population growth continues to foster a research focus on the nuclear science and technology at NC State University. The State is continuing to develop a foundation for the nuclear industry with such companies as General Electric-Hitachi, AREVA, NuScale, and Toshiba establishing a presence.

Figure 3: Shearon Harris Nuclear Power Station

NC State: A Department of Firsts

NC State University (NCSU), the largest university in North Carolina, is home to 33,755 students within 12 academic programs. With more than 800 patents in NCSU's name, innovation can be seen across the university. Centennial Campus alone is home to one of the largest engineering programs in the US, as well as the James B. Hunt Engineering Library, and over 70 government, industry and nonprofit partners. In January 2015, President Barack Obama announced that NC State was chosen to lead the Next Generation Power Electronics National Manufacturing Innovation Institute. NC State is proud to have one of the top nuclear engineering programs in the United States – ranked 5th in the 2017 US News & World Report. In 1953, it became home to "the first temple of the atom," the first nuclear research reactor in an academic institution. There have been four reactors on campus at three different campus sites. Currently standing and operational is the PULSTAR reactor, built for instruction, research, and reactor operator training and has been nationally recognized as the premier 1-MW reactor program. The PULSTAR reactor has and continues to be utilized by other universities and industrial organizations.

Figure 4: NC State Department of Nuclear Engineering

First achieving criticality in 1972, the PULSTAR has been utilized for many different experiments and has undergone many upgrades to its various systems. Some of its research facilities include a high intensity positron beam that creates anti-electrons for use in positron spectroscopy, used for studying both thin and bulk films. This study allows a non-destructive but quantitative way of studying voids and defects in both films and solids. The PULSTAR also has a neutron diffraction facility, used for studying the structures of different crystalline solids. Under construction is the Ultra Cold Neutron facility, that will use heavy water and cryogenic gases to slow down and cool neutrons to below 70K. It will study the behavior of the free neutron. In line with one of the missions of the PULSTAR, service, is the Neutron Imaging Facility. For instance, NIF is being used for the imaging of aircraft turbine blades. These neutron images are part of a quality control assurance for each turbine blade.

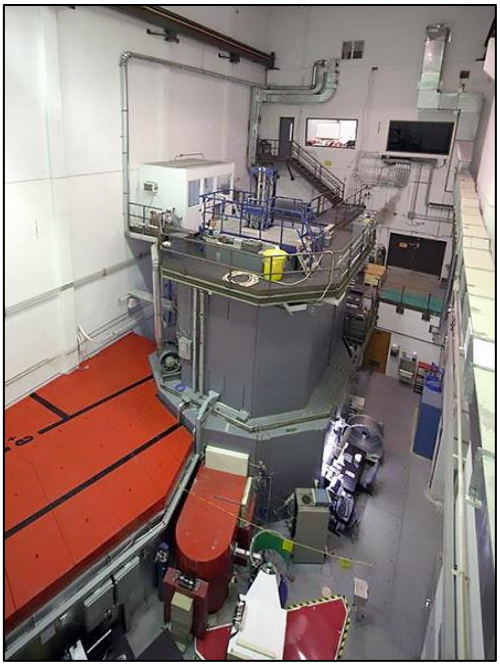


Figure 5: PULSTAR Reactor

The PULSTAR is an invaluable teaching tool, providing real time data for both students in the control room as well as remotely through the internet reactor laboratory. The internet reactor laboratory allows students in the United States and abroad to see all the parameters a student in the control room would see, as well as having video conferencing abilities. Along with being used for labs, students at NC State can also become licensed reactor operators. By taking a course on reactor operations, and undergoing a rigorous training regiment, selected students will be tested and licensed by the NRC to operate the PULSTAR reactor.

The newest edition to our facilities include the Nuclear Engineering Simulation Laboratory. A Generic Pressurized Water Reactor (GPWR) was purchased from GSE Systems. It serves as an invaluable teaching tool for our upper level and graduate students.

Figure 6. Nuclear Engineering Simulation Laboratory

We are also proud to host a number of unique consortia –

- The Consortium for Advanced Simulation of Light Water Reactors (CASL), funded by the Department of Energy, uses advanced computer simulations to create safer, more cost-effective nuclear power plants.

- The Consortium for Nonproliferation Enabling Capabilities (CNEC) is funded by the National Nuclear Security Administration's (NNSA's) Office of Defense Nuclear Nonproliferation (DNN R&D) Proliferation Detection Program (PDP). The mission of the PDP is to develop technologies to detect foreign nuclear weapons development activities; to support nuclear arms control treaties verification and monitoring for compliance; and to support national nuclear security more broadly.

- The Consortium for Nuclear Power (CNP) was established in March 2017. Its mission is to promote research and development, innovation, education, and training as well as the provision of technical support, expert advice and consultancy services that will benefit the nuclear industry and its regulation.

- The National University Consortium (NUC), established by INL, with NC State University as one of the founding members, collaborates on research that strengthens the portfolios of INL and universities thus furthers the nation's strategic nuclear energy objectives.

In addition to the consortia, our department houses multiple research groups and programs –

- The 4th State Application Research Group (4-STAR) focuses in the area of industrial applications of plasma discharges, enhancing current plasma applications and developing new plasma applications for next generation material and device fabrication.

- The Center for Engineering Applications of Radioisotopes (CEAR) focuses on industrial and medical radiation and radioisotope measurement applications. The areas of interest include the optimum design and use of short-lived radioisotope tracers for unit processes, nuclear gauges, nuclear analyzers, nuclear oil well logging devices and computed tomography devices.

- The Nuclear Reactor Program (NRP) enhances, promotes, and utilizes the PULSTAR research reactor and associated facilities dedicated to research, teaching and extension. The 1 MW PULSTAR research reactor is recognized nationally for its efforts.

- The Radiation Detection Applications in Nuclear Security (RADIANS) applies advanced radiation measurement and analysis methods to meet current and future challenges of the nuclear security mission.

- The Reactor Dynamics and Fuel Modelling Group (RDFMG), established at Penn State University recently moved to NC State University. RDFMG has expertise in developing, validation, and application of methodologies in core neutronics, core and system thermal-hydraulics, and coupled neutronics/thermal-hydraulics/fuel performance calculations.

- The Retrospective Dosimetry and Nuclear Assay (RDNA) focuses on measurement techniques that can reconstruct historical radiological operations and materials spanning emergency response, forensics and air monitoring applications.

Lastly, departmental faculty participate in collaborative research with other departments. For example,

- The Center for Nuclear Energy Facilities and Structures performs research on innovative and rigorous solutions to problems in nuclear power plants and transfers this technology to industry. These solutions decrease uncertainty, increase safety and reduce the cost of operation of existing plants and of building new ones.

NC State's American Nuclear Society Student Chapter

The American Nuclear Society Student Chapter at North Carolina State University was formed in 1958, making it one of the oldest in the nation. In our almost 60 years of existence, we have helped generations of nuclear engineers bridge the gap from academia into industry. Currently, our chapter consists of approximately 80 individuals, including both undergraduate and graduate students. This past year, eight of our members were recipients of ANS scholarships.

Professional Development

Each semester, the College of Engineering hosts a college-wide career fair. To prepare our members, we host resume and interview workshops, as well bring in the companies to our meetings so they can meet one-on-one with just nuclear engineering students. In the past couple years, we have hosted General Electric-Hitachi, Savannah River National Laboratory, the US Navy, NAVSEA, US Department of Energy NNSA, PNNL, INL, and the US NRC, to name a few. Additionally, to meet on a more personal level with industry members, we host networking nights with the North American Young Generation in Nuclear (NAYGN) at Duke Energy. To give our members a more hands-on technical experience, we sponsor tours to nearby facilities, such as Shearon Harris Nuclear Power Plant. This spring, we plan to travel to Savannah River National Laboratory and the Brunswick Nuclear Power Station. Lastly, we send between 20-25 students to the ANS Student Conference.

Figure 7. NC State at the 2017 ANS Student Conference

Service

In addition to professional development, service is another core element of our chapter's mission. We often assist the department during university open houses as nuclear engineering ambassadors, speaking to prospective nuclear engineering students and parents about our program. Each fall, all freshman engineering students are required to design and compete projects. One of the projects is nuclear related, entitled "Light Sensitive Monitor for the PULSTAR Reactor". We assist in the judging of the project. Lastly, we host a boy scouts' nuclear science merit badge workshop to educate youth about nuclear science and technology.

Socials

We frequently host socials for networking, as a study break or to end a successful academic year. Highlights include 'Welcome to NCSU Nuclear Engineering', the end-of-year picnic, bowling nights, and football tailgates. On a more frequent level, we partner with our sister organization, Women in Nuclear (WIN), to host dinners at a local restaurant every Wednesday evening. Known as WIN Wednesdays, this event helps breaks up the week and serves as a networking event. We also team with the department for a Nuclear Halloween and Thanksgiving potluck.

Figure 8. Annual ANS Fall BBQ

Conference Plan

Proposed Dates

The two weeks proposed for the 2019 conference held at NC State are as follows (in order of preference):

1. April 4 – April 6, 2019
2. April 11 – April 13, 2019

Our first proposed date was chosen for the following advantages:

- As all the facilities are available for the dates. The first date was also chosen to stay with tradition of hosting the student conference during the first week of April.
- As shown in the calendar below, every school's spring breaks occur in March, and therefore will not interfere with any of the breaks.
- The dates are late enough in the semester to give senior design teams enough time to prepare their projects.
- As Palm Sunday is on April 14, preference is given to the first date as to allow students who wish to observe this holiday time to return home.
- According to the current ANS calendar, neither date conflicts scheduled meetings or conferences.
- Raleigh weather in April is mild, ranging between 50 and 70 degrees Fahrenheit. Both dates are late enough that snow related travel obstructions should not be an issue.

March, 2019

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4	5	6	7	8	9
University of Florida, Pennsylvania State, VCU						
10	11	12	13	14	15	16
Virginia Tech, Purdue, NC State, University of Pennsylvania						
17	18	19	20	21	22	23
University of Tennessee, Idaho State, University of Wisconsin						
24	25	26	27	28	29	30
UC Berkely, MIT, Oregon State, University of Missouri						

Attendance

Our location in the Nuclear South and ability to attract industry leaders should draw attendees to our conference. The table below shows attendance numbers from the past eight student conferences. Based upon these numbers, we expect between 400 and 500 students, and around 150 professionals. The Budgeting and Finance Section shows a detailed budget for both the high and low attendance estimates.

School	Year	Students	Professionals
(North Carolina State University)	(2019)	(500)	(150)
University of Florida	2018	430*	120*
University of Pittsburgh	2017	450*	150 *
University of Wisconsin, Madison	2016	438	118
Texas A&M University	2015	380	87
Pennsylvania State University	2014	388	134
MIT	2013	531	101
University of Nevada, Las Vegas	2012	400	200
Georgia Institute of Technology	2011	425	150
University of Michigan	2010	482	183

* Estimated Attendance

Attendance Contingency Plan

If attendance is higher than expected, the overflow hotel facilities will be used to accommodate lodging. The conference program limiting factor is transportation. If we notice there are more attendees than planned, we will contract more buses. The increase in attendees should cover that cost. If attendance is lower than expected we will make appropriate cuts to the budget in areas such as reimbursement, dining or socials. See the finance section for specifics.

Facilities

Talley Student Union

Figure 9: Talley Student Union

Most of the conference, including the technical workshops, panels, banquets, and poster sessions will take place in North Carolina State's Talley Student Union. The Student Union was recently built featuring state-of-the-art design both on its exterior and interior. The State Ballroom can comfortably seat 1200 attendees in auditorium style seating or 672 attendees in banquet style seating. The State Ballroom may also be divided into up to five separate meeting rooms that can each hold more than 100 attendees. In addition, there are 8 different conference rooms capable of holding up to 100 attendees, including Stewart Theatre, that can hold up to 740 attendees.

Talley Student Union houses an exciting lineup of new dining options, starting with four quick-service restaurants, a convenience store, gourmet bakery, elegant bistro, and ice cream shop. Other amenities include the NC State's bookstore, a copy center, a movie theater, and ATM. Talley creates an all-inclusive environment by facilitating building accessibility as well as gender-neutral bathrooms. Energy saving heating and lighting, recycling options for food and electronic products, green cleaning products, low flow plumbing, and access to local foods make Talley a shining example of sustainability. Talley is a short walk away from north campus that is fondly referred to as the Brickyard. There are a variety of spacious and relaxed lounge areas for attendees to enjoy between sessions.

Figure 10 Tally Student Union Ballroom

Individuals under the employment of NCSU Events Services, who manage the technical equipment for the individual rooms, will be hired to help manage the use of the rooms. Technicians will be employed to ensure the functionality of the equipment such as projectors, screens, cameras, microphones, etc. **Talley provides a wonderful service to student organizations by allowing them to rent rooms free of charge**. Daily equipment rental and staffing rates are similarly affordable, ranging from $50 to $100 for most equipment and personnel.

Figure 11: Interior of Talley Student Union

Facilities Contingency Plan: Sheraton Raleigh Hotel

Figure 12. Sheraton Raleigh Hotel

The Sheraton Raleigh hotel serves as the primary lodging facility for the conference, but also serves as a contingency location for the main conference events. The 18,000 square foot indoor meeting space includes the Oak Forest Ballroom with a capacity to hold 600 attendees. There are 6 additional conference rooms that have a capacity of up to 100 attendees and 4 additional rooms to hold up to 50 attendees. Located in the heart of downtown Raleigh, the Sheraton is a short walk from several delightful venues and within 3 miles of the NC State campus. Enjoy the onsite Italian-American restaurant, Jimmy V's Osteria and Bar, or take a short, 10-minute walk to the Contemporary Art Museum of Raleigh. Cameron Village contains more than 100 stores, restaurants, and bars, is only an 8-minute drive away.

The Sheraton will provide audio visual and catering staff to set up individual rooms for each event. Once a minimum of $50,000 has been spent on catering and staffing, which is likely due to the size of the event, the room rental fees are waived.

Figure 13. Interior of Sheraton Hotel

Hotels

StateView Hotel
2451 Alumni Dr.
Raleigh, NC 27606
1-404-920-3015


Figure 14. NC State's Marriott Hotel

Located a stone's throw away from Lake Raleigh, this Marriott Autograph Collection hotel is a short walk from the Lonnie Poole Golf Course, Dorothy and Roy Park Alumni Center, and the State Club. Situated on NC State's Centennial Campus, the Talley Student Union Building is only a 10-minute drive away. Each of the 164 rooms features a 49" flat screen TV, complimentary WiFi, a walk-in shower, and in-room phone chargers. Relax in the outdoor pool and restaurant and bar, or enhance your productivity with the business and fitness centers and reception area.

- 50 rooms available
- $159/night
- Located on NC State Centennial Campus

Sheraton Raleigh Hotel
421 South Salisbury Street,
Raleigh, NC 27601
Phone: 1-919-834-9900

Figure 15. Raleigh Sheraton Hotel

Get lost in the sights and sounds of downtown Raleigh. The hotel is a leisurely walk from the State Capitol, museums, restaurants, nightlife, and the Duke Energy Center for the Performing Arts. The 100% smoke-free hotel features a polished, contemporary flair throughout all guest areas. The 353 renovated guest rooms and suites all feature the ultra-comfortable Sheraton Sweet Sleeper® Bed and a flat-panel LCD TV. Breakfast will be provided by the hotel catering staff every morning for attendees.

- 250 rooms will be reserved for conference use out of the 353 available rooms
- $145/night
- 3.3 miles from NC State Campus

Overflow- Doubletree Hilton Brownstone Hotel
1707 Hillsborough Street,
Raleigh, NC 27605,
Phone: 1-919-828-0811

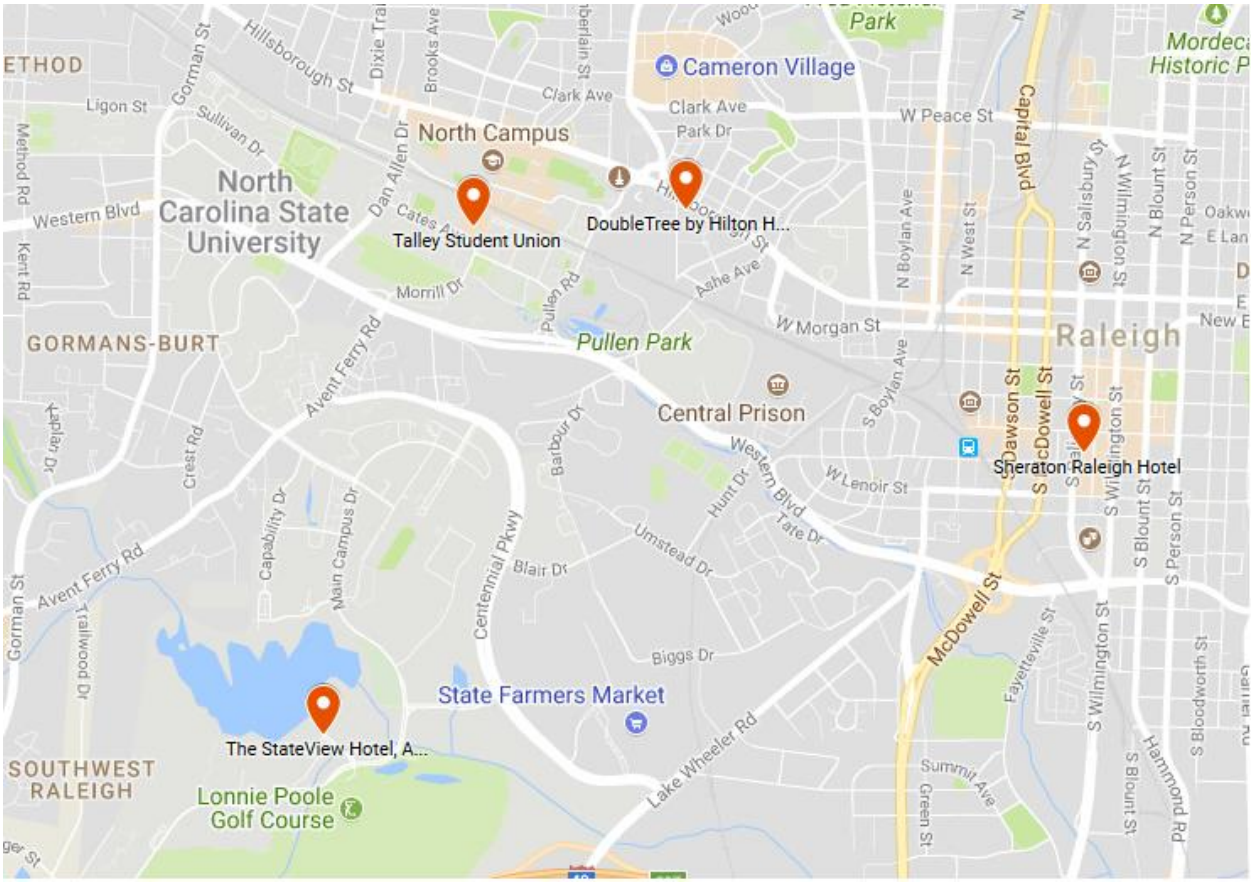
Figure 16. Doubletree Hilton Brownstone Hotel

Ideally located downtown near NC State University, this Raleigh hotel is just steps from 100 retail stores, 30 restaurants and numerous entertainment venues. Enjoy easy access to the downtown business district, Raleigh Convention Center, NC State Capitol and government complexes, one mile away. Corporate travelers appreciate our proximity to US 1 and I-40/440, Research Triangle Park and Raleigh-Durham International Airport. Experience the upscale amenities such as 37-inch HDTVs, clock radios with MP3 connectivity and complimentary high-speed internet access.

- 50 rooms will be available for conference Use
- $149/night
- Adjacent to NC State Campus

The map below shows the conference facilities and the hotels. Buses will operate on a regular schedule to transport attendees between the different locations.

Scale: 1 inch ~ ¾ mile



Dining

Figure 27. Rave! Catering

Since the majority of the conference will be taking place on campus, the major meals and refreshments will be provided by Rave! Catering. Rave! Catering, located within Talley Student Union hosts all catering and event activities for university events. They provide the optimal venue setup with the best menu selection, freshest ingredients, and local produce for any event. Also, Rave! has a good selection of vegetarian and allergen free options for those with dietary restrictions. In addition to our catering service, there are an abundance of dining locations within Talley Student Union and within the Atrium Food Court on NC State's north campus that could provide students with options outside of the conference plan. Beyond campus, there are a host of restaurants very close to NC State that range from fast food to upscale dining. We encourage students and attendees in general to explore the many options of Raleigh. Many of these locations are located along Hillsborough Street, which is adjacent to NC State's campus and serves as the thoroughfare from campus to downtown Raleigh. We also expect the hotels, that will hosting students, will have a variety options for foods throughout their stay. Additional details on the budgeting and pricing of the dining options can be found in the Appendix.

Coffee and Refreshment Breaks

Coffee and refreshment breaks will be provided Thursday, Friday, and Saturday both morning and afternoon during the conference program. These breaks will be provided by Rave! Catering in Talley Student Union and are expected to provide coffee, tea, snacks, and fruit. These breaks will provide time for attendees to network.

Breakfasts

Light breakfasts will be provided through Rave! on Friday and Saturday, which will include Port City Java coffee, fruit juices, hot water with assorted tea bags, seasonal fruit, pastries, and oatmeal.

Lunches

Boxed lunches will be provided on Friday and Saturday, as well as to those attending tours on Thursday. These boxed lunches are perfect for attendees while they continue conference activities. Each lunch box includes a sandwich, large cookie, potato chips, and choice of canned soda or bottled water. In addition, attendees are encouraged to explore campus options such as Talley's restaurants and the Atrium Food Court, as well as the vast number of nearby restaurants.

Thursday Dinner: Enlighten

The opening dinner on Thursday night will be within the Talley Student Union in the State Ballroom. The theme for the night's activities and dinner will be the "Enlighten" portion of our threefold theme. The dinner, provided by Rave!, will consist of a themed buffet which will include a main course, sides, salad, and a dessert. Selected speakers will present, discussing their fields and the connections to the nuclear industry, related to the theme. The night will conclude with the social at Boxcar Bar + Arcade.

Friday Dinner: Embrace

On Friday night, dinner will be held again within Talley Student Union in the State Ballroom. The theme for the night's activities and dinner will be the "Embrace" theme. The dinner will consist of three course plated meals by Rave! with a choice of salad, sides, rolls, main course, and dessert. Selected speakers will also give talks discussing their fields and the connections to the nuclear industry and theme. The night will conclude with the social at East Village Bar and Grill.

Saturday Dinner: Empower

As a conclusion to our conference, the Saturday night Dinner and Awards Ceremony will be held in the Contemporary Art Museum in Downtown Raleigh for a night of celebration and fun. The night's theme will round out our conference's approach with the idea of "Empower" when it comes to the next era of the nuclear industry and focus on our nuclear world. The dinner will consist of a multiple course plated meal with desserts and a bar (for of age attendees) provided by a well-established catering service required by the Museum. The night will also include the Awards Ceremony where the winners will be recognized for the various papers and special awards. Special speakers, along with ANS leaders, will leave resonating messages as we conclude the conference. The night will end with a live band within the Contemporary Art Museum.

Preliminary Program

Arrival

For guests arriving via plane on Thursday, shuttles to and from the airport will operate at a regular schedule throughout the day. The shuttles will be operated by student volunteers, and will be available on an as-needed basis. Additionally, we will create an Uber/Lyft discount code for conference attendees.

Thursday

Conduction of off-site tours of the Sharon Harris Nuclear Plant and Duke Triangle University Nuclear Laboratory (TUNL) tour will be held in the morning before lunch. Those students attending the General Electric –Hitachi tour will spend the majority of the day on the trip. Lunch will be served at NC State's Bistro 1887. Facility tours of the campus, PULSTAR reactor, plasma facilities, materials labs and simulation lab will be held throughout the day. The opening reception will promptly begin at 6:00 pm at NCSU's Talley Student Union, the center of student activities and the university's premier organizational space. The reception and dinner will be followed by a rocking social at the Boxcar Bar + Arcade. Bussing to and from the social will be provided.

Friday

Panels, technical sessions, poster sessions, the career fair and lunch will be held in the morning and afternoon at Talley Student Union. Several campus tours and departmental facilities may be provided for those who are unable to attend on Thursday. The keynote speaker and formal dinner will be held at Talley beginning at 6:00 pm. Following dinner, attendees will be able to walk to our main street, Hillsborough St., to enjoy an evening at East Village Bar and Grill. Additionally, the older crowd will have an opportunity to experience one of our popular bar strips, Glenwood Avenue.

Saturday

The panels, technical sessions, lunch and interviews will wrap up during the day. Workshops will be held in the morning and afternoon. The conference will be concluded with an enjoyable night at the North Carolina Contemporary Art Museum with a social following. This social will finish off the conference with a bang by featuring a live band performance.

Sunday

Shuttle service will run through the morning and day to Raleigh-Durham Airport from the hotels.

Thursday

	Mountains / Piedmont	Coastal	Currituck	Hatteras	Ocracoke	3210	3222	3285
12:00								
12:30								
1:00	MCNP Workshop							
1:30								
2:00								
2:30								
3:00			1st Time Orientation					
3:30								
4:00								
4:30								

Friday

	Mountains / Piedmont	Coastal	Currituck	Hatteras	Ocracoke	3210	3222	3285
8:00								
8:30								
9:00								
9:30								
10:00	Career Fair	Policy Changes Panel	Reactor Physics I	Persuasive Speaking Workshop	Fuel Cycles & Waste I	Detection & Measurement I	Thermal Hydraulics I	Math & Computation I
10:30								
11:00		Spent Fuel Panel						
11:30								
12:00			Lunch & Learn		Lunch & Learn			
12:30								
1:00				Cobra Workshop				
1:30								
2:00		Nuclear Economics Panel	Reactor Physics II		Fuel Cycles & Waste II	Detection & Measurement II	Thermal Hydraulics II	Math & Computation II
2:30								
3:00		NIMBY Panel	ETWD		Accel. App.			Bio & Med
3:30								
4:00		Re-embracing Nuclear Panel						
4:30								

Saturday

	Mountains / Piedmont	Coastal	Currituck	Hatteras	Ocracoke	3210	3222	3285
8:00								
8:30								
9:00								
9:30								
10:00	Poster Session	Nuclear Industries Panel	Nuclear Safety	Planning a Student Conference	Nuclear Materials	Detection & Measurement III	Advanced Reactors I	Radiaition Shielding
10:30								
11:00		New Frontier Panel	Hum. Fact/I&C					
11:30								
12:00		SSC Meeting	Lunch & Learn	Lunch & Learn				
12:30								
1:00								
1:30								
2:00		Innovation Competition	Diversity Panel	Transitioning from Undergarduate Studies	Non-proliferation	Operations and Power	Advanced Reactors II	Fusion
2:30								
3:00			New Frontier Panel					
3:30								
4:00								
4:30								

Panels

Enlighten

Policy Changes - With a new administration, concern over the spread of nuclear weapons has re-entered the public eye. Dr. John Mattingly, Technical Director of the Consortium for Nonproliferation Enabling Capabilities (CNEC), will discuss the technical considerations that went into making the Joint Comprehensive Plan of Action to address Iran's nuclear capabilities. Dr. Bill Boettcher, an expert in nuclear coordination policy, will discuss the how the growing tensions between North Korea and the United States are affecting the global nonproliferation regime. Additionally, Dr. Eric Loewen of General Electric's PRISM Reactor Program will highlight key policy challenges in deploying Gen IV reactors in the American and global markets.

Spent Fuel – One of the greatest environmental challenges of nuclear power is the responsible management of spent fuel storage facilities. The speakers on this panel will include Dr. Robert Hayes, whose research focuses on spent fuel assay and characterization for nonproliferation measurements, Dr. Tracy Stover of Savannah River Remediation, and a representative from the Shearon Harris Nuclear Generating Station, home to the largest spent fuel pool in the United States.

Nuclear Economics – As global energy production shifts away from centralized generating stations to distributed energy resources, nuclear power is adapting to changing and previously untapped markets. Speakers will include Lenka Kollar, director of business strategy at NuScale, Scott E. Rasmussen, Vice President of GE's PRISM product line, and a spokesperson from Duke Energy. Each of these speakers will share their expertise on budget management, product development, and expansion into new markets.

Embrace

Public Acceptance of Nuclear Energy - Over the years, we have improved our outreach to the communities surrounding nuclear power for the public to have greater understanding of its risks and benefits. Dr. William Kinsella, professor within the Communications at NC State, will discuss how different societies perceive risk and how these perceptions affect public lifestyles. Representatives from Southern Company will highlight how construction of the Vogtle Nuclear Plant is having a positive impact on the communities employed by the plant.

Re-embracing Nuclear - After a devastating impact to the public image from recent power plant accidents, this panel will look at how recovering countries are re-adopting nuclear power as part of their energy generation. Topics will include the United Kingdom's interest in PRISM for plutonium burning, and expansion of nuclear power in South Africa and the UAE.

Nuclear Industries - Outside power generation, nuclear industries have great potential in the medical field. From veterinary medicine to biomedical research headed by our sister universities at UNC and Duke, this panel will focus on the benefits of nuclear medicine. Dr. Katarina Stapelmann of NC State's Nuclear Engineering program will discuss how plasmas are being used as a new treatment for skin ailments. On the manufacturing side, Dr. Steven Shannon will discuss how plasma etching techniques are used to produce electronic components.

Empower

New Frontier - Looking ahead to the future, this panel will highlight exciting details about Small Modular Reactors (SMRs), new designs by TerraPower, and even projected reactors for space exploration. It will also look at research reactors in Jordan and upcoming reactors in the UAE and South Korea. The panel will also explore Generation IV reactor designs, with Dr. Leslie Dewan of Transatomic discussing the molten salt reactor design. In addition, Dr. Eric Loewen of GE Hitachi will discuss the PRISM reactor, and its role in closing the nuclear fuel cycle. It will also explore fusion research with a representative from Oak Ridge National Laboratory talking about their partnership with ITER.

Nuclear Outreach - Networking within the community is vital for success. We will host a panel on general information session featuring prominent guests from ANS National, Women In Nuclear (WIN), and North American Young Generation Nuclear. The speakers will include a representative from WIN and NAYGN, and the co-partners of Potomac Communications Group, Mimi Limbach and Laura Hermann. Topics of discussion will include closing the gap between the public and nuclear industry, how to market the industry for recruitment, and how to get new employees involved in outreach initiatives.

Diversity Panel - The Diversity Panel will be from 2:00 pm – 3:00 pm on Saturday and will include the experiences and thoughts of professionals from a variety of backgrounds in the nuclear field. The panel's purpose is to provide firsthand accounts of obstacles often faced within the nuclear industry when it comes to diversity. These experiences will strive to provide insight to what can be done to foster a more inclusive environment, which should ultimately empower students and young professionals from all backgrounds. Speakers will include leadership and members from ANS including Lisa Marshall, Director of Outreach for NC State's Nuclear Engineering Department and ANS Board Member, Brett Rampal from NuScale and Kalin Kiesling, University of Wisconsin graduate student, to name a few.

Workshops

First time conference attendees [Enlighten] - As an introduction to the conference for first time attendees, we would like to hold a short informational program at the start of the conference lead by an ANS Educational Training Workforce Development Division representatives. The representatives will explain how students should begin to experience and explore ANS as an organization, conferences and topical meetings as well as this conference in order to attain the greatest benefit.

Persuasive Speaking [Embrace] - This workshop will equip young and future professionals with the skills needed to convey engineering topics to individuals in a non-technical manner and provide skills to be informative and resourceful to one's own community. This workshop will be led by Margaret Harding, who has been recognized by American Nuclear Society with a Presidential citation in 2011 and the Special Award for Media and Communication in 2012. In our technical nuclear world heavy with jargon and complex topics it is very important to be able to communicate with the public communicating the importance of our nuclear world. Persuasive speaking affects all forms of communication including crisis communication, non-technical explanation of technical subjects, changing others' point of view on the ethics or practicality of nuclear and more.

Transitioning from Undergraduate Studies [Empower] - Presented by Ms. Lisa Marshall of NCSU's Nuclear Engineering Advising, this workshop will prepare students for what is next upon graduation with one's first degree. It will provide insight to prospective students on what graduate admissions committee look for when they review an application. This workshop will also equip students with information with regards to funding their studies, and provide a step by step guide on how to stand out from other applicants when they apply for graduate school. There are many possible paths to take in nuclear engineering, as such this workshop will give future nuclear engineers information regarding the many different possible careers.

Planning a Student Conference [Empower] – Bidding, planning, and hosting a student conference is an excellent opportunity for professional development and leadership experience. The ANS National Young Members Group will be presenting on how to successfully win and plan a student conference, as well as answer any questions the schools may have.

MCNP Workshop [Empower] - MCNP is a general-purpose Monte Carlo N-Particle code that can be used for neutron, photon, electron, or coupled neutron/photon/electron transport. Specific areas of application include, but are not limited to, radiation protection and dosimetry, radiation shielding, radiography, medical physics, nuclear criticality safety, detector design and analysis, nuclear oil well logging, accelerator target design, fission and fusion reactor design, decontamination and decommissioning. This workshop will be hosted by Dr. Avneet Sood, a group leader at Los Alamos National Laboratory who uses Monto Carlo methods in applications in nuclear criticality safety, passive and active radiation detection and measurement, nuclear threat evaluation and response, and nuclear experiment design and assessment.

Cobra-TF [Empower] - Lead by Dr. Maria Avramova, Cobra is a thermal-hydraulic simulation code designed for Light Water Reactor (LWR) vessels and core analysis. It uses a two-fluid three-field modeling approach. The code has been extensively developed and validated for Pressurized Water Reactor (PWR), Boiling Water Reactor (BWR), Water-Water Energetic Reactor (VVER), Small Modular Reactor (SMR), Fast Breeder Reactor (FBR), and research reactor applications. The program is capable of providing three-dimensional figures of full core sub-channel analysis of reactor transient.

Innovation Competition [Embrace] – To follow tradition, NC State will continue to host the Innovation Competition. Students with entrepreneurial ideas in the field of nuclear engineering will present their plan to a panel of judges, followed by a question and answer session.

Technical Sessions

Technical sessions will be held on Friday and Saturday and will be open to both undergraduate and graduate students to present. Each room will be equipped with the necessities for the audio and visual (A/V) system as well as podiums, projectors, screens, and other additional tools.

Poster presentations will be held concurrently with the podium presentations. The podium presentations will be limited to a 15-minute time period and incorporate a 5-minute question and answer portion. At least two judges will decide on the presentation criteria based on, but not limited to, the significance of work, relevance to the field, originality, etc. A volunteer will be in every room to assist with any technical needs and to ensure that the session runs smoothly. In the case of any technical difficulties with the A/V system, the volunteer will manage the transition to another available room.

Several tracks have been proposed for technical sessions in this conference that relate to our theme Enlighten, Embrace, Empower:

Friday

- Reactor Physics
- Fuel Cycles & Waste Management
- Detection & Measurement
- Thermal Hydraulics
- Mathematics & Computation (1 and 2)
- Accelerator Applications
- Biology & Medicine
- Education, Training & Workforce Development

Saturday

- Detection & Measurement
- Human Factors, Instrumentation & Controls
- Nuclear Criticality Safety
- Nuclear Nonproliferation Policy
- Radiation Protection & Shielding
- Operations & Power
- Materials Science & Technology

Papers will be submitted through the national ANS portal. They must follow all template instructions located on the conference website. They will then be processed by the Technical Coordinator and sorted according to their track and presentation type. Papers that align with the missions Consortium of Advanced Light Water Reactors (CASL) and Consortium for Nonproliferation Enabling Capabilities (CNEC) will also be submitted to these tracks. After papers are processed, they will be reviewed by a committee of academic and industry professionals. Following review, the papers will be returned to the authors with comments, as needed. If no comments are made, the paper will be accepted and the author will be notified. Corrected papers will follow the same process after they are returned. If there are too many technical submissions, the best papers will be given priority to a podium presentation and the rest will be presented via a poster

Poster Session

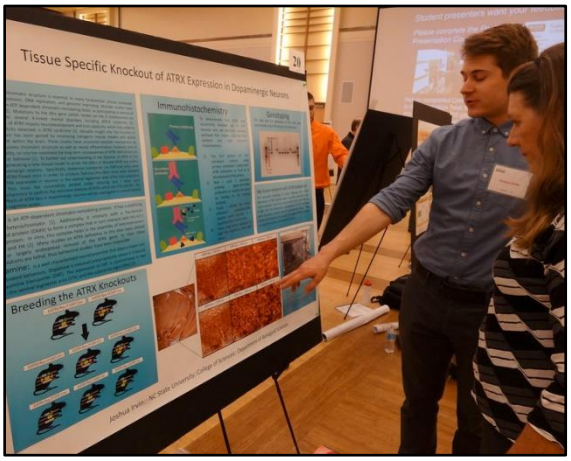


Figure 38. Poster Presentations

Undergraduate and graduate students will be able to present their research during a poster session in the spacious State Ballroom, with over 7000 square feet of space located in newly constructed Talley Student Union. Neither students nor attendees will incur any additional costs for the poster session as the room is included in the cost of the main conference. Students should arrive around 9:30am on Saturday, April 6th to setup their posters, and will be able to share their findings to attendees from 10:00 am – 4:00 pm. Communication with presenters, poster setup, and floor layout will be coordinated by the Technical Committee.

Career Fair

Twice a year, the College of Engineering of NC State hosts one of the largest career fairs in the nation specifically for engineering students. Based on that success and the success of previous student conferences, we will be able to get around 50 companies to participate. In addition, NC State Graduate Admissions and the Career Development Center will be in attendance. Career fair organizations can choose their level of sponsorship via the packages they select. The career fair will be open to all conference participants on Friday in one of the Talley Ballrooms from 10 am to 4 pm. A list of participating companies will be published closer to the date of the conference.

Figure 19: N.C. State Engineering Career Fair

Tours

Shearon Harris Nuclear Power Plant

Figure 20. Shearon Harris Nuclear Plant

Located 20 miles southwest of Raleigh, Shearon Harris is a PWR operated by Duke Energy. The Harris plant provides over 20% of the nuclear power in all of NC, and about 7% of the state's energy over all. The tour of Shearon Harris will occur on Thursday from 9:00 am until 12:00 noon. Bus transportation will be provided by the NC State Motor Pool with a hired driver. Pick-up for the tour will occur at the Sheraton Hotel at 8:30 am and return there around 12:30 pm. The tour will be limited to 35 participants, therefore the first attendees to sign up will have secure spots. The expected transportation cost for the trip is $200.00. (Address: 5421 Shearon Harris Rd, New Hill, NC 27562)

GE-Hitachi Fuel Fabrication

Figure 21. GE Fuel Fabrication Plant

The GE Enrichment Facility and Headquarters is located on the southeast coast in Wilmington, North Carolina. There are various operations ongoing at the site including advanced reactor design. Some of the designs include advanced boiling water reactors or PRISM, an SMR approach to a sodium-cooled fast breeder reactor. The facility also conducts laser enrichment of UF6 gas by way of the SILEX technology. The facility received their operating license in 2012 and has been operating since. The tour of GE Hitachi will occur on Thursday from 9:00 am until 3:00 pm. Bus transportation will be provided by the NC State Motor Pool with hired drivers. Pick-up for the tour will occur at the Sheraton Hotel at 7:00 am and return there around 5:00 pm. The tour will be limited to 55 participants, therefore the first attendees to sign up will have secure spots. Lunch will be provided by either the conference hosts or by GE. The expected transportation cost for the trip is $620.00. (Address: 3901 Castle Hayne Rd, Wilmington, NC 28401)

Duke University TUNL

Figure 22. Duke TUNL Lab

The Triangle Universities Nuclear Laboratory is located on Duke University's campus in Durham, NC. Their facilities are equipped with a High Intensity Gamma-Ray Source (HIGS) in the Duke Free Electron Laser Lab (DFELL), an FN tandem Van de Graaff accelerator whose maximum terminal voltage is 10 MV, and two low-energy electrostatic accelerators in the Laboratory for Experimental Nuclear Astrophysics (LENA). The tour of the Duke University TUNL will occur on Thursday from 9:00 am until 12:00 noon. Bus transportation will be provided by the NC State Motor Pool with a hired driver. Pick-up for the tour will occur at the Sheraton Hotel at 8:30 am and return there around 12:30 pm. The tour will also be limited to 35 participants, therefore the first attendees to sign up will have secure spots. The expected transportation cost for the trip is $220.00. (Address: Triangle University Nuclear Laboratory, Triangle University Nuclear Laboratory Building (TUNL), Durham, NC 27710)

PULSTAR Reactor

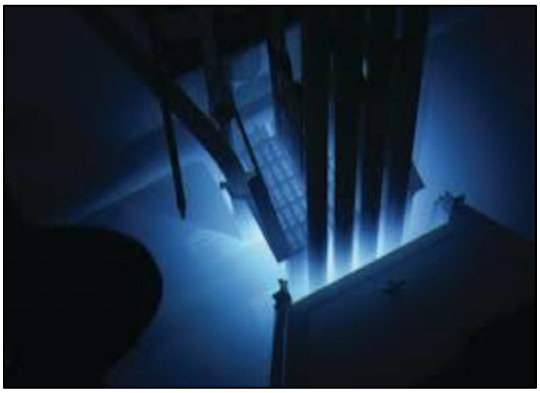


Figure 23. PULSTAR Reactor

One of the stars of NC State's nuclear engineering program, the PULSTAR is a 1 MW research reactor built in 1972. As it is located only a five-minute walk from the conference facilities, tours will be offered throughout the day on an hour and a half interval starting at 10 AM. Frequency of tours can be increased or decreased depending on demand. (Address: 2500 Katharine Stinson Dr., Raleigh, NC 27607)

Hunt Engineering Library and Centennial Campus

Centennial Campus serves as a hub of innovation, housing the fourth largest engineering program in the United States. Over 100 startups have launched on this campus as well as having been issued over 800 patents. Hunt Engineering Library is the center of this campus, nicknamed a “research library of the future”. (Address: 1070 Partners Way, Raleigh, NC 27606)

Figure 24. Hunt Library

Socials

Thursday

Boxcar – The first social is to be held at Boxcar in downtown Raleigh. This Bar-Arcade is a fusion of a traditional arcade and a nightclub. Game tokens will be provided for each attendee. Boxcar will not be a private event exclusively to the ANS Conference but will reserve space for the large crowd. As such, we must limit the social to 400 guests. Additionally, this event will go from 8 – 11 pm.

Figure 25. Boxcar

Raleigh Beer Trolley – For the older crowd, there is a beer trolley located down the street from Boxcar. On this excursion, guests will be able to pedal around Raleigh and get a feel for the city. This is a great way to kick off the conference and get attendees familiar to Raleigh. The trolley stops at three different establishments, where guests may take a break. The trolley returns to Boxcar after a two-hour round trip.

Figure 26. Raleigh Beer Trolley

Friday

East Village Bar and Grill is a short walk away from Talley Student Union, located on Hillsborough Street. Attendees will get to experience the heart of NC State by taking an adventure onto our most famous and historic street. At East Village, karaoke will be provided in addition to finger foods and alcoholic and non-alcoholic beverages. For the older crowd, transportation will be provided to one of Raleigh's most well-known bar strips, Glenwood Avenue. On Glenwood, guests will have the option to go to multiple establishments.

Figure 27. East Village Bar and Grill

Saturday

Our final social will be held at the Contemporary Art Museum in downtown Raleigh. This event will finish off the conference with a bang by featuring a live band. Most importantly, dinner will be served prior to this event and no transportation will be required. The concluding speeches and awards ceremony will fall around dinner before the social. Shortly after dinner, guests are highly encouraged to experience the greatest that Raleigh has to offer. Additionally, the Contemporary Art Museum has a vast space and specializes in special events.

Figure 28. Contemporary Art Museum

Keynote Speakers

1) Dr. Eric P. Loewen is the Chief Consulting Engineer at GE-Hitachi Nuclear Energy (GEH) in Wilmington, North Carolina. His current work involves leading GEH's efforts to deploy the integral fast reactor PRISM, a small modular reactor (SMR) that will recycle spent nuclear fuel from the current fleet of light water reactors and also fission and eliminate weapons grade material. Loewen has been a member of the American Nuclear Society (ANS) since 1987 holding a variety of leadership positions, including having served as President from June 2011 to June 2012. Loewen received both his masters and doctoral degrees in Nuclear Engineering and Engineering Physics, respectively, from the University of Wisconsin-Madison.

2) Dr. Alan Icenhour is the Associate Laboratory Director (ALD) for the Nuclear Science and Engineering Directorate (NSED) at the Oak Ridge National Laboratory (ORNL). NSED operates state-of-the-art nuclear facilities and conducts technology research, development, and application programs that impact a large range of fields from basic science to reactor development to national security. As ALD, Dr. Icenhour leads three research divisions, one operating division, and the Consortium for Advanced Simulation of Light Water Reactors. NSED mission areas include research and development (R&D) for both fission and fusion technologies; advanced modeling and simulation; stable and radioactive isotope R&D and production; research, development, and deployment of technologies to address nuclear security challenges globally; and safe and efficient operation of ORNL's nuclear facilities.

He received his BS degree in nuclear engineering from North Carolina State University, and his MS and PhD degrees in nuclear engineering from the University of Tennessee. He is an Adjunct Professor of Nuclear Engineering at the University of Tennessee. He is a fellow of the American Nuclear Society and a member of the Institute for Nuclear Materials Management.

3.) Congressman G.K. Butterfield is a United States Congressman elected in 2004 in North Carolina's 1st District. Congressman Butterfield serves on the United States House Committee on Energy and Commerce, specifically the Subcommittee on Energy. Through action in the House of Representatives, he has long been an advocate for broadening the base for energy production in the United States, including nuclear energy. He believes that nuclear is an important focus for energy in the future and that the United States' commitment to nuclear energy is strong. He advocates for North Carolina being a hub for nuclear energy, which will allow for job growth and energy security.

Media

Website

To create a user-friendly website, our committee will be coordinating with members of the Computer Science Department. The schedule, sponsors, information about the City of Raleigh, and all relevant details for conference attendees will be easily accessible on the website.

App

Conference participants will have access to the Guidebook cellular application utilizing the license of ANS. Through this app, conference-goers will have a seamless time navigating and staying on top of the conference agenda. The *Guidebook* will have up-to-date information on the summary, time, and location for all events happening on every day of the conference. The Guidebook app is available to both Android and iOS users.

This app will also include features such as integrated social media, interactive maps and layouts of the career fair and buildings, push messaging for important communications, sponsorship/advertising capabilities, session attendance tracking, live polls, private messaging for attendees, and user feedback and surveys.

Social Media

We will be using social media such as Twitter and Facebook to communicate with attendees throughout the weekend. With hundreds of projected attendees, using social media will be the most efficient way to convey information to all of our guests and answer any possible questions before or during the conference.

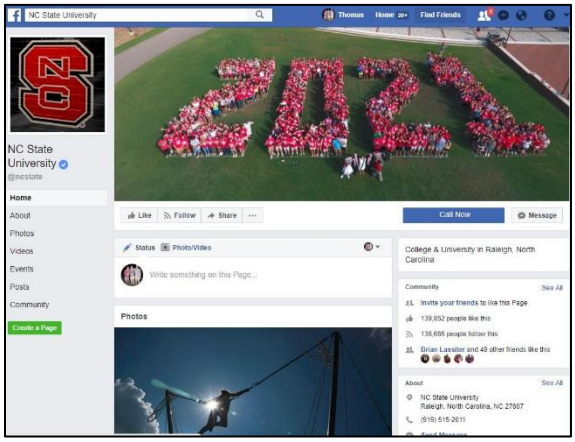


Figure 29. NC State Facebook

By maintaining our social media outlets, we can remind our attendees of events and workshops going on throughout the day. By keeping in touch with everyone and constantly posting updates we can ensure that we are up to date and that our guests are satisfied. Our media outlets also provide an invaluable tool for communicating the schedule in case of emergency cancellation or schedule change.

Figure 30. NC State Twitter

As the conference comes to a close at the end of the day, we will use Facebook and Twitter to notify our attendees about activities to partake in at night. Our Facebook and Twitter pages also serve as grounds for our attendees to communicate and make plans with one another.

In addition to social media, we will also be using the mobile app to update and remind guests about events. On this app, the schedule will be posted and news will be spread daily. This will be the easiest way to make sure attendees are on time and in the right place for our events.

At the end of the day, we will use Facebook and Twitter to notify our attendees that the night is still young with places in Raleigh to go to and mingle. Our Facebook and Twitter pages also serve as grounds for our attendees to communicate and make plans with one another. While people are out and about in Raleigh they can use a trending hashtag such as #ANSRaleigh or #NukeOn to see what fellow ANS members are up to and join in with others on the fun.

Transportation

Air Travel

The most convenient option is to arrive at Raleigh-Durham International Airport, about 15 miles and twenty-minute drive to the Sheraton Raleigh Hotel. The following rates are estimated for 1 adult economy class ticket. The average cost is $421, however, rates may vary.

School	Departure Airport	Round trip cost to RDU
University California Berkeley	Oakland International (OAK)	$787
University of Florida	Gainesville Regional Airport (GNV)	$400
Georgia Institute Technology	Atlanta Intl. Airport (ATL)	$183
Pennsylvania State University	University Park Airport (SCE)	$406
Purdue University	Indianapolis Airport (IND)	$286
Kansas State University	Manhattan Regional Airport (MHK)	$682
MIT	Logan International Airport (BOS)	$308
University of Maryland	Reagan National Airport (DCA)	$167
University of Michigan	Wayne County Airport (DTW)	$340
Louisiana State University	Baton Rouge Metropolitan (BTR)	$340
Iowa State University	Des Moines International (DSM)	$480
Idaho State University	Idaho Falls Regional Airport (IDA)	$850
Missouri U. of Science and Technology	Fort Leonard Wood (TBN)	$535
University of Nevada	McCarran Intl. Airport (LAS)	$420
University of New Mexico	Albuquerque Intl. Sunport (ABQ)	$560
City College of New York	La Guardia Airport (LGA)	$188
Rensselaer Polytechnic	Albany Intl. Airport (ALB)	$415
Ohio State University	Port Columbus Intl. Airport (CMH)	$283
Oregon State University	Mahlon Sweet Field (EUG)	$483
University of Tennessee	McGhee Tyson Airport (TYS)	$395
Texas A&M University	Easterwood Field (CLL)	$600
University of Texas at Austin	Austin Bergstrom Intl. Airport (AUS)	$264
Utah State University	Salt Lake City Intl. Airport (SLC)	$423
University of Utah	Salt Lake City Intl. Airport (SLC)	$423
Virginia Commonwealth University	Richmond Intl. Airport (RIC)	$345
University of Wisconsin	Dane County Regional (MSN)	$452
Virginia Tech	Roanoke Regional (ROA)	$360

Transportation to and from Airport

The NC State Motor Pool Services will be utilized and paid for by the conference committee for frequent round trips during Thursday to take attendees from the airport to the Sheraton and on Sunday from the Sheraton to RDU Intl. Airport. It will take approximately 20 minutes to get to the Sheraton located 17.7 miles away from the airport. By running three busses on 40 minute loops a bus should be at the airport to shuttle attendees every 20 minutes from 3:00pm-10:00pm. These buses will be driven with hired drivers. Fifteen seat passenger vans will run throughout the day to pick up those that arrive outside of that timeline, which will be driven by student volunteers.

For those attendees who wish to obtain a rental car for the weekend, RDU International Airport offers 8 different rental car companies. Each company offers shuttle buses from Terminals 1 and 2 to the on-site location where the vehicle can be obtained. Companies include: Advantage, Alamo, Avis, Enterprise, Hertz, National, and more. Additional information about rental cars can found inside the airport and at the information desk in respective terminals. Parking will be available on the Reynold's Coliseum Deck.

Raleigh also has an extensive taxi system. Yellow cabs to RDU-specific taxis are available outside most terminals at RDU. Smartphone based apps like Uber, Campus Cruizer, and Lyft operate in Raleigh too. For attendees arriving on Wednesday evening, since there are no conference events occurring transportation will be limited to the alternative options stated above. Uber/Lyft discount codes will be available as well to help alleviate transport costs to and from the airport.

Ground Travel

Many of the schools listed are a reasonable driving distance away from Raleigh, NC. In the interest of saving money, it would be ideal for those less than 4 hours away by car to drive. Downtown Raleigh is easily accessible through the 440-beltline, which borders the city. This can be approached easily from I-40 if travelling from the east or the west. If travelling from the north, I-85 connects directly to I-40, which in turn will take you to the beltline and downtown. Alternatively, from I-85, travelers can transition to US-1 which becomes Capital Blvd. If travelling from the south, I-95 connects directly with I-40 as well.

Driving costs are shown below for sections within 8 hour driving distance from Raleigh. The round trip cost is estimated based on a four passenger personal vehicle with mileage costs calculated using published government mileage figures ($0.535 per mile).

Ground Travel Time and Fuel Costs to NC State

University	Distance (mi)	Driving Time (hrs)	Estimated Cost	Estimated Cost per Person*
City College of New York	515	8.5	$551.05	$137.77
Georgia Institute of Technology	405	6.5	$433.35	$108.34
Ohio State University	486	7.5	$520.02	$130.01
Pennsylvania State University	480	8	$513.6	$128.40
University of Florida	523.6	7.5	$560.252	$140.07
University of Maryland	292	5	$312.44	$78.11
University of South Carolina	226	3.5	$241.82	$60.46
University of Tennessee	362	5.5	$387.34	$96.84
Virginia Commonwealth University	173	2.5	$185.11	$46.28
Virginia Tech	228	3.5	$243.96	$60.99

**Assuming private vehicles with four people per vehicle*

Transportation to and from Talley/Sheraton/Socials

Sheraton Raleigh Hotel offers complimentary shuttles to and from NCSU campus, which will be hosting the main program held at Talley Student Union Ballroom, and much more. NCSU campus is located approximately 3.3 miles from the main conference lodging. These complimentary shuttles will be supplemented by the NCSU Motor Pool, which will make rounds between Sheraton Raleigh Hotel and Talley Student Union between 7:15 and 10:00 am utilizing four busses on 20-minute loops, between 10am and 3:00 pm utilizing two busses on 30-minute loops, between 3pm and 6pm utilizing three busses on 20-minute loops and between 8 pm and 11pm utilizing three busses on 20-minute loops. There will also be back-up 15 seater vans and small sedan cars in place to pick up any extra attendees. Shuttling attendees to and from Talley, their hotels and the social events will cost $1,700* per day. Transporting everyone to their hotels on Thursday would cost $1,000* by running bus shuttles from 3:00 to 10:00pm with a van rented for the day to pick up groups that do not come during that time frame. These shuttles will be driven by the motor pool employees. The most convenient mode of transportation for events downtown will be walking since most venues are within a few blocks; the nature of these events can be found in detail in the program section of the proposal.

Tours

Transportation to and from Duke TUNL (limit 35 participants) and Shearon Harris (limit 35 participants) will be provided utilizing NCSU Motor Pool with hired drivers. Estimated time is around an hour round trip for both of these locations. Duke is located approximately 30 miles away and Shearon Harris, about 25 miles away. Transportation to GE Hitachi in Wilmington (limit 55 participants) will be provided by the NC State Motor Pool, with hired drivers. It is located 252 miles away and is approximately 4 hours round trip. Loading for the trips will begin at 8:30 on Thursday morning at the Sheraton Raleigh Hotel. Duke Energy's Shearon Harris tour participants will return to Talley Student Union at 12 pm for lunch and GE Hitachi tour participants will return by 4 pm. The estimated transportation cost for all three tours is $1,050*.

*cost analysis on spreadsheet

Finances

Budget

The conference will be attended by an estimated 500 students and 150 professionals. Fifteen additional seats are reserved for volunteers for the NCSU ANS Chapter. $201,500 are anticipated in sponsorship donations for this case. The budget for this case is shown in **Tables 1 and 2**. In this case, a net revenue of $256,500 is expected. This is a large surplus, but we still provide a contingency plan to guarantee no significant shortage in funds, which is listed on the right-most column of Table 1.

The food costs within the budget were derived from the higher end of the estimated food cost range; therefore the possibility of exceeding the food costs that have been budgeted for is dramatically reduced. A more detailed food cost is included in the Appendix.

Table 1 shown below includes all the expected expenses for the conference. Potential budget cut could refer to the contingency plan was already included in the last column. Costs that are independent of the number of attendees have also been accounted for within our budget. They include: the facilities such as the Talley Ballroom, speaker gifts, T-shirts, transportation, and technical expenses. Sales tax has been estimated at 10 %, ensuring that all unforeseen surcharges are accounted for.

Table 1 Expense Table

	Item	Units	Unit Cost	Cost	Contingency Plan
Dinning & Catering	Thursday Break/Arrival	650	8	5,200	Discretionary I
	Thursday Dinner	650	25	16,250	Discretionary I
	Friday Breakfast	650	8	5,200	Discretionary I
	Friday Lunch	650	10	6,500	Discretionary I
	Friday Dinner	650	25	16,250	Discretionary I
	Friday Break	650	8	5,200	Discretionary I
	Saturday Breakfast	650	8	5,200	Discretionary I
	Saturday Lunch	650	10	6,500	Discretionary I
	Saturday Dinner	650	25	16,250	Discretionary I
	Saturday Break	650	8	5,200	Discretionary I

Total Food Cost: 87,750

Facility	Talley Student Union	3	100	300	Necessary

Total Facility Cost: 300

Transportation	Sharon Harris Nuclear Plant	1	197.15	197.15	Necessary
	GE Tour	2	616	616	Necessary
	Duke TUNL	1	213.15	213.15	Necessary
	Van			581.75	Necessary
	Bus			6,063.3	Necessary
	Parking	50	20	1,000	Necessary

Total transportation cost: 8,671.35

Social	Boxcar (coins)	600	1	600	Discretionary II
	Raleigh Beer Trolley	6	400	2,400	Discretionary II
	Band Party	1	9000	9,000	Discretionary II
	East Village	1	0	0	Discretionary III
	Glenwood	1	0	0	Discretionary III

Total social cost: 12,000

Package	bags	650	1	650	Discretionary III
	pens	650	0.5	325	Discretionary III
	T-shirts	650	5	3,250	Discretionary I
	USB	650	5	3,250	Discretionary II
	Give-away items	650	0	Provided by sponsors	Necessary

Total package cost: 7475

Reimbursement	Travel	500	100	50,000	Discretionary III
	Lodging	500	100	50,000	Discretionary III

Total reimbursement: 100,000

Misc	Name tags	1	15	15	Necessary
	App	1	5000	5,000	Necessary
	Website	1	1000	1,000	Necessary
	Social Media	1	200	200	Necessary
	Projectors, screens, computers	10	0	Provided by facility	Necessary
	Sponsorship information packages	650	0	Provided by sponsors	Necessary

Total misc cost: 6,215

Awards	Frames and certificate printing	3	100	300	Necessary
	speaker gift	3	50	150	Necessary

Total award cost: 450

Grand total expense: $222,861.35

Note: The contingency plan is classified as either Necessary, or Discretionary I, II, or III. Necessary expenses are not subject to cuts. Discretionary expenses may be cut. Discretionary III expenses will be the first cut in such a scenario, while Discretionary I will be cut last. Note: For the reimbursement, the average cost will be $100 for travel, but will in reality vary depending on the method and length of travel of the attendee

Table 2 Revenue Table

	Item Description	Units	Values ($)	Income ($)
Registration	Student registration	500	35	17,500
	Professional registration	150	250	37,500
Total of Registration: 55,000				
Fundraising	Companions	15	1,000	15,000
	Career Fair	15	2,500	37,500
	Events Pro	4	3,500	14,000
	Bronze	9	5,000	45,000
	Silver	4	10,000	40,000
	Gold	2	15,000	30,000
	Platinum	1	20,000	20,000
Total of Fundraising: 201,500				

Total Revenue: $256,500

Registration

Based off the registration fees of previous conferences and the needs of the proposed budget, the registration fees are $35 for students and $250 for professionals. Several waived and reduced professional registrations are factored in the overall expected revenue.

Reimbursement Procedure

ANS National provided us with the annual average total student travel reimbursement of $60,000 for the past four ANS Student Conferences. We assume students applying for travel reimbursements will receive a reimbursement from us that covers most of their costs associated with both transportation (either flight or driving to the conference) and lodging. Based on the attendance costs in Table 3, there will be $200 reimbursement for each student, in which transportation and lodging reimbursements are both $100.

Attendance Costs

The table below lists the attendance cost for both students and professionals, classified into minimum cost, medium cost and maximum cost based on varying expenses on transportation and lodging. The reimbursement was already issued to the students. For simplicity, the same airfare data was used for professionals and students, however, due to the large nuclear industry around North Carolina, the average transportation costs for professionals is expected to be much lower.

Table 3 Student Attendance Cost

Item	Cost		
	Minimum ($)	**Medium ($)**	**Maximum ($)**
Registration	35		
Transportation	150	260	450
Travel Reimbursement	80	100	120
Lodging	139	150	279
Lodging Reimbursement	100		
Total	**144**	**310**	**609**

Table 4 Professional Attendance Cost

Item	Cost		
	Minimum ($)	**Medium ($)**	**Maximum ($)**
Registration	250		
Transportation	150	260	450
Lodging	139	150	279
Total	**539**	**410**	**729**

Fundraising

The full cost of the conference will be covered through sponsorships from various entities. We will first reach out to local nuclear industries in North Carolina such as GE Hitachi in Wilmington (headquarters of their nuclear division), Duke Energy in Charlotte (Headquarters) and Westinghouse Electric Company to name a few. Next, companies that helped sponsor past ANS Conferences would be contacted in hopes of acquiring their continued support. And finally, we will seek sponsorship from the ANS Divisions and the NC State Nuclear Engineering Department. To encourage large donations, we have set up different sponsorship packages. The banking will be done by Wells Fargo, which currently manages the ANS Student Chapter bank account and is easily accessible from campus. The Budget and Finance Director will be in charge of all finances, and any money spent will require the signatures of both co-chairs. Tax exempt status will be looked into.

Companions ($<2500)

- Two tables at Friday dinner recognition as a companion sponsor

Events:

- **Career Fair ($ 2500)**
  Only for organization who is interested in Career Fair, recognition as a sponsor
- **Events Pro ($ 3500)**
  Career fair booth, 1 waived registration, recognition as a sponsor, one coffee break, panel or workshop sponsorship

Tiers:

- **Bronze ($ 5000)**
  Career fair booth, 2 waived registrations, small advertisement on conference program, 1 panel or workshop sponsorship, 1 breakfast or technical session sponsorship
- **Silver ($ 10000)**
  Career fair booth, 2 waived registrations, Friday or Saturday lunch & learn or 2 tours sponsorship, recognition as a sponsor, half a page advertisement on conference program, 1 socials sponsorships or 1 technical session sponsorships
- **Gold ($ 15000)**
  Career fair booth, 3 waived registrations, Opening Ceremony or Saturday dinner talk, recognition as a sponsor, full page advertisement on conference program, entire technical section sponsorship, advertisement via giveaways.
- **Platinum ($ 20000)**
  Limited availability, 4 waived registrations, Friday dinner talk, recognition as the mother ship sponsor, full page advertisement on conference program, entire technical section sponsorship, 1 selected social or tour sponsorship, award ceremony sponsorship, advertisement via giveaways.

Staffing

Staff members will consist of student volunteers who are affiliated with NC State. This includes members of NC State's ANS Student Chapter, the Department of Nuclear Engineering Department, College of Engineering Student Ambassadors, and any other individual who expresses interest in volunteer work – we will reach out to student organizations on campus. Estimated number of volunteer jobs around 100. However, if a volunteer works many jobs in one day over multiple days, that number can significantly be reduced. A schedule will be put together to manage volunteers, and staff headquarters will reside in a designated room in the Talley facility.

Function	Thursday	Friday	Saturday	Sunday	Total Staff
Registration & Information	6	5	5	-	16
Workshops	2	2	4	-	8
Technical	2	6	6	-	14
Panels	-	3	3		6
Activities	6	6	6	-	18
Transportation	8	6	6	8	28
Misc.	6	6	6	-	18
Total	30	34	36	8	108

Registration & Information: This staff section is in charge of facilitating that all attendees register, and are informed of the facilities, layout, program, and itinerary for the conference. They will be responsible for distributing registration packets, maps, and answering questions pertaining to scheduling and facilities.

Workshops: This staff section helps facilitate the workshops. They ensure that everything needed for the workshops is functional and in place. For example, microphones, instructional packets, and projectors. Their specific function will be on a case by case basis depending on the workshop.

Technical Assistants: This staff section ensures electronics, such as microphones and projectors, are functional for the rest of the events. This includes socials, dinners, presentations, lectures, and the career fair.

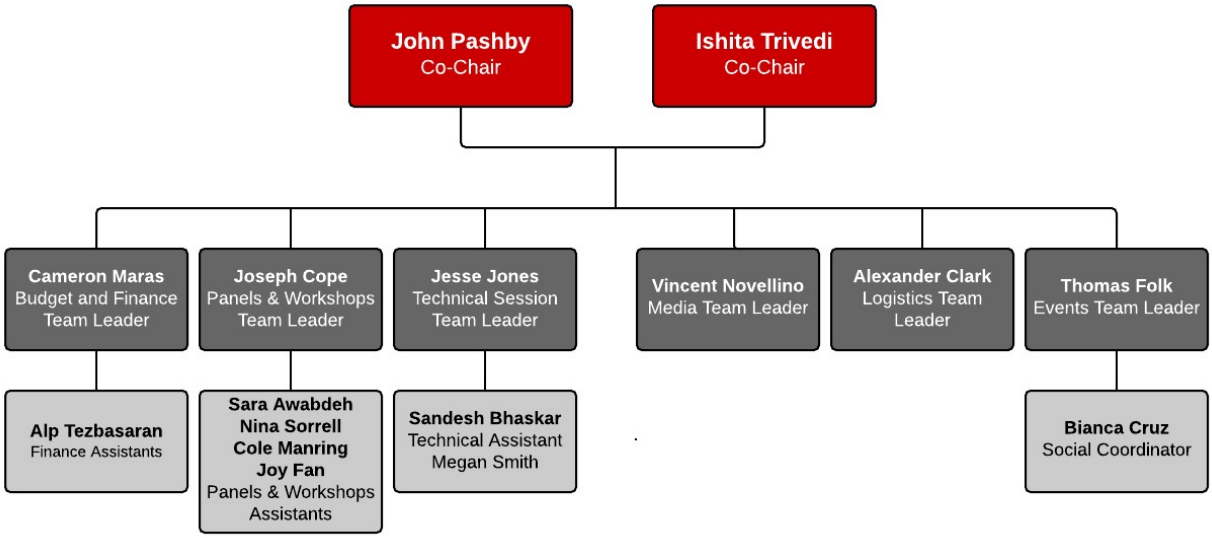
Panel Assistants: This staff section ensures smooth functioning of each panel, which includes coordinating with the panelists.

Program/Activities: This staff section is responsible for all non-electronic necessities for programs and activities during the convention. Tours, socials, dinners, and the career fair are some to name a few. The staff make sure all professionals and attendees are aware of where to go and what to do for each of these events. They also communicate with caterers, university tour guides, and rental site staff.

Mics/Logistics: An excess of staff is provided on hand for various tasks, such as going to the store and getting materials, setting up tables, and a myriad of other tasks as requested by committee heads.

Organization Structure

The organization committee is divided into sub-committees pertaining to individual aspects of the conference. Each sub-committee is appointed a chair, which reports to the co-chairs.



*Team leader will have additional volunteers to execute the tasks at hand

Chair Responsibilities

Budget and Finance Team Leader: Responsible for sponsorship and managing the budget of the conference. This chair compiles financial data from facilities, caterers, transportation utilities, and hotels, and ensures the money is paid out. Registration of attendees is included in this category, as well as receiving sponsorship money from financial donors.

Panels and Workshops Team Leader: Panels and workshops are organized and managed by this chair. They are responsible for outreach to panelists and event leads and ensures events run smoothly.

Technical Session Team Leader: Technical sessions are organized and managed by this chair. They ensure everything runs smoothly at these events, and are responsible for collecting posters, and papers for these events. The judges for the poster and paper contests are gathered by this individual.

Media Team Leader: Create and manage the guidebook and website for the conference and coordinate with other chairs to ensure information be appropriately distributed. Manages the social media to inform guests of upcoming events and deadlines.

Logistics Team Leader: Responsible for accommodations, conference rooms, transportation, and catering. Ensure everything required for events is supplied, and ensure transportation and catering is running smoothly.

Events Team Leader: Hold master schedule for all planned events, tours, banquets and socials. Has knowledge of the details of what goes on in the given events, including times, staffing, and equipment.

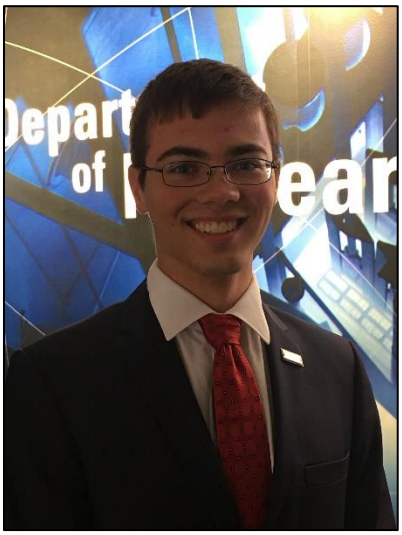
Disputes and Replacements

For disputes between sub-committees, the dispute will follow chain of command until a resolution can be made. Ultimately the co-chairs will deliberate and their decision will be final.

In the event that a sub-committee chair fails to comply with the standards of the board or does not fulfill their responsibilities, the co-chairs can elect to remove the member from their position. In the event that a vacancy occurs within the board, a member serving underneath the subcommittee chair moves up a role and fills in the vacant position. If the vacancy is in executive position, the remaining executive nominates a new individual and the board votes to elect a new executive from the existing board members. Once this occurs, the vacancy left by the new executive will be filled by the members moving up positions in the committee tree, or responsibilities will be distributed as necessary.

The Team

John Pashby: Co-Chair



John Pashby is the current American Nuclear Society President at N.C. State. He is a senior in Nuclear Engineering and is also pursuing a minor in Violin Performance. Upon graduating, he plans to work towards his Masters of Science in Nuclear Engineering. His research experiences include working with Dr. Hawari developing ENDF nuclear data files for thermal neutron scattering cross sections, as well as with Dr. Bolotnov and CASL modeling the effects of bubbles under various flow conditions. He presented his CASL research at the 2017 ANS Student Conference. This past summer, he worked with the Department of Homeland Security at Lawrence Livermore National Laboratory testing the current radiation detection and imaging systems at the United States border crossings.

Ishita Trivedi: Co-Chair

Ishita Trivedi is a PhD student in Nuclear Engineering working with Dr. Kostadin Ivanov with a focus on reactor physics and uncertainty analysis. She received her B.S. in Nuclear Engineering from Pennsylvania State University and went on to pursue graduate education at North Carolina State University (NCSU). At NCSU she was awarded the Graduate Merit Award and Provost Doctoral Fellowship. Her interests lie in reactor physics and advancements in Generation IV type reactors. This inspired her current research on optimization of liquid-metal cooled fast reactor core design. Previously, she interned at Argonne National Lab working with Dr. James Seinicki on fission product retention in Lead-Cooled Fast Reactors. The work was presented at the 2017 Mathematical and Computation Science Conference in Jeju, Korea. She has also worked on other projects such as HTGR core calculations and AP1000 core design optimization. Upon graduation, she hopes to continue research at a national laboratory.

Cameron Maras: Budget and Finance Team Leader

Cameron Maras is a Junior in the Nuclear Engineering undergraduate program at NC State. He was born in Youngstown, Ohio and lived there until choosing to attend NC State in 2015. He is interested in nonproliferation and nuclear safety as well as advanced reactor design. Recently, he has conducted research with air monitoring for emergency response. Previously, he has been involved with the University Office of Courses and Curricula as a student committee member and as lab coordinator for the Young Investigators' Summer Program in Nuclear Engineering. Upon graduation, he plans to complete the Navy Nuclear Propulsion Officer Candidate Program as an Prototype Instructor. He also plans to pursue advanced degrees at NC State in nuclear engineering after the Navy.

S. Joseph Cope: Panels & Workshops Team Leader

As a PhD student at North Carolina State University, Joseph Samuel Cope has experienced work in several different applications of nuclear engineering with participating in the ANS student chapter. Currently, as a CNEC fellow, his research focuses on air monitoring for radiological emergency response scenarios. He has spent summers at Newport News Shipbuilding, INL, ORNL, KAPL and will be in Washington, DC for the summer of 2018 at the Remote Sensing Laboratory with NNSA. From shipbuilding design, reactor physics modeling, fallout modeling, and now extensive nonproliferation research, his six years at N.C. State and various summer internships have been rewarding. He received his Bachelor's degree in 2016 and Masters of Nuclear Engineering in 2017 both from NC State. He plans to pursue national laboratory research and academia following his PhD.

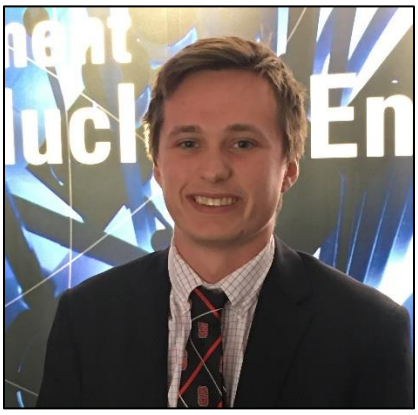
Vincent Novellino: Media Team Leader

Vincent Novellino is a sophomore pursuing a BS in Nuclear Engineering and a minor in Mathematics at the North Carolina State University. He currently is licensed by the Nuclear Regulatory Commission to operate the PULSTAR nuclear reactor. As an undergraduate, he is currently doing nuclear materials research with Dr. Eapen. His interest includes learning about different Gen IV reactor designs, and evaluating the benefits of each. As a reactor operator, he helped out with the various projects carried out by the Nuclear Reactor Program, including a service project for the British Navy.

Alexander Clark: Logistics Team Leader

Alexander Clark is a fourth-year PhD student studying data assimilation of nuclear data applied to neutron multiplicity counting experiments with Dr. John Mattingly. He has been honored to receive both the Consortium for Nonproliferation Enabling Capabilities Fellowship (2016-2019) and the Provost Doctoral Recruitment Fellowship (2014-2015) during his graduate studies at North Carolina State University, that began during Fall 2014. He has presented two posters (UITI, 2016; UPR, 2017) and participated in an internship at Los Alamos National Laboratory during Summer 2016. He received a BS in Nuclear Engineering with a minor in Music from Idaho State University in 2014. During his undergraduate studies, he was awarded scholarships from several organizations, including the American Nuclear Society (2013-2014), the Nuclear Regulatory Commission (2012-2013, 2014), and AREVA (2013-2014). He will be serving as co-Student Chair for the 2018 American Nuclear Society topical meeting of the Nuclear Nonproliferation Division, which will be hosted in Wilmington, NC.

Thomas Folk: Event Team Leader



Thomas Folk is a senior in the Nuclear Engineering undergraduate program at NC State. He is a highly involved student on campus by participating in undergraduate research and being an active brother in Lambda Chi Alpha fraternity. Thomas plans on pursuing a master's degree in nuclear engineering after he graduates with his bachelor's degree.

Alp Tezbasaran: Finance Assistant

Alp is a Nuclear Engineer from Turkey and currently a PhD student at the North Carolina State University, Nuclear Engineering Department. He was the representative student of his previous department at Hacettepe University for two years. He worked in several topics like PWR-CANDU combined fuel cycles, photoneutron shielding for medical facilities, effect of Th content in different reactor types. In his professional career, he dealt with CFD models that include free surfaces and Lattice-Boltzmann applications. He also worked on government projects where he was responsible for public information activities. His current research interests include validation methodologies for thermal hydraulic models.

Sara Awabdeh: Panels & Workshops Assistant

Sara is currently pursuing her MSc in Nuclear Engineering degree at the NC State University. She is a graduate of the University of Sharjah (UOS) in the United Arab Emirates, holding a BS in Nuclear Engineering with the highest honors degree. She was a co-founder and vice-president of the first American Nuclear Society Student Chapter outside the US, and the Nuclear Club in UOS. Her main research interest is in the field of radiation detection and imaging. During her undergraduate term, she was a research assistant working with the head of department Dr. Walid Metwally on optimizing a neutron backscattering landmine detection system using MCNP Transport code. She also worked on a project to utilize a D-D neutron generator from Adelphi Tech. to develop a nondestructive and cost-effective fast neutron imaging system used for testing material properties, winning the first prize at the Annual Research Forum 2015/2016 at the UOS. She has an experience in the field of medical physics and nuclear medicine acquired upon completing her undergraduate internship period. In addition, Sara was a Calculus 1, Calculus 2, and science project mentor for sophomore students at UOS during her undergraduate term.

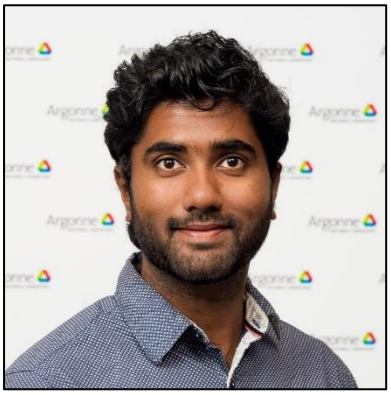
Nina Sorrell: Panels & Workshops Assistant

Nina Colby Sorrell is a PhD student here at North Carolina State University (NCSU) and has been an active ANS member since her undergraduate freshman year at NCSU. Under Dr. Ayman Hawari, she is currently working to produce cross sections based on fundamental physics, benchmark the Transient Reactor Facility (TREAT) at Idaho National Laboratory, and develop methods for modeling transient reactor systems. Previous projects have included modeling the PULSTAR Research Reactor Neutron Powder Diffractometer for the purpose of developing monoenergetic beams for thermal neutron cross section analysis and investigation of reactor graphite cross sections in the TREAT reactor. She has also worked as an reactor operator for the NCSU PULSTAR Reactor, Duke Energy Nuclear Generation Intern at the Brunswick Nuclear Plant, and Idaho National Laboratory Reactor Physics Modeling and Simulation group intern.

Joy Fan: Panels & Workshops Assistant

Yuqiao (Joy) Fan is a first year PhD student working on thermal-hydraulics research projects with direct numerical simulation methods. She has been an active Nuclear Engineering student with a B.E. in Nuclear Engineering from Xi'an Jiaotong University and an M.S.E. in Nuclear Engineering from the University of Michigan-Ann Arbor. Besides the academic achievements of publishing 6 journal papers and 1 patent, Joy enjoys sharing ideas and experience and getting involved in the local community. When she was a member in the ANS Student Chapter at Michigan, she presented at the Michigan-Ohio ANS Local Section Meeting in 2016. Before studying in US, she was an ambassador for the sustainable development program between XJTU and Hong Kong University of Science and Technology. She has been the chef editor of a famous local periodical at XJTU called *So That Is University Life.*

Sandesh Bhaskar: Technical Assistant



Sandesh is a Mechanical Engineer from India, currently a MS student at the North Carolina State University, Nuclear Engineering Department. His research interests include design and modeling of fourth generation reactors and two-phase flows.

Bianca Cruz: Social Coordinator

Bianca is a first-year graduate student pursuing a PhD at North Carolina State University. She graduated Magna Cum Laude with a BS in Nuclear Engineering from South Carolina State University in 2016. She became a member of the Alpha Nu Sigma Honors Society in her undergraduate years. She is currently under the advisement of Dr. Robert Hayes in the Retrospective Dosimetry and Nuclear Assay laboratory. She hopes to one day work for the U.S. Nuclear Regulatory Commission and the International Atomic Energy Agency.

Liability

Any conference of this size has inherent potential liabilities. Most of these occur in a few key areas. The potential liabilities in these areas will be mitigated in the following ways.

Transportation: The NCSU Motorpool liability associated with their duties. Additional liability will be covered by the alternate transportation services that attendees wish to use. Student volunteers must pass a training program created and enforced by the committee to drive the shuttles to and from the conference/airport.

Food: Caterers and hotel facility providing food and beverages is responsible for the service and all liability associated with the distribution of food and beverages.

Alcohol: Alcohol will only be served to those who can present valid identification showing they are 21 years or older. The hotel facilities, ANS Conference Committee, caterers, volunteer staff or the Department of Nuclear Engineering will not be held for any injuries sustained from the consumption or intake of alcoholic beverages.

Hotel: Hotel liability is covered by the Sheraton Raleigh facility and other hotels themselves if alternative lodging is chosen.

Facilities: Similarly, facilities assume liability for use of any and all of their properties.

General: NCSU, nor any of the facilities, vendors, caterers, or staff will be inherently held responsible for loss of property, personal injury, or personal damages as the result of one's own decisions.

Appendix

The food costs within the budget could be elaborated in the following table. The tables on the left estimate a $25 / person dinner while the tables on the right estimate $20 / person.

Thursday	Breakfast	Lunch	Dinner	Total
	N/A	N/A	25	
High			16,250	21,450
Med			14,375	18,975
Low			13,125	17,325
Break	8			

Thursday	Breakfast	Lunch	Dinner	Total
	N/A	N/A	20	
High			13,000	18,200
Med			11,500	16,100
Low			10,500	14,700
Break	8			

Friday	Breakfast	Lunch	Dinner	Total
	8	10	25	
High	5,200	6,500	16,250	33,150
Med	4,600	5,750	14,375	29,325
Low	4,200	5,250	13,125	26,775
Break	8			

Friday	Breakfast	Lunch	Dinner	Total
	8	10	20	
High	5,200	6,500	13,000	29,900
Med	4,600	5,750	11,500	26,450
Low	4,200	5,250	10,500	24,150
Break	8			

Saturday	Breakfast	Lunch	Dinner	Total
	8	10	25	
High	5,200	6,500	16,250	33,150
Med	4,600	5,750	14,375	29,325
Low	4,200	5,250	13,125	26,775
Break	8			

Saturday	Breakfast	Lunch	Dinner	Total
	8	10	20	
High	5,200	6,500	13,000	29,900
Med	4,600	5,750	11,500	26,450
Low	4,200	5,250	10,500	24,150
Break	8			

The following table shows the room capacities of the Tally Ballrooms and conference rooms.

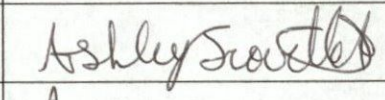
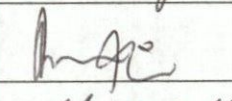
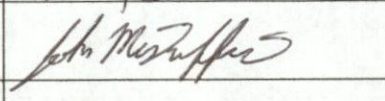
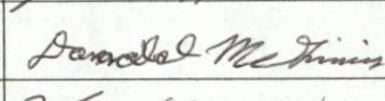
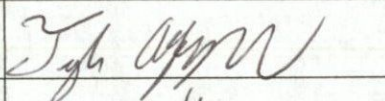
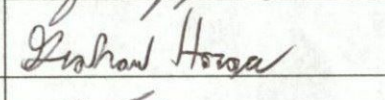
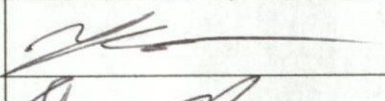
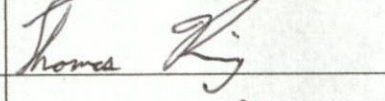
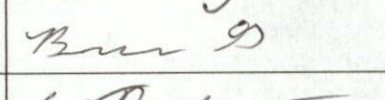
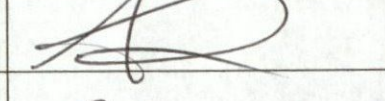
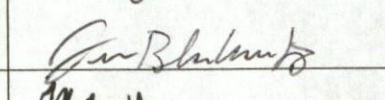
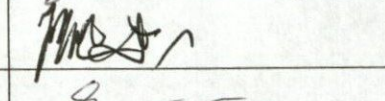
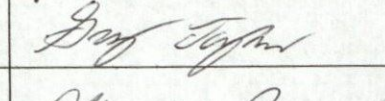
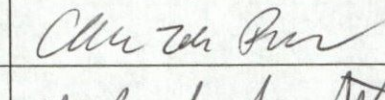
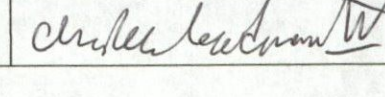
Room	Capacity
Mountains / Piedmont	288
Coastal	356
Currituck	112
Hatteras	108
Ocracoke	112
3210	75
3222	96
3285	100

Support

Student signatures from the Nuclear Engineering Department showing support for the NC State ANS Student Conference are shown on the following pages.

Student Support

I pledge my effort and support to the ANS Student Chapter at North Carolina State University in hosting the 2019 ANS National Student Conference.

Name	Graduation Year	Signature
Ashley Scoville	2019	
Ciara Rice	2019	
John McDuffie	2019	
Donald McInnis	2019	
Tyler Alfonzetti	2019	
Graham Harger	2019	
Irfan Mekic	2019	
Thomas King	2019	
Bryson Graccia	2019	
Scott Burke	2019	
Anne Deak	2019	
Jesse Blankenship	2019	
Matthew Fitz	2019	
Caray Taylor	2019	
Chris van Dohlen	2020	
Charles Goodman	2021	

Student Support

I pledge my effort and support to the ANS Student Chapter at North Carolina State University in hosting the 2019 ANS National Student Conference.

Name	Graduation Year	Signature
Jake Perry	2019	
Ashley Meyer	2019	
Scot Treadway	2019	
Conor Fox	2019	
Donald Fike	2019	
Cameron Macas	2019	
Trevor Collis	2019	
Jacob Blevins	2019	
Kai Drummler	2019	
Lewis Rigsbee	2018	
Haaken Lysne	2019	
Matthew Sanderford	2019	
Ben Laramee	2019	
Andy Jones	2019	
Joey Fenell	2019	
Ulric Groves	2019	

Student Support

I pledge my effort and support to the ANS Student Chapter at North Carolina State University in hosting the 2019 ANS National Student Conference.

Name	Graduation Year	Signature
Arthur Valdman	2020	
Chris von Dohlen	2020	
Jon Crozier	2020	
Weston Murphy	2020	Weston Murphy
Amadu Toronka	2019	
Chris Gozum	2020	
Liam Truong	2020	
Kevin Jackson	2020	
Andrew Whitley	2020	
Eric Olson	2020	
Lindsay Verrico	2020	
Matthew Trevey	2020	
Robert Carlson	2020	
Ashley Scoville	2019	
Demi Fasina	2019	
Graham Harger	2019	

Student Support

I pledge my effort and support to the ANS Student Chapter at North Carolina State University in hosting the 2019 ANS National Student Conference.

Name	Graduation Year	Signature
Charles Goodman	2021	
Mohsen Zabara	2020	
Ahmed Al-Khawaja	2020	
HENRY HOPSON	2020	
VINCENT VELLINE	2020	
John Klemes	2020	
Harrison Klas	2021	
Yasemin Ozbek	2021.	
Nick Joslin	2020	
Jacob A. Ulenbos	2021	
Blake Montz	2020	
Nicholas Meehan	2020	
Patrick Hartwell	2020	
Stephen Henshaw	2020	
Justin Cohen	2019	
William Bramley	2020	

Student Support

I pledge my effort and support to the ANS Student Chapter at North Carolina State University in hosting the 2019 ANS National Student Conference.

Name	Graduation Year	Signature
Kaby Brown	2021	Kaby Brown
Keyshawn Brown	2021	Keyshawn Brown
Jackson Swain	2020	Jackson Swain

NC STATE UNIVERSITY

College of Engineering
Department of Nuclear Engineering

www.ne.ncsu.edu

Campus Box 7909
3141 Burlington Engineering Labs
2500 Stinson Drive
Raleigh, NC 27695-7909

September 28, 2017

Student Conference Selection Committee
American Nuclear Society (ANS)
555 N Kensington Ave, La Grange Park, IL 60526

Dear Conference Selection Committee,

I am very pleased to confirm the support of the North Carolina State University (NCSU) Nuclear Engineering Department (NED) to the NCSU ANS Student Chapter proposal to organize and host the ANS Student Conference to be held in Raleigh, NC in Spring of 2019.

Should this proposal be selected to host the meeting in Raleigh, NC the NCSU NED will support actively and strongly the NCSU students in the organizational activities related to hosting and conductance of the conference.

The NCSU ANS Chapter has strong membership and excellent organizational capabilities and experience. The NCSU NED has strong outreach and student activities as well as expertise and experience in organizing different events such as national and international workshops, meeting and conferences. Our department has world class faculty and facilities in all major areas of nuclear science and engineering. The NCSU NED and the ANS Student Chapter are very confident that if a favorable decision is made and we are given the opportunity to organize the 2019 ANS student conference it will be an excellent and memorable event.

Please do not hesitate to contact me should you require additional information or clarification regarding this support. Questions may be directed to my attention either by email: knivanov@ncsu.edu or by phone at (919)-515-1466.

Sincerely,

Dr. Kostadin Ivanov
Professor and Department Head
Department of Nuclear Engineering
N.C. State University

NC STATE UNIVERSITY

College of Engineering
DEPARTMENT OF NUCLEAR ENGINEERING
2500 Stinson Drive, Campus Box 7909
Raleigh, North Carolina
USA 27695-7909

September 26, 2017

ANS - Student Conference Selection Committee
555 North Kensington Avenue
La Grange Park, Illinois 60526

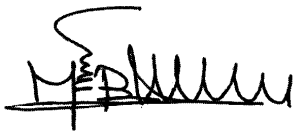
Dear Conference Selection Committee:

It is with great trust to support the proposal of North Carolina State University ANS Student Chapter to organize and host the ANS Student Conference to be held in Raleigh, NC. The NC State ANS chapter has strong membership and motivated students who are unquestionably capable of hosting an enriching, vibrant and meaningful conference and the chapter is eager to undertake this endeavor.

The NC State chapter has actively hosted outreach, educational and professional development activities for its members and always works for the advancement of nuclear engineering. The honor of hosting the national student conference would provide NC State students with the opportunity to build upon their experiences, and a chance to further their public outreach skills. Our department has always been a pioneer in the field of nuclear science and we are fully committed to raise the bar of excellence even higher. I believe that the student chapter will organize a stimulating conference experience for all involved.

On behalf of the Department of Nuclear Engineering and NC State University, we look forward to a favorable decision and the opportunity to host the ANS Student Conference. Please do not hesitate to contact me should you have any questions.

Sincerely,



Mohamed Bourham, PhD
Alumni Distinguished Graduate Professor of Nuclear Engineering
Director: Master of Engineering Program, College of Engineering