

the SPS Observer

Volume LVI, Issue 3

WINTER 2023



- + Creative Outlets and Reaching New Faces
- + Making Space for LGBTQ+ People in STEM
- + Robocode Battle Builds Bridges

- + Connecting Research Hopefuls and Research Mentors
- + The SPS Planetarium Takeover
- + Running—and Dunking—for Physics

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ON THE COVER

Following the success of rooftop observations, the Swarthmore College SPS chapter took a two-day trip to Cherry Springs State Park in PA, one of the few remaining dark spots in the northeastern US. They write, “Even though we booked hotel rooms for the trip, everyone ended up staying at the observing spot all night, as we were all mesmerized by the stars we could see with the naked eye.” In this photo, students work on polar aligning the telescope mount for tracking. Photo by Jesus Rivera.



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AIP Member Societies:

- American Association of Physicists in Medicine
- American Association of Physics Teachers
- American Astronomical Society
- ACA: The Structural Science Society
- American Meteorological Society
- American Physical Society
- Acoustical Society of America
- AVS: Science & Technology of Materials, Interfaces, and Processing
- Optica (formerly known as OSA)
- The Society of Rheology

Other Member Organizations:

- Sigma Pi Sigma physics and astronomy honor society
- Society of Physics Students

The More WE SHARE

by Kayla Stephens, Assistant Director, SPS

**“The miracle is this: The more we share the more we have.”
— Leonard Nimoy**

One of my favorite moments of the 2022 Physics Congress was the **Breaking Boundaries** event (see page 34), where SPS chapters displayed their favorite activities, chapter logos, T-shirts, pins, SPS swag, and most importantly, their culture.

This event was an opportunity for chapters to showcase the unique activities they do and share ideas to benefit and inspire other chapters. I’m a strong believer in not recreating the wheel, and SPS is built on community—what works well for one chapter can likely help another. As the saying goes, “We are better together.” The strength of each SPS chapter contributes to the overall strength of the SPS community.

For the past few years, we have dedicated the winter issue of *The SPS Observer* to highlighting the work chapters are doing in outreach, professional development, community building, research, and other areas. The SPS office supports chapters in many ways, but the biggest resource you have is each other! Take the time to read through this issue and see what you have in common with other chapters, what new ideas you can take back to your chapter, or what your chapter might like to share with others in the future.

The editorial team learned about most of the activities and events featured in this issue through your 2021–22 SPS chapter reports. We are so impressed with what you are doing on your campuses, in your communities, and collectively—you should be very proud. If only we had room to feature *all* of the amazing activities. We hope that this issue will inspire you to try something new or consider sharing your chapter efforts with the SPS community. No matter how big or small your contributions, they all help make the SPS community—and our world—that much stronger. //

If you have a story you’d like to share with the SPS community, please email SPS-programs@aip.org. And don’t forget to submit your chapter report this spring!



ABOVE: Kayla Stephens. Photo by Hyun Joo Kim, AIP.

STAY TUNED FOR PHYSCON HIGHLIGHTS

If you missed the 2022 Physics Congress, stay tuned for the 2023 spring issue, which will feature many unforgettable moments! Also, check out the SPS YouTube channel @SPSNational to view a brief recap of the congress and the recordings of the astounding plenary talks.

Outstanding Chapter Advisor & Outstanding Chapter Awards

2021–2022 SPS OUTSTANDING CHAPTER AWARDS

The SPS Outstanding, Distinguished, and Notable Chapters are determined each year by the National Council through careful review of the SPS chapter reports. Designations are made based on chapter involvement in local, zone, and national SPS meetings, participation in SPS programs, outreach efforts, student recruitment, and interaction with the department and department alumni. To earn these designations, SPS chapters are encouraged to stay active and engaged by participating in an array of activities. Sample activities can be found in the SPS Information Handbook, available at spsnational.org/about/governance/sps-information-handbook. SPS chapter reports are due June 15.

Outstanding Chapters

Zone 1

Brown University
Fairfield University
Saint Anselm College
Suffolk University
Worcester Polytechnic Institute
Yale University

Zone 2

Adelphi University
The City College of New York, CUNY
Ithaca College
New York University
Rochester Institute of Technology
Saint John's University
Stony Brook University
University at Buffalo
University of Rochester

Zone 3

Juniata College
Lycoming College
Moravian University
Rowan University
Saint Joseph's University
Swarthmore College
University of the Sciences

Zone 4

College of William & Mary
Howard University
Old Dominion University

Randolph College
University of Virginia
Virginia Tech

Zone 5

Appalachian State University
Davidson College
Duke University
High Point University
The University of North Carolina at Asheville
The University of North Carolina at Chapel Hill
Wake Forest University

Zone 6

Augusta University
Emory University
Florida Polytechnic University
Georgia Institute of Technology
University of Central Florida
University of Florida
University of North Alabama
Valdosta State University

Zone 7

Cleveland State University
Grove City College
Kettering University A
Kettering University B
Lawrence Technological University
Marshall University

Zone 8

University of Louisville
University of Tennessee Knoxville

Zone 9

Augustana College
Carthage College
University of Wisconsin - Parkside
University of Wisconsin - River Falls

Zone 10

Dillard University
Rhodes College

Zone 11

Bethel University
Coe College
Creighton University
Minnesota State University Moorhead
South Dakota School of Mines & Technology
University of Minnesota, Twin Cities
University of Northern Iowa

Zone 12

Missouri Southern State University
Southwestern Oklahoma State University

University of Missouri - Columbia
William Jewell College

Zone 13

Abilene Christian University
McMurry University
Texas A&M University - Commerce
Texas Lutheran University

Zone 14

Colorado School of Mines
United States Air Force Academy
University of Colorado Denver
University of Denver

Zone 15

University of Utah

Zone 16

Embry-Riddle Aeronautical University - Prescott

Zone 17

Lewis and Clark College
University of Washington Bothell
Washington State University

Zone 18

California State University, Long Beach
University of California, Berkeley
University of California, San Diego
University of San Diego

UPCOMING SPS AWARD APPLICATION DEADLINES

March 15

- SPS Award for Outstanding Undergraduate Research
- SPS Scholarships
- SPS Outstanding Chapter Advisor Award

June 15

- SPS Outstanding Chapter Award (chapter reports are due)

For details on all SPS awards visit spsnational.org/awards.

Distinguished Chapters

Zone 1

Mount Holyoke College
Smith College

Zone 2

Hamilton College
Manhattan College

Zone 3

Bryn Mawr College
Drew University
Indiana University of Pennsylvania
Messiah University
The Pennsylvania State University
Ramapo College of New Jersey
Rutgers University
Seton Hall University
Stevens Institute of Technology
Stockton University

Zone 4

The George Washington University
Georgetown University
Northern Virginia Community College
Radford University

Randolph-Macon College
Towson University
University of Mary Washington
University of Maryland, College Park
Virginia Commonwealth University

Zone 5

The Citadel
Clemson University
University of Tampa
Wofford College

Zone 6

Florida State University
Georgia Southern University
The University of Alabama
University of Puerto Rico, Mayagüez Campus
University of Puerto Rico, Rio Piedras Campus
University of West Florida

Zone 7

The College of Wooster
Denison University

Kalamazoo College
Ohio University
University of Michigan Ann Arbor
University of Pittsburgh
Wayne State University

Zone 8

Ball State University
Southern Adventist University
University of Kentucky
The University of Tennessee - Chattanooga

Zone 9

University of Illinois at Chicago
Wheaton College

Zone 10

University of Central Arkansas
University of Southern Mississippi

Zone 11

Augustana University
Luther College
Nebraska Wesleyan University

Zone 12

Oklahoma State University

Zone 13

Texas A&M University
The University of Texas at Dallas

Zone 14

Colorado Mesa University

Zone 15

Brigham Young University

Zone 16

Arizona State University

Zone 17

University of Oregon

Zone 18

California Lutheran University
California State Polytechnic University, Pomona
California State University, Sacramento

Notable Chapters

Zone 1

Boston College
Massachusetts Institute of Technology
Saint Michael's College
Trinity College - Hartford
The University of Maine
University of Vermont

Zone 2

Buffalo State College
State University of New York at New Paltz

Zone 3

Drexel University
East Stroudsburg University of Pennsylvania
Ursinus College

Zone 4

Roanoke College
Salisbury University

Zone 5

Furman University
North Carolina State University
Presbyterian College

Zone 6

Wallace Community College

Zone 7

Allegheny College
Calvin University
Gannon University
Kenyon College
Ohio Wesleyan University

Zone 8

DePauw University
East Tennessee State University

Illinois State University
Indiana State University
Murray State University
Saint Mary's College

Zone 9

Lawrence University
University of Wisconsin - Eau Claire

Zone 10

Henderson State University
Tuskegee University
Union University

Zone 11

Concordia College
Gustavus Adolphus College

Zone 12

Pittsburg State University

Zone 13

Angelo State University
San Antonio College
Stephen F. Austin State University
Tarleton State University
University of Houston

Zone 14

Fort Lewis College

Zone 18

California State University, Channel Islands
California State University, Northridge

2021–2022 SPS OUTSTANDING CHAPTER ADVISOR

The SPS Outstanding Chapter Advisor Award is the most prestigious recognition given each year by SPS. The following SPS advisors were nominated by their students, colleagues, and departments in recognition of their dedication to furthering the mission of SPS. The winner receives a total of \$5,000 for themselves, their chapter, and their department. Learn more about the award at spsnational.org/awards/outstanding-chapter-advisor. Nominations for next year's award are due March 15.

Winner: *Peter Sheldon*, Randolph College

Nominees:

Nicole Gugliucci
St. Anselm College

Varun Makhija
University of Mary Washington

Sean McBride
Marshall University

Michael "Bodhi" Rogers
University of Colorado Denver

Mark Scafonas
St. Joseph's University

Meet the 2021 SPS Outstanding Chapter Advisor: **Peter Sheldon**

by Korena Di Roma Howley, Contributing Editor

The SPS Outstanding Chapter Advisor Award is the most prestigious award given by SPS, bestowed annually on the basis of the leadership, student leadership development, support, and encouragement the advisor has provided to the chapter. For his leadership and guidance of the SPS chapter at Randolph College, Peter Sheldon is the 2021–22 SPS Outstanding Chapter Advisor.

As an undergraduate math major at Amherst College, Peter Sheldon found himself gravitating toward the physics department because of the people—early influences whose examples would guide him throughout his career.

Now Sheldon is beginning his 25th year as a physics professor at Randolph College in Lynchburg, Virginia—and it's still about the people. "My role here is to engage students and to help them be the best physics, engineering, or STEM majors that they can be," he says.

Sheldon started Randolph's SPS and Sigma Pi Sigma chapters in 1999 and has chaired the school's physics and engineering department since 2002. As a chair and chapter advisor, he says, "I have had the most amazing opportunities to help start programs that are student oriented and that help our students be successful."

These programs include the Central Virginia Science Festival (SciFest), an SPS-led community event that Sheldon cofounded in 2005, and Step Up to Physical Science and Engineering at Randolph (SUPER), an honors and support program for STEM majors that kicked off in 2010. SUPER has been the recipient of nearly \$3 million in grant funding from the National Science Foundation (NSF) and includes a



ABOVE: Peter Sheldon (third from left) poses with Randolph students at the 2022 Physics Congress. Photo courtesy of Sheldon.

mentoring program, a career component, and annual one-credit seminar classes that prepare students for research and careers.

In his role as SPS advisor, Sheldon enjoys leading one of Randolph's most active clubs. "I love any opportunity to get to know the students outside of the classroom and to help them to get noticed at the college," he says. Over the past 16 years, the chapter has won 14 Outstanding Chapter Awards. Sheldon attributes its success to consistency and persistence.

"We hold regular activities, and we engage the community," he says. "If an event isn't successful, we don't let that hold us back. We learn from failures and move forward. Resilience is most important for a student and for a chapter." And, as an advisor, Sheldon isn't afraid to be involved. "I attend all the SPS meetings I can, and I advise the SPS leadership on a regular basis," he says.

Sheldon's enthusiasm for growing and adapting programs is evident in the evolution of both SUPER and SciFest. After learning that many physics undergraduates were concerned about mental wellness, SUPER program leaders sought and received NSF support to add mental health and inclusion components to the program.

SciFest, meanwhile, has become the largest event on Randolph's campus, attracting thousands of people to the school each year for hands-on activities, performances, panels, and other opportunities for engagement with the sciences. Nearly a third of Randolph's student body volunteers for SciFest. With Sheldon's guidance, the event is entirely run by SPS, providing valuable leadership training for chapter members and other students.

Throughout his 25 years at Randolph, Sheldon has also worked with dozens of students in independent research on topics including physics education, low-temperature physics, roller coasters, and inertial navigation. In their letter nominating him for the Outstanding Chapter Advisor Award, students highlighted this commitment to cultivating student research, as well as Sheldon's dedication to developing Randolph's SPS chapter, his accessible manner, and his active teaching style.

"He represents the true goal of the Society of Physics Students—to help us grow and mature into the larger community of physicists and engineers," the students write.

Of course, for Sheldon it's the students themselves who contribute to a robust and engaging SPS chapter. "Physics students by nature need to be an inquisitive bunch," he says. "They also need to be hardworking and resilient. That is also exactly what a successful club needs. It is those students who are most curious who become part of the chapter, and it is the resilient nature of these students that allows the club to be successful." //

NOMINATE YOUR ADVISOR

For details on the SPS Outstanding Chapter Advisor Award, visit spsnational.org/awards/outstanding-chapter-advisor. Nominations are due March 15.

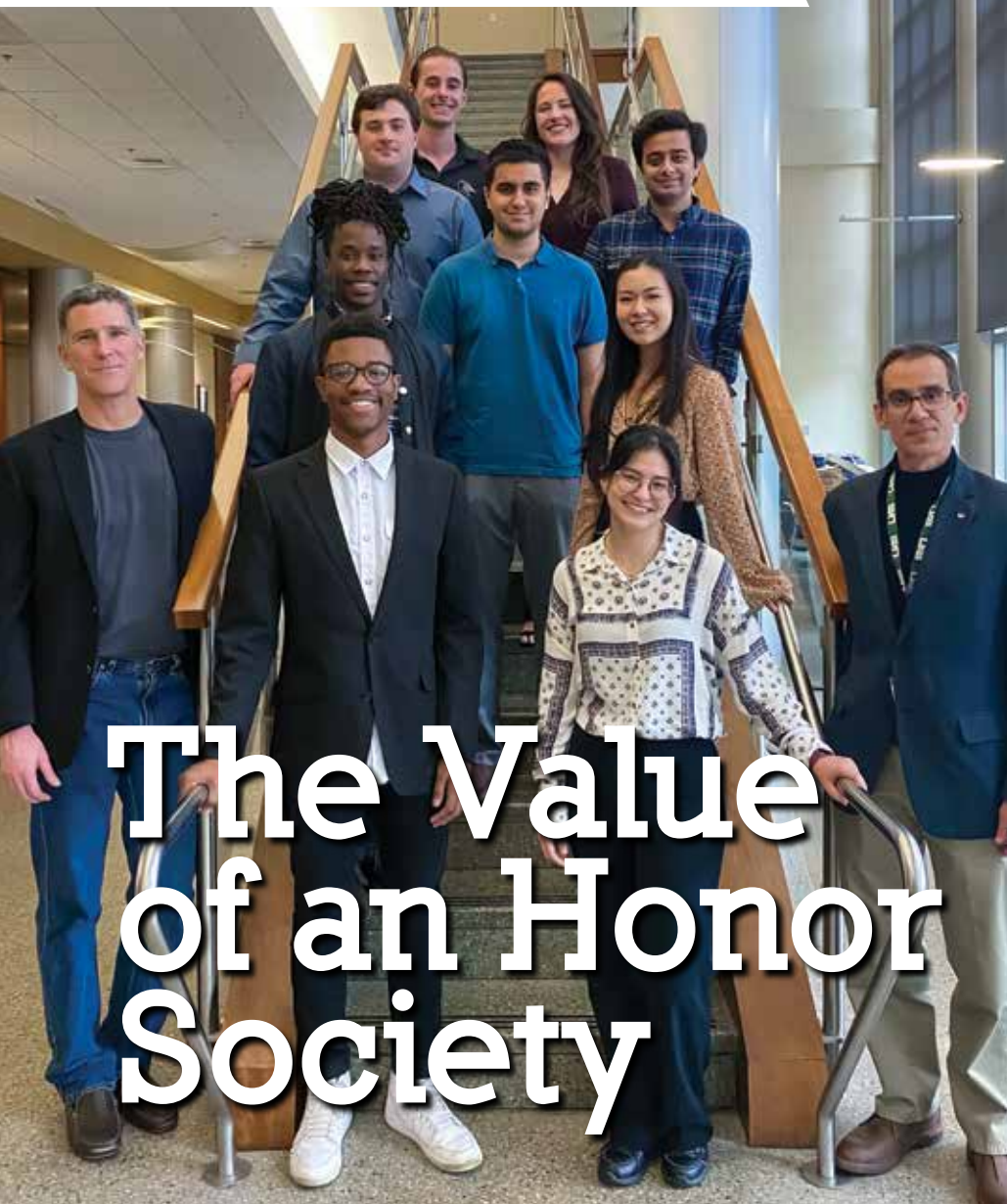
FUTURE OF PHYSICS DAYS

Lay the Groundwork for Your Future in Physics

Future of Physics Days (FPD) events help undergraduate students gain valuable professional experiences at APS scientific meetings. Join us at an APS March or April Meeting to present your research, explore career options, and meet new colleagues.



SPECIAL FEATURE



The Value of an Honor Society

by Blane Baker, Sigma Pi Sigma President and Professor of Physics, William Jewell College

As president of Sigma Pi Sigma, I am often asked, “What is the difference between the Society of Physics Students and Sigma Pi Sigma?” To put it briefly, SPS is a professional society open to all students interested in physics and astronomy, and Sigma Pi Sigma is the physics and astronomy honor society and recognizes outstanding academic performance or distinguished service.

As I have interacted with folks over my first few months as president, some have questioned the value of honor societies, which are exclusive by their very nature. I would like to offer two responses, but first I will start with some history.

Sigma Pi Sigma originated on the campus of Davidson College in 1921. In December of that year, five undergraduate physics students and four faculty members established an

LEFT: One of the newest chapters of Sigma Pi Sigma was founded on April 8, 2022, at the University of Alabama at Birmingham. This chapter was installed by former Sigma Pi Sigma President Jim Borgardt.

organization for physics students that emphasized honoring scholarship, encouraging interest in physics, promoting service, and providing fellowship. They called their organization Sigma Pi Sigma. This name comes from the first letters of a motto that translates from the Greek as “Investigation, the forerunner of knowledge.”

Once $\Sigma\Pi\Sigma$ was established at Davidson, physics departments throughout the country expressed interest in the organization. A chapter at Penn State was founded in 1926 by Marsh White, who served as Sigma Pi Sigma executive secretary for more than 20 years. You may be familiar with his name—in honor of White’s longtime service, SPS offers Marsh W. White Awards to support chapter projects designed to promote interest in physics among students and the public.

The first national convention of $\Sigma\Pi\Sigma$ was held at Davidson College in 1928, with the six existing chapters participating. That convention was the precursor to the modern Physics Congress, including the most recent congress held in October in Washington, DC. By 1929 there were ten $\Sigma\Pi\Sigma$ chapters.

In the early days, Sigma Pi Sigma was a fraternal organization complete with secret handshakes and shenanigans. At the first business meeting of the organization at Davidson, the most serious discussion focused on how much voltage could be applied to a new member without causing “permanent damage.” Apparently, the experiment was done on “Wooly” Grey, a member of the first induction class, with no harm done.

At the third national convention at Purdue in 1934, the name “fraternity” was replaced by “society,” and all secrecy was removed. In 1936, $\Sigma\Pi\Sigma$ became—and remains to this day—an Associated Society in the Physics Section of the American Association for the Advancement of Science (AAAS). In 1945, $\Sigma\Pi\Sigma$ became a member of the Association of College Honor Societies (ACHS), the national accrediting organization. In the early 1950s $\Sigma\Pi\Sigma$ became an Affiliate Member of the AAAS.

Also in the 1950s, the American Institute of Physics (AIP) and Sigma Pi Sigma began collaborating on projects centered around physics education and student development.

On April 22, 1968, Articles of Agreement between the AIP Student Sections and $\Sigma\Pi\Sigma$ were signed, resulting in two joined organizations, the Society of Physics Students (SPS) and $\Sigma\Pi\Sigma$. Both societies remain supported by AIP today. The two organizations operate side by side in many departments, cohosting events and outreach programs.

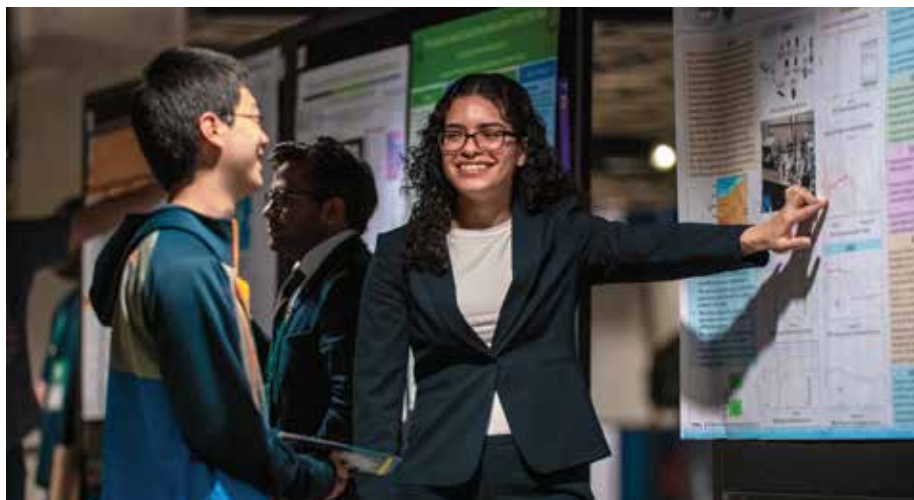
SPS welcomes all students interested in physics and astronomy. Today there are over 800 SPS chapters at colleges and universities worldwide, and members are typically undergraduate students. There are fewer Sigma Pi Sigma chapters, but membership in Sigma Pi Sigma is for a lifetime. Students who excel in their academic programs or demonstrate exemplary service may be invited to join by their local chapter. Alumni may also be inducted. The honor society fosters opportunities for its 100,000 members—ranging from students to those who've been long retired—to connect and contribute to the broader physics and astronomy community. This includes supporting current undergraduate students through giving and other means.

So, what is the value of an honor society?

First, I believe that Sigma Pi Sigma and other honor societies can, and should, use their resources to give *all* students opportunities to thrive. Honor societies can provide scholarships, sponsor outreach programs for kids, and fund research opportunities for departments with no budgets for scholarly work. Sigma Pi Sigma is engaged in these activities, and I would like to see us do even more. As organizations that value fellowship and service, one of our highest priorities must be to promote inclusivity and advocate for everyone.

Second, while societies like Sigma Pi Sigma honor certain achievements, those individuals who are inducted are charged with promoting physics and astronomy for the good of *all*. That's something I encourage members to take seriously. By promoting our values of fellowship, service, and appreciation for the field, honor society members can help everyone around them to thrive. As I have often told my students, use your sphere of influence to make the world better for everyone.

As your SPS chapter engages in departmental, campus-wide, community, and zone activities, I invite you to consider organizing a Sigma Pi Sigma induction ceremony to honor students who have achieved academically in your department, or who have served SPS during their undergraduate careers. If your school doesn't already have a chapter of Sigma



TOP: Sigma Pi Sigma president Blane Baker welcomes attendees to the 2022 Physics Congress. Photos courtesy of SPS.

ABOVE: Continuing the tradition started in 1928, the 2022 Physics Congress brought together 1,200 physics undergraduates and mentors to build community, share research, and discuss the future of physics and astronomy. Many of these students would have been unable to attend without the generous financial support of Sigma Pi Sigma members.

Pi Sigma, reach out to the SPS National Office for guidance on starting one.

Sigma Pi Sigma induction ceremonies provide opportunities to connect with alumni, host guest speakers, and introduce new students to your department. In my department at William Jewell College, we conduct an annual induction ceremony and then gather for a social and dessert, followed by various departmental recognitions.

Everyone is included, and students often remember this event as a special time in their undergraduate experience.

From its inception, Sigma Pi Sigma has sought to help all students thrive and to serve the public by sharing our passion for physics and astronomy. Today we continue that legacy with a renewed commitment to providing opportunities for all students and ensuring that all are welcome. //

For more information on Sigma Pi Sigma and hosting an induction, visit sigmapisigma.org.



SPS CHAPTERS ON BUILDING COMMUNITY



1

Oklahoma State University SPS members took a three-day road trip to the Johnson Space Center in Houston, Texas. Here, they take in the first stage of the Saturn V rocket.

2

Augustana University SPS members on a giant Newton's cradle float the chapter built for the school's homecoming parade.

3

The Georgia Institute of Technology SPS chapter visits the Kennedy Space Center in Cape Canaveral, Florida.

4

Members of Seton Hall University's SPS chapter on a field trip to the Franklin Institute.

5

Despite rainy conditions, about 70 physics students enjoyed the annual fall bonfire hosted by the University of California, San Diego's SPS chapter.

All photos courtesy of the corresponding chapter's 2021–22 chapter report.



FIGHTING MISCONCEPTIONS WITH WATER BALLOONS

LEFT: Kenyon College SPS members show off their newly painted T-shirts. Photos courtesy of the chapter.

TOP: Soggy participants enjoy ice cream after the water balloon fight.

ABOVE: April 24 is National Physics Day in the US. What better way to celebrate?

by Kalista Wayt, SPS Chapter Vice President, Kenyon College

Students who are drawn to physics are often curious, determined, bright, and resolute. And yet there are many misconceptions about physicists as people, such as that we're boring and inaccessible. These misconceptions reverberate throughout society and can deter undergraduates from approaching or remaining in the field. Therefore our SPS chapter works to break down false impressions by demonstrating that physics is fun and accessible. Working toward this goal, we've funded educational field trips and hosted panels on imposter syndrome. But sometimes it takes two gallons of lemonade, six quarts of ice cream, 10 bottles of paint, 30 plain T-shirts, and 1,500 water balloons to get the job done.

It started with a simple question: What is an easy activity to host on a hot spring day? The brainstorming began with suggestions of cold lemonade and ice cream. Then someone asked, "What about a water balloon fight?" Suddenly the zeal to relive our childhoods took over. Of course, before we could start planning, we had to consider how we could make it relevant to breaking down barriers. Luckily, time was on our side—National Physics Day was right around the corner.

By framing the water balloon fight as a physics celebration, we planned to show people that physicists are not just boring people in lab coats. Just like any other group, we like to have fun. And to increase the fun, we decided to fill these water balloons not just with water, but with paint too. That way we could chuck paint-filled balloons at each other while turning our plain T-shirts into memorabilia. And we would have lemonade and ice cream, because at a party you can have your cake and eat it too.

There was just one last obstacle to the event—the fact that gravity is such a downer. Literally. When you throw water balloons, the plastic breaks apart and ends up on the ground. This thought led to a frantic online search for "biodegradable water balloons." The good news is that they exist—but there was a catch: The smallest pack came with 1,500 water balloons. Good old-fashioned hose-spigot, tie-them-yourself water balloons. We had a humongous task in front of us.

After securing budgets and permissions as fast as possible, we bought T-shirts, water balloons, paint, cups, utensils, and bowls. A week before the event we started advertising. Posters went up, and Discords and emails were sent. One email included a video of our vice president accidentally getting hit with a water balloon in the back of the head. Schedules were cleared, and former presidents, secretaries, treasurers, and vice presidents were recruited. We had one task left: Fill 1,500 water balloons in only five hours.

Sequestered away in a windowless basement, we began our work. Squirt to fill the balloon with paint, turn and fill to the max with water, twist and seal, then a thud as the messy weapon was added to our growing pile. We repeated this hour after hour, balloon after balloon. We emptied trash cans, carts, and bags to hold the ammunition, and the pile still kept growing. It grew and grew. And somehow, we managed to fill only 500 water balloons!

But the number didn't matter. It was time. Several of us, including many first-year students, moved into position. Then the fight began. Balloons were flying, water was splashing from all directions, and torsos were being covered in paint. First-years and seniors alike squealed as they chased each other with mischievous intent. The best part was the pure, unburdened laughter echoing outside our building. In that chaos, the first-years could see that we weren't super special, academically gifted upperclassman, destined from birth to become untouchable physicists. We were just people. People who they could reach out to for advice, people who they fit in with, and, most importantly in that moment, people who squealed when hit by an incoming balloon.

After the last balloon had burst and the final scoops of ice cream had been consumed, we took a moment to bask in the contentment. We had successfully brought our community together and showed first-year students that physicists like to have fun too. It turns out that you don't need 1,500 water balloons to break down the physics barrier. Five hundred is enough. //

MAKING SPACE FOR LGBTQ+ PEOPLE IN STEM

by Leon G.O. Sullivan, SPS Chapter Secretary, the City College of New York

In May 2022, the physics club at the City College of New York hosted its second annual LGBTQ+ in STEM event over Zoom. City College students heard from people in the LGBTQ+ community who work in various STEM fields: Dr. Michael Moloney, CEO of the American Institute of Physics, Prof. Timothy Atherton, associate professor of physics at Tufts University, Prof. Jeremy Dodd, senior lecturer at Columbia University, and Delia M. Sosa, clinical data specialist at the Broad Institute of MIT and Harvard. Guests spoke about topics like the importance of finding a place where one feels accepted for who they are, promoting intersectionality in discussions of diversity, and making sure universities are safe spaces for students in the LGBTQ+ community as well as other minorities.

The panelists also talked about seeing positive changes for the LGBTQ+ community in STEM, as well as in the outside world, over the course of their lives and careers. Many had been the only LGBTQ+ person at their place of work or in their lab at some point. Even though they had a lot in common intellectually with the people they were surrounded by, they found it hard socially. Speakers emphasized the important role of allies in ensuring that their spaces are places where LGBTQ+ people feel accepted and comfortable discussing their experiences without being othered for who they are or how they live their lives.

LGBTQ+ students in STEM who attended the event came away with feelings of belonging and optimism. One student in the physics club said, "It's great to not only know that there are other people in STEM like me, but also that they can flourish and find success in spite of anti-LGBT discrimination." Another added, "It feels really good to know that there are places like this for queer people in physics."

Creating spaces where LGBTQ+ people in STEM can discuss their experiences is important. According to a 2021 paper in *Science Advances* by researchers at the University of Michigan and Temple University, LGBTQ+ STEM professionals were more likely to experience career limitations, harassment, and professional devaluation than their cisgender and heterosexual peers across STEM disciplines and employment sectors.¹ As stressed by speakers at our event, it's important to the success of LGBTQ+ students and professionals that they have opportunities to come together and feel supported. Hosting panels like this is one way to facilitate a sense of belonging among LGBTQ+ people in STEM.

Our physics club's executive board is proud to have hosted this event for the second year in a row, and we look forward to holding more events like this. We are planning another LGBTQ+ in STEM event for 2023 and a similar event focused on the experiences of people of color in STEM. Creating an environment that promotes diversity in physics and in STEM is critical to our field and to the future of science. //



ABOVE: The CUNY SPS chapter promotes its LGBTQ+ STEM panel. Image courtesy of the chapter.

GET MONEY FOR INCLUSIVE CHAPTER EVENTS

Future Faces of Physics Awards of up to \$500 are available for chapter programs or events that promote diversity in physics and astronomy. Applications are due November 15. Learn more at spsnational.org/awards/future-faces.

References

1. Cech, E. A., and T. J. Waidzunus. "Systemic Inequalities for LGBTQ Professionals in Stem." *Science Advances* 7, no. 3 (2021). <https://doi.org/10.1126/sciadv.abe0933>.

BETTER TOGETHER— A MERGER UNIFIES TWO SPS CHAPTERS

by Kayla Dickert and Joseph Popp, SPS Chapter Co-Presidents, Saint Joseph's University

In the spring semester of 2021, Saint Joseph's University (SJU) and the University of the Sciences (USciences), both in Philadelphia, announced the possibility of a merger. The following June it became official: Saint Joseph's University would be absorbing the University of the Sciences. SJU would become SJU - Hawk Hill campus, and USciences would become SJU - University City campus.

This came as quite a shock to many students, and especially to physics majors at USciences. The announcement raised questions regarding curriculum, tuition, class locations, and extracurricular activities and left students feeling uneasy about the future. To ease some of these anxieties, the two physics departments and SPS chapters worked together to create a positive and productive environment throughout the process.

The semester before the merger, we focused on getting to know each other. We organized weekly physics seminars on the Hawk Hill campus where USciences professors introduced themselves and their research. SPS officers from both chapters met and organized joint activities, including tours of both campuses. These activities promoted fellowship and camaraderie, and gave students an excuse to indulge in department-funded snacks.

Students appointed a set of SPS officers from each campus to share governance during the fall 2022 semester, enabling equal representation and distribution of the large amount of labor needed to work out the merger. This body of officers meets every other week to organize and report on events, scholarship opportunities, and activities. So far our merged chapter has attended conferences (including the 2022 Physics Congress), been involved in community service projects, completed scholarship applications, and hosted community events on both campuses. A new, more typical set of officers will be elected for next year.

"If it weren't for the merger, I would not be at Saint Joe's anymore," says Joe Popp, the SPS co-president from Hawk Hill campus. "It simply did not have the resources I needed to reasonably reach the goals I wanted." Now that there are new faculty, students, labs, and opportunities, Popp is confident that his SJU education will support his goal of pursuing a PhD in physics. Kayla Dickert, the co-president from University City campus, agrees that the merger is a great opportunity to gain new experiences. "It was rewarding to gain a new perspective, and I'm excited about the opportunity Saint Joseph's awards us," she says.

SJU physics professor and our SPS and Sigma Pi Sigma advisor for the joint chapter, Dr. Roberto Ramos, says, "It was a very difficult and



ABOVE: Saint Joseph's University SPS chapter members pose at PhysCon 2022. Authors and co-presidents Joseph Popp and Kayla Dickert are seated. Photo courtesy of Roberto Ramos.

uncertain time for both physics majors and physics faculty." He says he's proud of the students. "[They] underwent a phase transition and are still adjusting to the changes brought by the merger, but I am amazed at their resiliency and forward-facing resolve."

The USciences SPS and Sigma Pi Sigma chapters were retired on May 4, 2022, during the last Sigma Pi Sigma induction ceremony. The ceremony was facilitated by Dr. Ramos, and the chapter's Red Book, which contains the names and signatures of the USciences Sigma Pi Sigma members, will be kept at the SPS National Office. Dr. Brad Conrad, the SPS director, was on hand to close the SPS chapter.

"The legacy of USciences SPS, with its strong history of off-campus physics outreach and seven straight years of being an Outstanding SPS Chapter, lives on in the combined chapter at Saint Joseph's University," says Dr. Ramos. "When you have students from two outstanding SPS chapters coming together, considering the combined strengths of the two physics programs, the future can only be bright!" //



RUNNING— AND DUNKING —FOR PHYSICS



by Delina Levine, SPS Chapter President, and Ronan Hix, SPS Chapter Vice President, University of Maryland, College Park

On a cold April morning, a group of students, faculty, and community members gathered outside the Toll Physics Building at the University of Maryland, College Park (UMD). It was the morning of the Centennial 3.14 K Run, an outreach and fundraising event hosted by our SPS chapter. However, our race included a few out-of-the-ordinary elements. If you peered in at one point, you'd have seen a group gathered around a student holding a beanbag, cheering as the student took aim at the PVC contraption that serves as the UMD physics department's dunk tank. You'd have heard a smack rise above the cheers as the beanbag found its target and the bucket upended, sending a torrent of frigid water over the cheerfully dismayed director of SPS and Sigma Pi Sigma, Brad Conrad.

The Sigma Pi Sigma Centennial Run was one of the first in-person outreach events our SPS chapter held after the pandemic. We had regularly hosted events for the public pre-pandemic, including science shows and interactive demo booths at festivals. The idea behind the run was to start reengaging with the local community via a short, interactive, family-friendly event that promoted exercise, connection, and the message behind all our outreach events—that physics can be fun for everyone. The run also gave us a chance to highlight SPS and the Sigma Pi Sigma honor society by celebrating its 100th birthday and raising some money for travel to the upcoming 2022 Physics Congress.

When tasked with choosing a length for the race, the planning committee naturally decided to make the route scenic and exactly 3.14 kilometers long. As participants arrived, we gave

them numbers and T-shirts. Then, speakers from the UMD physics department and SPS National said a few words, and with a countdown from the 2021 SPS Outstanding Chapter Advisor, Donna Hammer—our advisor at UMD—the runners were off!

After the run, we held a celebration complete with snacks, games, and physics demonstrations run by our chapter. We like to demonstrate important concepts in physics and astronomy, like elastic collisions and angular momentum, using household materials. In one game we balanced an embroidery hoop vertically on top of an empty bottle. Then we placed a marker on top of the hoop and had participants race to see who could be the first to knock away the hoop such that the marker fell straight into the bottle. This led to a discussion about inertia and friction. With simple demos like these, we connected physics more concretely to participants' daily lives and helped them see how interesting and fun physics can be.

In the event finale, runners were selected by raffle to try their luck at dunking a target. The first victim? SPS and Sigma Pi Sigma director Brad Conrad! After Dr. Conrad, UMD physics department chair Steve Rolston took the hot seat. Another set of contenders tried their luck, and in the end, Dr. Rolston, too, experienced the icy cold water, thanks to a well-placed beanbag thrown by an undergraduate student from his own lab. We're certain that made their next research meeting interesting!

Overall, the run was a tremendous success. Students, faculty, and members of the community interacted with physics in an unorthodox and engaging way while celebrating 100 years of Sigma Pi Sigma. On top of that, the money



LEFT: Participants start the 3.14 K run for the Centennial Celebration.

TOP: The UMD SPS chapter, hosts of the Centennial Run.

ABOVE: Director of SPS and Sigma Pi Sigma, Brad Conrad, is successfully dunked by a participant. Photos courtesy of the SPS office.

we raised helped us pay registration and accommodation costs for chapter members who attended the Physics Congress, where they connected with other students from all over the country. This event was such a success that we're hoping to host another run this upcoming spring—our physics professors better invest in some rain gear! //

PI(E) DAY GOES BIG!

by Janessa Slone, SPS Chapter President, Embry-Riddle Aeronautical University - Prescott

Two years ago, our SPS chapter at Embry-Riddle Aeronautical University - Prescott celebrated Pi Day for the first time. Last year our chapter officers decided that this tradition was worth continuing, on one condition: we make the event bigger!

Our first celebration consisted of a Digits of Pi Contest, where students recited as many digits of pi as they could, and the top ten finishers received full-size pies. We also sold “thank you” mini pies, which students could buy for other students or faculty members in appreciation.

To make the 2022 celebration bigger and better, we planned a weeklong fundraiser culminating in several Friday events. Each day in our student union, chapter members sold homemade baked goods—cookies, brownies, chocolate-covered strawberries, and a variety of vegan and gluten-free sweets. We decked out our table with SPS balloons and stickers, and many students bought spherical cow stickers along with their treats.

After four days of volunteer schedules and bake sales, the Friday fun began. Early in the morning, SPS members set up a pie-throwing area in the quad on campus. It was very cold, but that didn't stop us. As a last hoorah before spring break, SPS officers and four faculty members from the physics and astronomy department volunteered to be pied by students. We charged \$2 to throw a pie at the target from about seven feet away, but there was also a \$5 option to get a guaranteed hit.

The faculty members were excited to help us raise money. Dr. Michele Zanolin paid for numerous students to throw pies at SPS officers, and even paid for students to throw pies at him! Pie your Professors quickly became a huge hit and secured a spot on next year's schedule.

During the pie throwing, new volunteers came every hour for seven hours. SPS chapter



ABOVE: Pie Your Professor was a fun and popular fundraiser for the SPS chapter at Embry-Riddle Aeronautical University - Prescott. Photo courtesy of the chapter.

members continued selling baked goods and pi(e)-themed stickers. We also held another Digits of Pi Contest. First-year student Hailey Beier won a free pie by reciting a record 156 numbers! She's one of our newest SPS members and really showed her dedication with that accomplishment.

Through these pi-themed activities we raised about \$600 to help SPS members travel across the country to the 2022 Physics Congress—and we had a lot of fun.

Our chapter is known for fun and effective fundraisers. In addition to Pie Day, we partner with restaurants like MOD Pizza and sell Chick-fil-A sandwiches, Society of Physics Students

T-shirts, fun stickers, and “Spooky Grams,” which are bags filled with candy, toys, stickers, and handwritten notes from the purchaser/sender. Last fall we sold 300 grams!

If your chapter wants to hold awesome fundraisers, keep in mind the time and thought that goes into an event like Pie Your Professors or Spooky Grams. Having lots of dedicated members is a huge help, and SPS National is always a great resource for ideas. Be sure your members have a say in the events, prizes, and other details. Our chapter members all have a role in our fundraisers, and that helps to bring us together. //

SPS CHAPTERS ON PROFESSIONAL DEVELOPMENT



1



2



3



4



5

1

Kayla Diaz, an SPS member at the University of Tampa, presents her research at a school symposium.

2

A new member of Colorado Mesa University's Sigma Pi Sigma chapter signs the Red Book.

3

The University of San Diego delegation poses for a photo at the 2022 APS April Meeting.

4

SPS members at the University of Southern Mississippi take a break from welcoming people to the 2022 Rayborn Lecture hosted by their department, featuring exoplanet pioneer Sara Seager.

5

Ball State University inducts a new class of Sigma Pi Sigma members.

All photos courtesy of the corresponding chapter's 2021–22 chapter report.

CONNECTING RESEARCH HOPEFULS AND RESEARCH MENTORS

by Aidan Keaveney, Former SPS Chapter President and Incoming Chapter Vice President, Appalachian State University

The Undergraduate Research Opportunities Fair has become an annual tradition for our Physics and Astronomy (PandA) Club at Appalachian State University (ASU). Every year we invite professors in the Department of Physics and Astronomy to give lightning-style introductory talks about their research and opportunities for undergraduate students to get involved.

The highest degree offered in our department is an MS in engineering physics, so undergraduate students are among the primary drivers of research. As such, professors are often seeking research students as eagerly as students are seeking research mentors. Through the fair, we aim to inform students about potential research opportunities and provide a platform for professors seeking research students.

In February 2022, we hosted one of our most successful events to date. Nine professors shared their work in atmospheric science, optics, biophysics, atomic physics, astronomy, quantum, condensed matter physics, instrumentation, machine learning, environmental science, and diversity and inclusive excellence in STEM. I also shared my experience with external research and internship opportunities, including Research Experiences for Undergraduates (REUs).

I like to attend every year. Even if I'm not looking for a research opportunity, it's



ABOVE: Dr. James Patrick Sherman explains his research on atmospheric aerosols during an Undergraduate Research Fair at ASU. Photo courtesy of the ASU SPS chapter.

fascinating to hear about all of the different kinds of research being done in our department and the opportunities for undergraduate students to impact that research.

Dr. Brooke Hester is our PandA co-advisor and recruits students at the fair. She finds the event valuable for everyone in the department. "The Undergraduate Research Opportunities Fair is a clever way to bring faculty members and students together. Students are exposed to the research happening in the department, and have opportunities to interact and ask questions. The faculty doing research are able to find research students more easily, without having to seek out people on their own," she says. Three students have joined Dr. Hester's research lab after attending a fair.

Student-faculty interactions aren't the only benefit, according to Dr. Hester. "Students also see the importance placed on undergraduate research by the department. The fair provides community building and helps to improve department culture as well," she says.

PandA incoming co-president Blake Heckenlaible attended the event for the first time in 2021. "It was awesome!" he says. "I was a freshman at the time; I was curious and wanted to explore physics. Listening to the professors talk about their research opened my eyes to all the various topics that are out there. For me, it made physics much more exciting."

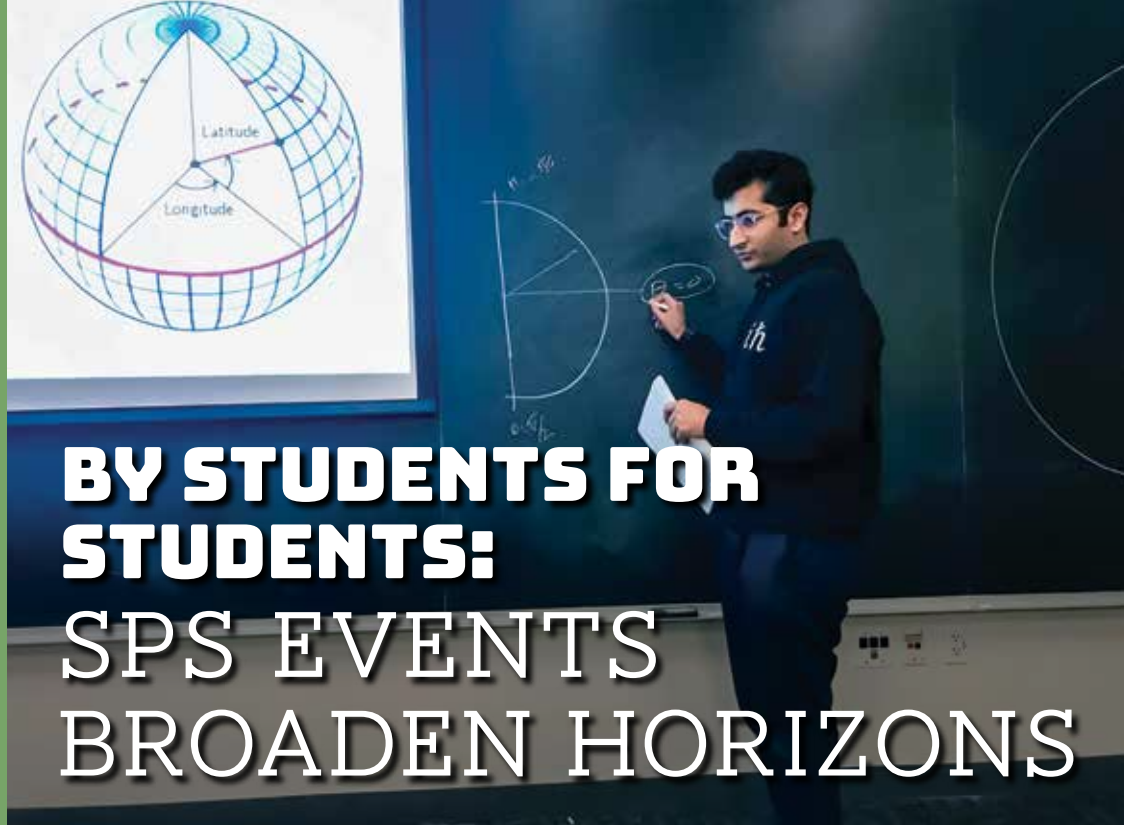
The 2020 Undergraduate Research Opportunities Fair was the last event we hosted—and the last time we had pizza together—before COVID-19 restrictions were put in place. In 2021 we hosted the event virtually, via Zoom, so we were happy when the event (and the pizza!) returned to the physics building in 2022. We're looking forward to another great event this spring. //

TEST DRIVE A CAREER AT SPS JOBS

Check out SPS Jobs for internship, research experience, and job postings in physics, astronomy, and related fields: jobs.spsnational.org.

SPS AWARD FOR OUTSTANDING UNDERGRADUATE RESEARCH

Outstanding Undergraduate Research Awards recognize individuals for exceptional physics or astronomy research conducted as an undergraduate. Winners receive \$1,800 in travel funding to present their research at an AIP Member Society meeting, \$500 for themselves, and \$500 for their SPS chapter. Applications are due March 15. Learn more at spsnational.org/awards/outstanding-undergraduate-research.



BY STUDENTS FOR STUDENTS: SPS EVENTS BROADEN HORIZONS

LEFT: SPS member Aashish Khubchandani explains latitude and longitude during a PhedEx on map projections. Photo by Noah Johnson.

BELOW: The NYU SPS chapter offers professional development and community-building opportunities in many formats and on many topics to keep their members engaged. Photo courtesy of the chapter.

by Noah Johnson, SPS Chapter Co-President, New York University

Imagine that you're a first-year physics major standing in front of a room full of other physics majors with a PowerPoint slide behind you that reads "How Humans Can Go to Venus." You're excited but also nervous. This room is full of really smart people you look up to. How will they react to this little presentation on Venus?

Now imagine how you'd feel if, at the end of the talk, you got a lot of good questions, insightful comments, and a round of applause. What an overwhelming sense of support, confidence, and community you'd feel. Well, I am that student, and since that first talk I've participated in three more Physics Education Experience (PhedEx) events.

What makes our SPS chapter at New York University (NYU) so special is our strong community and our focus on providing a high-quality undergraduate physics experience. We help students explore opportunities open to them as undergraduates and professionals via events such as PhedEx and our annual Industry Panel.

A PhedEx is not an ordinary research seminar. The talks are given *by* students *for* students. SPS members who sign up give their talk during a weekly meeting. They can present on any topic they're interested in, from their

research to a passion or side project. During a PhedEx, a speaker might play the guitar while talking about acoustics, solve an economics problem with help from the audience, talk about research on optical trapping with lasers, or discuss the convoluted nature of English grammar ("Buffalo buffalo buffalo Buffalo buffalo" is a grammatically correct sentence). These talks give students the opportunity to practice both presenting and boiling down information to an understandable level for nonexperts.

The Industry Panel is one of SPS's newest but most successful events. Our chapter leadership recognized that many physics students thought pursuing a PhD and going into academia was their only option after graduation, although in reality there are a plethora of other career paths. We sought to remedy this limited view by hosting a panel of NYU physics alums who didn't pursue careers in academia. The panelists included a high school physics teacher, a few people who work at engineering companies, and one who works in business. SPS members moderated the discussion and fielded questions from undergraduate students interested in the many possibilities on display.

This is only the tip of the iceberg of what NYU SPS does. For example, our Undergraduate Physics Seminars bring in professors from



various departments at NYU to talk about their research. This helps students connect with professors for research projects. It also exposes students to a vast array of projects outside of their specific areas of interest, and even outside of physics. The seminars give attendees an opportunity to make interdisciplinary connections that they might not have considered otherwise. We care deeply about ensuring that SPS members have the best opportunities to further their careers in a safe, community-driven environment. //

ZONE 17 MEETING INSPIRES

by Seth Moriarty, SPS Chapter Vice President, Lewis and Clark College

Near the end of the spring 2022 semester, when the weather was finally starting to warm up and the sky was clear more often than rainy, I and five other physics students from Portland, Oregon, made our way to Eugene. We attend Lewis and Clark College, a small liberal arts institution nestled in the woods just south of Portland, and were spending the weekend at the University of Oregon (UO) for the Zone 17 SPS meeting.

Lewis and Clark has a small physics department, so events like this are great opportunities for us to meet other physics and astronomy students and professors. We're always eager to expand our circle of connections in order to better support our student body and get ideas for SPS chapter activities. This was the first time any of us had attended a zone meeting. We already had tentative plans to attend the 2022 Physics Congress in the fall, and our experience at the zone meeting only made us more excited about what was in store.

The building that houses the University of Oregon's physics department is a sight to behold, with its beautiful red-brick exterior and large windows and arches. We took time to wander around as soon as we got the chance. Inside is an atrium with a snaking staircase leading to the upper floors. Skylights bring in natural light, and there are metallic art installations and architectural details hanging from the ceiling and dotted around the railings of the upper floors. Throughout the building, there are cozy study spots near windows and blackboards.

The evening of our arrival, Scott Fisher, a very enthusiastic astronomy professor, gave a fantastic talk that included information about the Pine Mountain Observatory, a collection of



telescopes in eastern Oregon that are managed remotely by UO. We learned about student involvement in the observatory and looked at photos taken through its telescopes. This was especially inspiring because earlier in the spring, another student and I got keys to the observatory atop the physics building on our campus. The talk helped motivate us to start holding observatory nights for the Lewis and Clark student body. We are also trying to get a camera for our scope so that we can take our own long-exposure photos of the night sky.

On Saturday, after some delicious vegan cinnamon rolls for breakfast, each SPS chapter in attendance gave a small presentation about what they had done in the past year. It was nice to talk about our accomplishments and hear about events other student groups were hosting on their campuses. The meeting especially made us want to start doing outreach in our community. Overall, the trip was an inspiring break from everyday student life and motivated us to do more with our SPS chapter. //



ABOVE: In addition to the Zone 17 meeting trip, the SPS chapter at Lewis and Clark hosted several activities, including a barbecue and pumpkin launch. Photos courtesy of the chapter.

SPS ZONE MEETINGS

Zone meetings bring together students from SPS chapters within a geographic region. They're fun and effective ways for undergraduate physics and astronomy majors to meet other students, present their research, and interact with practicing scientists. SPS has 18 zones, and most hold at least one zone meeting per year. To see which zone you're in and find a list of upcoming zone meetings, visit spsnational.org/meetings/zone-meetings.

SPS Mascots



At **Radford University**, SPS students have bonded over an old log—yes, a real wood log—that was being discarded. After an SPS member rescued the log, the chapter rightfully recognized them as a new buddy, Natural Log. Natural Log has strong arms and a great smile to greet everyone in a friendly manner. Their googly eyes take in everything, including mistakes in the students’ derivations on the whiteboards.



Dinosaurs are an important part of the annual Science Festival organized by the **Randolph College** SPS chapter. Harriet, a seven-foot-tall metal T-rex donated by a supportive alumna’s family, is guardian of the chapter’s observatory deck, patiently watching over the student parking lot. Harriet has helped chapter members bond and brings joy to the campus and local community. She occasionally makes appearances on social media, and locals even bring their kids by for a visit. She even dressed up as a mummy on Halloween! Photo courtesy of Peter Sheldon.



Does your chapter have a mascot? Let us know at sps@aip.org or on social media @SPSNational!

Ideas Worth Stealing



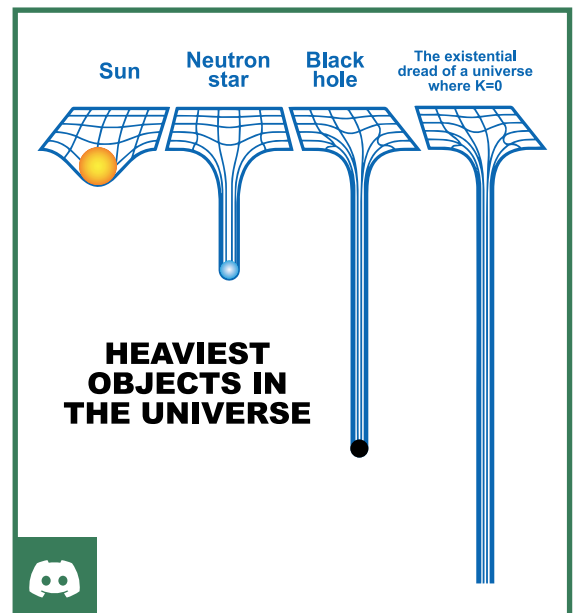
To ease the anxiety newer students might have about getting involved in physics research at **Duke University**, Duke’s SPS chapter hosted an event during which five undergraduates talked about their campus research and answered questions about preparing for and finding research positions. The chapter writes, “The research journey at Duke is not only exciting once you get started, but it’s also filled with support from fellow undergraduate students.”



SPS members at **Saint Anselm College** communicate via a Discord channel that’s become integral for planning events and projects, spreading news ... and sharing memes. Original, hilarious images are shared nearly every day. Their chapter advisor even presented a “Year in Meme” review at the Sigma Pi Sigma induction and end-of-year celebration. Image courtesy of the chapter.



The **SUNY University at Buffalo’s** SPS chapter cohosted a 5K and Milk Mile fundraiser with the running club on campus. During the Milk Mile, participants ran a mile around a track, drinking a carton of chocolate milk between laps!



Student Lounges



For their 2021 Halloween celebrations, **Colorado School of Mines** SPS members made hand-drawn ghosts representing fellow SPS members and physics faculty.



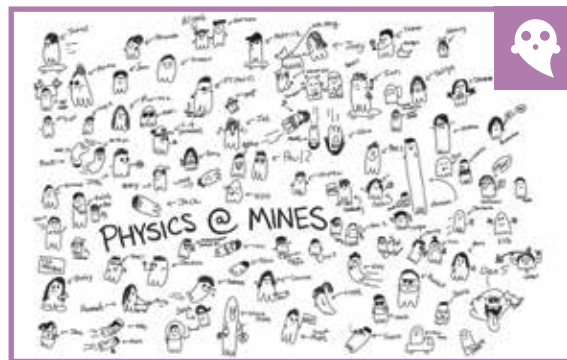
Augustana College SPS recently renovated its club room. Members helped choose furniture and decorated the room together. They rearranged tables, put up a new whiteboard, hung posters, and strung up club T-shirts from over the years.



A corner of **Cal Poly Pomona's** club room is covered in pictures of previous members and events, some of which date back to the early '80s!



Rochester Institute of Technology's Physics Activity Center (PAC), where SPS members and others hang out and study, was shuttered during the pandemic. As in-person classes resumed, SPS immediately set to work bringing the PAC back to its former glory, installing shelves and clearing clutter. Of course, the main attraction is the inexpensive snacks made available by the chapter!



■ ABOVE: Image courtesy of Elizabeth Buchheim.

Check out the SPS statement on the importance of student spaces at spsnational.org/about/governance/statements. If your group is looking to secure a common area, reach out to sps@aip.org for a letter of support!



Cleveland State University revived its Sigma Pi Sigma chapter in 2018, following a 46-year dormancy. Now they induct current students alongside recent and not-so-recent alumni. "This approach helps to build bridges between our department, current students, and alumni from different walks of life who either have established themselves already or are on an exciting career trajectory," the chapter writes. The 2022 induction brought together 60-plus guests for a celebratory evening that also included physics awards and recognitions.



To stimulate interest in computational physics and inspire people to learn code, the **University of California, Berkeley's** SPS chapter hosted its second UC Physics Hackathon for University of California campuses. SPS chapters from several campuses participated in a high-octane, 36-hour tournament.



The **Rowan University** SPS chapter participates in several impactful campus initiatives, including Project Period. Rowan's student organizations donate menstrual products to the project to be dispersed throughout campus for easy access and given to students who are unable to obtain them elsewhere.



■ ABOVE: Photos and images are courtesy of the corresponding chapter's 2021–22 chapter report unless otherwise noted.

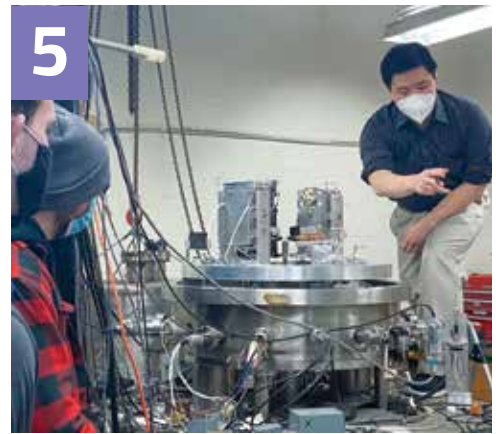
SPS CHAPTERS ON HANDS-ON PROJECTS



1 Northern Virginia Community College's SPS chapter tests a design for a hydroponic greenhouse.

2 The Engineering Physics Club at Ramapo College of New Jersey organizes Fold N Fly, an annual paper airplane competition that includes distance and target-hitting challenges. Photo by Danielle Bongiovanni.

3 Pumpkin carving is an annual tradition that students in Bethel University's SPS chapter embrace each October — how many ways can you write Newton's second law?



4 As part of an ongoing effort to engage the University of Illinois at Chicago community, the Astronomy Club set up telescopes in the middle of the quad and invited passersby to view Jupiter and Saturn.

5 During Open Lab Day, SPS students and physics faculty at the University of Kentucky showed off their labs to new students.

6 Seton Hall University SPS members during a marble roller coaster build challenge.



Photos courtesy of the corresponding chapter's 2021–22 chapter report unless otherwise noted.

THE SETBACKS AND SURPRISES OF A HUMAN NEWTON'S CRADLE

by Loyd Templeton, SPS Member, and Olivia Kaufmann, SPS Chapter President, Rhodes College

Last year our chapter attempted the daunting task of creating a Newton's cradle on a large scale—using suspended humans instead of spheres. We reached out to Highpoint Climbing and Fitness, a local rock-climbing gym, and asked to use their space as a venue since its rigging is designed to support the weight of humans. To our surprise, the gym manager was excited and agreed—as long as we signed a waiver and suspended people only about a foot off the ground.

The activity was entirely student run. Preparation and testing took place in the evenings to avoid disturbing others during busy gym hours. We made five trips to Highpoint over seven weeks to check the rigging and materials and develop a procedure. As with any physics project, we had to overcome several problems.

In our initial plan, the human spheres would wear inflatable bubble suits and standard climbing harnesses. Each person would have a rope tied to a single anchor point at the waist. However, having just that one contact point didn't work well with the bubble suits, which ended up hanging at a tilt, with the rope placing stress on the bubble. To overcome this, we purchased full body harnesses with connection points on each shoulder. They performed much better.

Another issue: where in the gym to rig our system. Climbing-gym walls aren't straight; they change angles to simulate varied terrain. This posed a problem since our human spheres needed to hang in a perfectly straight line. We needed two parallel walls that faced each other, but there were only two such areas in the gym, and neither was ideal. One was highly trafficked and lacked padding. The other had a height difference of about 15 feet between the walls, which meant the bubbles would swing in an elliptical path, and the walls weren't quite

parallel. Still, it was our best option. We purchased ropes to reduce the height discrepancy, and testing showed that the path of the bubbles appeared to be straight on target.

We needed a lot of volunteers to make this happen—three per bubble (one suspended and two belayers) and two all-purpose assistants on the ground to make sure everything was lined up and to initiate the collision. With five balls we needed 17 volunteers. Since it was important that they be skilled, we reached out to the Rhodes climbing club and local climbers.

The day of the event was hectic. Setup was much more involved than we had expected. We struggled to line up the balls perfectly given the not-quite-parallel walls. Eventually we lowered the volunteers and reassessed the situation. After brainstorming we tried again, focusing less on a perfect outcome and more on volunteer safety and comfort, and switching from five balls to three. We were pleasantly surprised by the results. The impact of the unaligned walls was less pronounced with a three-ball system, meaning the trajectories were more similar. Setup also took significantly less time, so volunteers were happy.

The desktop Newton's cradle is an excellent demonstration of the conservation of momentum and energy. At this large scale we had significant—and unavoidable—energy loss in our system, but we did see cradlelike behavior for one or two cycles, demonstrating the conservation of momentum.

Curious to see what our human Newton's cradle looked like? The Rhodes College communications team recorded the event, which you can see on our SPS chapter's YouTube channel at <https://bit.ly/3VTZCnA>. We plan to use the video for future outreach events to get younger students excited about physics, as well as to help recruit new members. //



ABOVE: Members of the Rhodes College SPS chapter demonstrate a human-scale Newton's cradle. Photos courtesy of Rhodes College SPS.

ROBOCODE BATTLE BUILDS BRIDGES

by Owen Root, SPS Chapter President, Nebraska Wesleyan University

Last spring, our SPS chapter—the Nebraska Wesleyan University physics club—was in the process of revitalization. During the preceding several years the club had been practically nonexistent due to the COVID-19 pandemic and lack of an effective officer team. But during the 2021–22 academic year, we were determined to get on our feet again and have an active presence on campus. Coming out of the pandemic, we felt that a strong physics community was more valuable than ever.

After hosting several small events and getting back on track with regular meetings, our SPS chapter wanted to connect with students in departments that have a lot of overlap with physics, namely, math and computer science. We had brainstormed for a while but hadn't come up with any sound ideas when one of our physics department faculty members suggested a programming game called Robocode.

None of us had heard of Robocode, but it sounded intriguing, so we started looking into it. We learned that Robocode can be a tool for improving one's programming skills and also introduces the fundamentals of machine learning. Using the Java programming language, participants build and develop robot battle tanks that duke it out in a live-displayed digital arena. While the "physics" involved in a Robocode battle isn't exactly true to life, having an understanding of real-world physics benefits one's intuition for Robocode.

This was exactly what we were looking for. It was both fun and engaging and had something for each of the audiences we wanted to draw in. We planned a Robocode showdown for the end of the semester. Then we started weekly sessions where people from all departments could learn Robocode and develop tanks. None of us were very familiar with Java, but we struggled over it together and had fun learning the language. We also enjoyed researching strategies people had developed for the game, some of which were incredibly complex and fascinating. Others had clearly put a lot of time into Robocode, and that motivated us to improve our own bots.

After months of planning and coding, the day of the final showdown arrived. Students from every department were invited to view the competition, which we held in our university's planetarium so that we could display the battle live on the big projector screen. The event was a massive success, with a viewer turnout more than double the size of our physics club. Of the tanks built over the course of the semester, five were sophisticated enough to compete. We had tons of fun cheering them on as they fought for victory on the big screen. The competition was great publicity for our chapter and established us as a fun and strong campus community. //



ABOVE: A Robocode battle in progress. Source: Larson, F. N., Mathew, N., and Šavara, P., Robocode, Source Forge, 2022. Available from sourceforge.net/projects/robocode/, accessed 26 November 2022.

GET MONEY FOR CHAPTER OUTREACH EVENTS

Marsh White Awards of up to \$500 are available for chapter programs or events that promote an interest in physics or astronomy among students or the general public. Applications are due November 15. Learn more at spsnational.org/awards/marsh-white.

THE SPS OBSERVER WANTS TO SHOWCASE YOUR CHAPTER

Invest in the future of your chapter and let SPS Headquarters know what you've been up to by submitting your SPS chapter report this spring. Chapters may be invited to share their activities in SPS publications. For details visit spsnational.org/resources/chapters/annual-chapter-reports.



CREATIVE OUTLETS AND REACHING NEW FACES

by Robert Laughlin, SPS Chapter President,
Florida State University

At the start of each semester, it's easy to feel excited about what's in store. But as the semester progresses, this excitement often dwindles and stress and anxiety pile up. Physics majors have a heavy course load and tough exams, so we may view stress and burnout as inherent aspects of studying physics. But these feelings can harm us academically and physically, and as SPS chapters, we should do what we can to combat them. While tactics to manage and mitigate stressors through time management and study strategies are beneficial, most physics students are already aware of them. Sometimes students just need a break from heavy course loads—something SPS chapters can provide.

Last year our chapter at Florida State University (FSU) had rocky attendance, but meetings with creative activities often had double or triple the attendance of our more academically oriented meetings. When I asked some of our members why they attended specific meetings, it came down to the work they had to do. For busy students, an academic meeting felt like more work, but a creative meeting felt like a break. Probably for this reason, our most successful meetings last year were two creative activities: making hexaflexagons and painting our research projects.

A hexaflexagon is a paper craft. When finished, it forms a flat hexagon with two visible faces. However, when you fold (or flex) a hexaflexagon in particular ways, you reveal new, previously hidden faces. Hexaflexagons are a specific type of flexagon—the category of objects that exhibit this unique property. Mathematician Arthur H. Stone discovered the first one in 1939. There are other flexagons with different shapes that reveal different numbers of hidden faces.

Aside from being an entertaining novelty, flexagons are particularly interesting to physicists because physics Nobel laureate Richard Feynman was part of the Princeton Flexagon Committee alongside mathematicians Bryant

LEFT: Florida State University SPS members show off their hexaflexagons.

BELOW: Students enjoy a break from coursework during one of FSU's SPS chapter events. Photos courtesy of the chapter.

Tuckerman and John W. Tuckey. While working on the Flexagon Committee, Feynman developed a hexaflexagon diagram that became a precursor to Feynman diagrams.

At our SPS hexaflexagon meeting, we talked about hexaflexagons and showed members how to make them. Then our members decorated the different faces of their hexaflexagons as they searched for new ones. This meeting has become an annual tradition in our chapter. If you'd like to try it with your chapter, you can find many videos about hexaflexagons and how to make them online, as well as printable templates. You could even have your members make their own diagrams for how to "traverse" their hexaflexagon to reach all the hidden faces.

In another popular meeting emphasizing creativity, we painted our undergraduate research projects or the research we might want to do in the future. In addition to serving as a creative outlet, this activity highlighted our members' research while encouraging others to get involved. We've also hosted meetings about origami, which some physicists study for its mechanical properties and applications in space travel.

I encourage all chapters to explore creative ways for their SPS members to express their love of physics and to incorporate such activities into their chapter's schedule. These events are great opportunities to unwind from the stress of classes, hang out with SPS friends, and maybe even learn something fun as well. //





Google Scholarship

Application Deadline - March 15

Amount: **\$2,500**

Up to 20 awards will be given in 2023

Awardees will be connected to Google through special events

This scholarship was created to support passionate physics and astronomy students as they pursue their dreams. This award seeks to aid undergraduate students with the potential and intention for continued scholastic success who are in financial need. Particular consideration is given to those that may have overcome significant obstacles in their professional journey. Those who are traditionally underrepresented in physics and astronomy or have overcome significant obstacles in their professional journey are strongly encouraged to apply, including first-generation college students and those from low socioeconomic backgrounds.

Criteria

- Demonstrated interest and perseverance in physics or astronomy
- Exhibition of effort and the potential for continued scholastic development
- Active participation in the department and in clubs/programs outside the classroom, such as SPS

For more information on the Google Scholarship, visit www.spsnational.org/awards

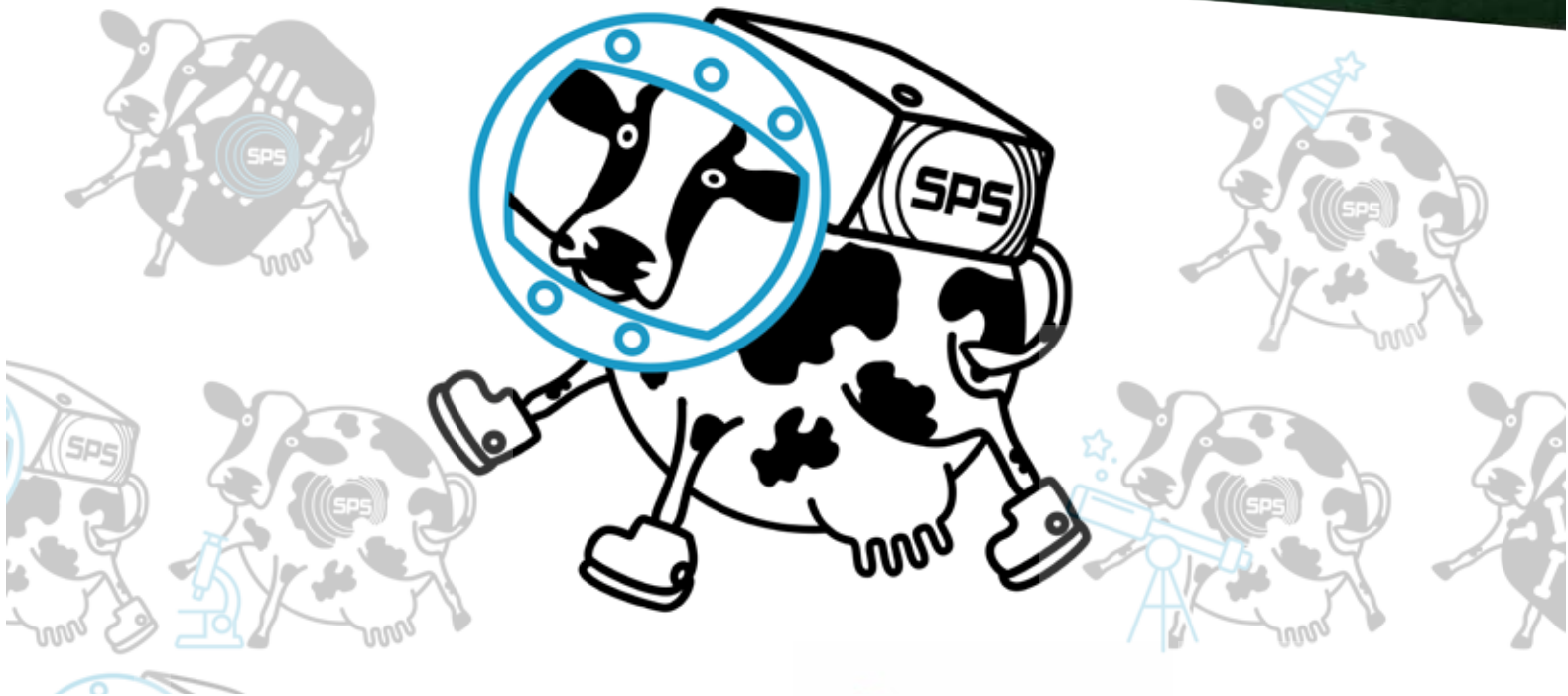


— RUN FOR SPS Council —



Nominations close **March 15**,
for more information,
visit www.spsnational.org/nominate

I WANT μ TO RUN FOR
SPS COUNCIL!



Find us @SPSNational:



SPS CHAPTERS ON OUTREACH AND SERVICE



1



2



3



4



5

1

An Appalachian State University SPS member wows kids during an outreach event for a homeschool group.

2

Emory University physics hosted a stall at the Atlanta Science Fair Expo that included a bubble activity, which the kids loved.

3

Randolph College's SPS chapter plays an essential role in SciFest, a week-long physics outreach event that brings more than 2,000 attendees to campus.

4

Kids observe salt plate wave patterns during High Point University's HPUiverse Day community outreach event.

5

Dillard University SPS members teach local grade school students about STEM.

All photos courtesy of the corresponding chapter's 2021–22 chapter report.



ROLLING CANS FOR A GREAT CAUSE

by Garath Vettters, Andrew Tom, Emily Maxey, Calvin Nash, and William Hennig, SPS Chapter Officers, Angelo State University



ABOVE: The fall 2022 semester's can roll food drive went well! Photo courtesy of Garath Vettters.

LEFT: The Angelo State University SPS chapter collects lots of cans every semester. Photo courtesy of Trey Holik.

Can drives that collect food for those in need are a staple of student organizations across the country. However, our SPS chapter at Angelo State University in San Angelo, Texas, mixes things up a bit.

Near the end of every semester, we set up a fancy binder and plywood ramp in one of the hallways of the Vincent Nursing and Physical Science Building, where our physics department is located. The premise is simple: Bring at least five cans to donate, roll one down the ramp, and calculate the kinematics of the can in two dimensions to get extra credit. This opportunity for students in intro-level physics allows them to see classroom concepts in action while doing some good for the community. After a week or two of collecting cans, our SPS chapter gathers them up, loads them into a shopping cart, and wheels them over to our University Center to donate them.

This event may seem small in comparison to other events our SPS chapter hosts during the semester, but that doesn't take away from its significance. Giving students the opportunity to put their physics skills to the test while engaging in a bit of friendly, can-racing rivalry is a great way to build community in our department. Moreover, it's a way for us to regularly give back to the greater community. During the 2021–22 academic year we collected more than a thousand cans.

Extra credit may be the main reason many students participate, but it's still encouraging to see so many cans surrounding the table where students document their donations. And it's meaningful to drop them off at the Concho Valley Food Bank and the food pantry located in our University Center. The can roll gives our SPS members an opportunity to work together and accomplish something great. //

HUNGER CAN BE CLOSER THAN YOU THINK!

SPS provides \$300 in financial support for chapters to start food cabinets for hungry physics and astronomy students. Chapters are to use funds for items that are freely accessible to all department undergraduates and are encouraged to fundraise to restock and maintain the food cabinet beyond the seed funding. Applications are accepted on a rolling basis. For details, see spsnational.org/scholarships/FFHPS.

WHO WILL YOU RECOGNIZE FOR OUTSTANDING SERVICE TO SPS?

SPS Outstanding Service Awards acknowledge outstanding chapter leaders—students, faculty, and staff—who further the mission of SPS and aim to support the health of the organization and the broader community through service. Chapter members can nominate candidates at any time. For details, see spsnational.org/awards/service.

BUILDING A SOLID FOUNDATION IN PHYSICS

by Katie Bailey, SPS Chapter President, Stephen F. Austin State University

Engaging with the community has long been a core focus of our SPS chapter at Stephen F. Austin State University. Our goal is to increase interest in STEM and help the public interact with our university. More specifically, we strive to reach the kids in our community—those who will one day succeed us. Now more than ever, cultivating and supporting an interest in physics among young people is necessary to foster diversity and inclusivity in our field.

One way that we work to achieve this is through an after-school program called Solid Foundation Association. Created in 1992, the association supports at-risk youth through mentorship and various types of enrichment. Our chapter has been volunteering at Solid Foundation for over a decade, encouraging interest in STEM and helping to make our field more accessible to students.

Most recently, we've been making the trip twice per month. Prior to each visit, our chapter members choose an introductory physics topic to focus on. We then identify relevant demonstrations and do practice runs with the help of faculty. We typically bring a few demos and a hands-on activity for students. Our audience has a wide age range, from elementary to high school, so we make sure that the demos are interesting to the whole group and that we can explain the concepts at a level that everyone can understand.

Upon our arrival, we gather all of the students together and introduce the topic. Then we ask questions to help us gauge what they might already know about the subject. Before each demo, we encourage students to form their own hypothesis about what might happen. Afterward, we discuss which hypotheses were correct and why. This transitions into a conversation about the underlying physics that drives each demonstration. Finally, we conclude each trip with an interactive activity, such as making ice cream, constructing tinfoil boats, or creating songs with boomwhackers (percussion tubes).



ABOVE: Chapter members demonstrate electric charge with a Van de Graaff generator. Photo by Katie Bailey.

In recent years this program has been so successful that we've begun collaborating with other STEM departments on campus to generate programs that go beyond physics. Ultimately, it's rewarding for our members to see so many young students get excited about STEM and become interested in pursuing a STEM degree. It's even more rewarding to think that our chapter might play a small role in increasing diversity in STEM fields in the coming years. //

GROW YOUR OUTREACH WITH HELP FROM SPS HEADQUARTERS

Get Money for Chapter Outreach Events

Marsh White Awards of up to \$500 are available for chapter programs or events that promote an interest in physics or astronomy among students or the general public. Applications are due November 15. Learn more at spsnational.org/awards/marsh-white.

Get Money for Chapter Events that Promote Diversity and Inclusivity

Future Faces of Physics Awards of up to \$500 are available for chapter programs or events that promote physics and astronomy across cultures. Applications are due November 15. Learn more at spsnational.org/awards/future-faces.

Get an Outreach Kit: The SPS SOCK

Science Outreach Catalyst Kits (SOCKs) are free science outreach kits designed for SPS chapters. New SOCKs are created each summer by SPS interns. Request a SOCK for your chapter at spsnational.org/programs/outreach/science-outreach-catalyst-kits.



FAMILY PHYSICS NIGHT

AN ANNUAL TRADITION OF COMMUNITY-BUILDING OUTREACH

by Sophia Saucedo, SPS Chapter Fundraising and Outreach Chair, Max Schaar, SPS Chapter Vice President, and Ezra Acero, SPS Member, with Toni Sauncy, SPS Chapter Advisor, Texas Lutheran University

Each November the Texas Lutheran University (TLU) SPS chapter hosts hundreds of campus visitors for an evening devoted to the wonders of physics.

Family Physics Night (FPN) began in 2012 with about 50 visitors. Now hundreds of people come for this community event featuring hands-on physics activities. Each year we have a new topic, and our students and faculty members spend weeks developing engaging activity stations that highlight the importance of understanding physics. The activities are designed to speak to people of all ages and enable them to see, learn, and be inspired by the magic that we know as physics.

Like most chapters, our outreach activity was curtailed during the pandemic, forcing a virtual FPN hosted in collaboration with the SPS National Office in 2020. In 2021, the 10th annual FPN drew nearly 200 visitors back to campus. Our theme was Exploring with Physics, inspired by the impending launch of the James Webb Space Telescope (JWST). Stations focused on how physicists and astronomers explore things from the small (build-your-own cardboard microscope) to the big (how the mysteries of the universe are being revealed using infrared radiation). In preparation, we constructed a full-scale model of the JWST primary mirror that served as a popular photo op and gave participants a tangible idea of the telescope's size. You may have seen our model in the main ballroom at the 2022 Physics Congress!

While it's typical for many open house science outreach events to attract elementary school-aged students, TLU FPN is popular with our local middle and high schools. We market FPN through a network of high school science teachers, many of whom bus students to the event from outlying rural areas after inspiring them with extra credit assignments. In addition, the TLU marketing staff help create flyers that are distributed throughout the community. More recently we've been using social media platforms (e.g., Instagram, Facebook, and Twitter) to remind FPN fans about the event.

Transforming an empty party barn into a bona fide interactive science museum requires organization and an all-hands-on-deck effort that takes hours. Setup typically begins in the early morning and ends just before the TLU Distinguished Public Lecture in Physics, which precedes a short demonstration show and the hands-on activities.

Visitor feedback about the experience is always positive, with the exception of some complaints about the "big crowds." Attendees respond well to lessons



TOP: TLU SPS chapter members pose in front of their full-scale model of JWST's primary mirror.

MIDDLE: Community members and student volunteers engage in demos in front of the JWST model.

ABOVE: An SPS member explains the greenhouse effect to a young visitor. Photos by Dustin Wyatt.

from TLU SPS members, who range in experience from first-year students to seniors. While our SPS chapter considers this event a public service, our physics department has another motive for supporting the event—engaging undergraduate physics majors in work that gives them agency and a sense of accomplishment, even as they learn to make a sometimes-intimidating subject fun and engaging for all. //

THE SPS PLANETARIUM TAKEOVER



an absolute joy and awe inspiring for us to learn how to operate the equipment, identify stars, present shows, and connect with members of our community. And we got to learn some astrophysics along the way.

In the spring of 2022, we presented five shows over the planetarium's three to four weeks of availability and reached more than 80 people. This fall we established a formal way for on-campus groups, clubs, and teams to register for shows. We've also hosted two community groups, including a Girl Scout troop from southern Iowa, and two open house nights where any and all could attend.

We've had a blast with this project and are really enjoying the planetarium. We're also having fun sharing this resource and our knowledge with younger students and the larger community. Interacting with youth and introducing them to physics and other sciences has been beyond rewarding. Our SPS chapter is pleased to have restored the planetarium to its proper use, and we hope to continue providing this service to the community for a long time to come. //



ABOVE LEFT: SPS members enjoy the planetarium they now operate.

ABOVE: Luther College SPS members pose inside the planetarium. Astronomical objects are projected onto the ceiling and upper portion of the walls using the round projector in the center of the room. Photos courtesy of Luther College's SPS chapter.

by Darren Kremer, SPS Chapter President, Dalton Ludington, Past SPS Chapter President (2021–22), and Will Ode, SPS Chapter Vice President, Luther College

Last spring our SPS chapter took control of Luther College's more than 60-year-old planetarium.

In the past the facility was run by a student in a work-study position and had a very limited schedule. Use had already been diminishing before 2020, and many students didn't know it existed. With pandemic complications added in, the room became primarily a place for campus clubs to watch movies. Its original purpose was being forgotten.

Planetariums come in different forms and sizes, but all are illuminated with a sense of beauty and magic. They are domed rooms that project stars and other astronomical objects onto the ceiling. During a show, a host takes visitors through the night sky or another

astronomical exploration. People often say how relaxing it is to watch the stars circle above, and the experience brings them to a point of intellectual curiosity as well.

The pandemic affected our SPS chapter in many ways, but primarily by decreasing opportunities for community outreach—a primary goal of ours. While discussing new ways to interact with the community and expose students to STEM fields, Luther faculty member and astrophysicist Dr. Jeffrey Wilkerson suggested that we use the planetarium, which was built in 1964 and can seat approximately 70 people. We were delighted by the opportunity.

Dr. Wilkerson has since trained 12 of us to run the planetarium and present shows. It was

PUBLISH YOUR UNDERGRADUATE WORK

The *Journal of Undergraduate Reports in Physics* (JURP) is a peer-reviewed publication of the Society of Physics Students that consists of papers by undergraduate physics and astronomy researchers. In addition to more traditional research topics in physics, astronomy, and related fields, papers may discuss the development of an outreach demonstration or tool. A print version of JURP is published every summer and sent to all SPS members. Manuscripts are accepted on a rolling basis but must be submitted by March 15 for print consideration. Learn more at spsnational.org/jurp.

Society of Physics Students

SPRING AWARDS



Applications Deadline

March 15



Outstanding Chapter Advisor Award

Awarded on the basis of leadership, student leadership development, support, and encouragement the advisor has provided to the chapter. Must have received an Outstanding Chapter Award within the past two years.

SPS Award for Outstanding Undergraduate Research

Provided to students based on exceptional research achievement in any physics- or astronomy-related field.

SPS Scholarships

Awarded to undergraduate physics and astronomy students on the basis of scholarship, SPS participation, and additional criteria specific to each scholarship.

ONGOING OPPORTUNITIES



Travel Awards

Up to \$300 awarded to SPS members presenting their research at a national meeting of an AIP Member Society.



Reporter Awards

Up to \$300 for an individual reporter and \$250 per person for chapter reporters, awarded for member(s) to report on national physics and astronomy meetings for SPS publications.



Research Travel Awards

Up to \$300 will be offered to help fund SPS members to conduct their research at a national laboratory or observatory.



www.spsnational.org/awards

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SPECIAL FEATURE

Sharing Ideas Leads to New Friends, Innovative Ideas, and Endless Talk of a Human Newton's Cradle

by Madelyn Johnson with Young Moua, SPS Reporters, University of Northern Iowa

In October more than 1,200 undergraduate physics and astronomy students, their mentors, and other supporters, gathered for the 2022 Physics Congress. Among renowned speakers, hands-on workshops, and engaging tours, a favorite event was Breaking Boundaries. During this time, SPS chapters from around the country showcased their activities and personalities with displays, demos, T-shirts, and swag. SPS reporters from the University of Northern Iowa (UNI) were on hand to capture the experience.

The fall of 2022 was the first time we'd had an active physics club at UNI in two years, due to pandemic restrictions. We wanted to participate in Breaking Boundaries but weren't sure what objects best represented our chapter. It didn't help that we were all new officers. Unfamiliar with the physics club inventory, we went through everything the physics club has ever owned: misspelled T-shirts,

tattoo guns, broken lasers, a cardboard cutout of Einstein ... But what really represented our club (and could fit in our carry-on bags)? Finally, after an afternoon of running around the physics building, fellow SPS member Young Moua and I put some things together.

With half my bag filled with old club T-shirts, Ping-Pong paddles, and balancing birds, we set off for Washington, DC. The afternoon of



FAR LEFT: SPS reporters and UNI physics club officers Young Moua and Madelyn Johnson showcase items that represent their chapter, including T-shirts, pens, light diffraction glasses, and Ping-Pong paddles! Photos courtesy of Madelyn Johnson and Young Moua.

LEFT: The Grove City College SPS chapter displays pictures and demonstrations from their activities.

ABOVE: Rowan University Physics and Astronomy Club members with items that represent their chapter, including model rockets they built.

RIGHT: Texas Lutheran University's SPS chapter shows off its physics-themed Lotería card. The chapter plays this traditional, bingo-like game with their university's Hispanic Club to spread their love of physics.

Breaking Boundaries, Young and I grabbed all our stuff and headed downstairs. We were surprised by how many people were already there! Expecting a small, low-key event, we were overwhelmed by the jovial and busy atmosphere. We quickly set up our table, and I went to visit the other chapter tables while Young represented our chapter.

I started with Embry-Riddle Aeronautical University - Prescott, and continued down the line of tables, talking with students and professors about each of their chapters. Initially I had dreaded talking with so many people, but I quickly changed my attitude. Every single table was full of amazing people who were so fun to talk with, and each chapter stood out in a unique way. Rowan University showcased its love of rocketry by bringing some of its model rockets. St. Joseph's University described how they work with their local community garden and run a summer camp encouraging girls to explore physics. I was having so much fun talking with different chapters that 45 minutes passed without my noticing!

I swapped places with Young and, for the second half of the event, stayed at the UNI physics club table. I talked to students from schools around the country, presenting old T-shirts, light diffraction glasses, and, of course, Ping-Pong paddles while sharing our activities and ideas with others. Our most popular items were the balancing birds, which we use to demonstrate center of mass during outreach events, and the Ping-Pong paddles. We even had a few people stop by to bounce the ball back and forth! While our physics club has many professional goals, such

as inclusion and outreach, one of our favorite objectives is to defeat our department head, Dr. Paul Shand, in the biannual Ping-Pong tournament. UNI physics students are united in working toward this goal, dedicating time to practice in the student lounge in hopes of one day stealing the trophy from Dr. Shand!

One visitor, Calvin Sprouse from Central Washington University, told me how much he liked Breaking Boundaries. His chapter took special note of a spandex gravity well presented by The George Washington University. Calvin found the idea fascinating and hoped his chapter would construct one when they returned home. One of our UNI members, Jake, talked to students from Rhodes College who had created a human Newton's cradle in collaboration with their school's rock-climbing team (see page 23). He was so invested in their cool idea that he talked about it all the way home to Cedar Falls. Maybe we'll have a talk with our rock-climbing team!

Breaking Boundaries turned out to be one of my favorite parts of the Physics Congress. We made new friends and got new fundraising, outreach, and event ideas for our own club. Like other chapters, our UNI physics club is just now coming back after COVID. We've struggled to find our footing these first few months. Thanks to this inspiring experience and so many great ideas, I believe our club will be able to pull off many successful events in the coming semester! //

SPS Chapter Report

Submission Deadline: June 15

Importance of Chapter Reports

- Share your chapter's efforts and best practices with other SPS chapters
- Update your chapter contact and leadership information
- Provide guidance for future SPS members in your chapter
- Determine your chapter's strengths and areas for improvement
- Receive feedback and SPS recognition

Qualify for National Recognition:

- SPS Outstanding Chapter Awards
- Blake Lilly Prize
- Feature in SPS publications, such as the *SPS Observer*, *JURP*, or *Radiations*.



For more information on Chapter Reports, visit spsnational.org/chapter-reports

Has your leadership changed since your last chapter report?
Update your contact information with the SPS anytime at spsnational.org/chaptercontacts



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