

Little Shop of Physics Newsletter

JANUARY
2024

Ongoing Experiences with CSU Amplify

The Little Shop of Physics has a longstanding partnership with Amplify. Part of the College of Natural Sciences, Amplify provides community, support, and programming for CSU students who are majoring in science.

This year, Amplify rolled out *Ongoing Experiences*. These experiences for Amplify freshman include some awesome activities with the Little Shop of Physics!

LSOP staff and interns met weekly with Amplify students to develop activities for 3rd and 4th graders. These activities included some classics—paper rockets, polarized art, liquid nitrogen ice cream—as well as some brand new ones such as wiggle bots, stoichiometry rockets, balance buddies, and chromatography art. Together, the Amplify students and LSOP teamed up to present these to the Fort Collins Boys and Girls Club, five programs in total!



We also held a monthly Ongoing Experience called *Show Me Some Science*. These large-scale, outdoor demos were open to all students, but focused on Amplify freshmen and held outside of the Piñon Hall dormitory. Students could participate or just watch, and the Amplify staff was on hand to help connect freshmen to the community.

Each month had a different theme. August was all about vortices and making fog rings; we even pulled out our giant vortex canon! September was about levitating, and involved both hot air balloons and objects held aloft in an airstream. October was all about rockets; participants could make and launch their own rockets.



Fall Break Road Trip to Oglala Lakota Nation

On the fourth week of November we traveled to South Dakota to share science with students on the Pine Ridge Reservation. The tradition started over a decade ago, with a pause during the height of COVID. We partnered with the CSU Native American Cultural Center, Oglala Lakota College Math and Science Department, and Generations Indigenous Ways. Our combined team provided a high density of science expertises and mentorship for every class of students.

This year we saw over 700 students at American Horse School in Allen, SD and Rockyford School in Porcupine, SD. We set-up over 100 hands-on

science experiments at each school for the students to free explore. At the end of their time with us, the students took home a Halliburton science at home kit, which included a LED light kit, rainbow glasses, solar viewing glasses, chromadepth glasses, UV beads, and a color changing bracelet. Many thanks to the generous support of the Halliburton Foundation, which made this trip possible.

The LSOP team stayed at the Sacred Earth Lodge at Red Cloud Renewable Energy Center. Many thanks to Henry Red Cloud and family for their hospitality.



AISES Powwow

In October, we were invited by the American Indian Science and Engineering Society (AISES) to take part in the Powwow. We set up over 50 hands-on experiments for the community to free explore during the Powwow.

Among the hands-on experiments were five built by students from Native American Culture & Education (NACE) at Lake Middle School in Denver. We provided transportation for families from Lake Middle School to come see their hands-on experiments on display. There were over 150 people from the community who joined us.



Part of the LSOP Family by Erika Monrreal-Garcia



If I had to describe The Little Shop of Physics in one word, it would be *inspiring*. The Little Shop of Physics is eye candy to anyone who loves science and crafts.

With the support of all the interns, staff, and Olivia and Heather by my side, I felt welcomed instantly and automatically felt like I belonged. Being an intern at The Little Shop has been an amazing experience for me. I felt like I could rely on anyone for any questions I had, from how an experiment works to how to use our awesome woodworking machines.

I was super excited to begin building my first experiment and began making different models of the Pepper's Ghost Illusion. My favorite memory as an intern was going down to the Birdseed Collective down at Denver and getting to show kids how to make their own Pepper's Ghost that

they could take home. I remember a little boy showing his mom while making his own model and saying "This is so cool I'm never throwing this away!" Building experiments is fun, but nothing beats getting to interact with kids and hear their crazy comments and ideas. Some kids have made me think about what projects to build next, like when I went to Pine Ridge and a middle schooler suggested we build something that is data related. I encourage the kids we visit to give us ideas on what to build, that way we have fun and dated experiments for them to interact with.

Being an intern at The Little Shop of Physics has been a very exciting and fulfilling experience. I get the chance to work with outstanding individuals who have helped me learn practical things that I could use every day. Getting the chance to show kids some science has been a very fun experience and I'm so happy we get to share this with different communities. Any day working at the Little Shop of Physics is a fun day.

Madison McDonald Observatory Grand Reopening

Little Shop of Physics was honored to be a part of the grand re-opening of the Madison Macdonald Observatory on October 6th, 2023! The evening event was free and open to the public and full of festivities! Little Shop of Physics set up hands-on science experiments in Biology 110, and outside the Madison Macdonald Observatory.

Physics Professor Julia Gehrlein gave a public talk about her research. The Physics SPS students had many telescopes ready for people to observe objects in our night sky, including Saturn's rings! The Astronomy Department, Little Shop of Physics, SPS students, and many volunteers working together made it a fun and memorable event!



Science at CSU Spur



This year, the Little Shop of Physics made strides toward meeting the goals of our grant from CSU Spur: to get K-12 students in Denver to build their own hands-on experiments!

None of this would have been possible without the Native American Culture and Education (NACE) division of Denver Public School District. We are so grateful to the NACE students at Lake Middle School, their families, and Melanie Archuleta for being our very first student group to make experiments with us this October! We would like to thank the Native American Cultural Center (NACC) at CSU for allowing us to showcase their experiments at the CSU Powwow this October. Now, the experiments are being showcased at CSU Spur on the second floor of Terra for the public. We are working towards growing our relationship with NACE and showcasing more experiments at Spur! In Spring 2024, we will be building experiments with NACE students at West Middle School, JFK High School, and South High School.

We also saw over 1,400 people at CSU Spur events this year, including Second Saturdays! Pictured on the right is a family playing with solar insects that were developed by our 4-H intern Tripp Pientka this summer. We are excited to participate in CSU Day on January 13, 2024 as part of the National Western Stock Show at CSU Spur.

Last, but not least, we would like to thank the Birdseed Collective for allowing us to pilot this new programming with them over the summer at their Summer Concert Series! These events were well-loved by our interns, as is shown in the Intern highlight article in this issue of the newsletter, written by Erika Monrreal-Garcia. We hope to continue summer programming with them in the upcoming year!

Finally, the Little Shop of Physics would like to formally recognize the key role the CSU Spur grant has played in empowering us to build new connections with communities in Denver.



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Solar Eclipse at CSU Spur

When stars align, is a saying used to mean good things were meant to happen. In our case, our Sun happened to align with the orbit of the Moon, covering seventy eight percent of the Sun's surface. This made for an astronomically cool Second Saturday at CSU Spur on October 14, 2023! We paired up with the CSU Madison-Macdonald Observatory to share the experience with over 150 people at CSU Spur. We had different ways to experience the eclipse, like solar eclipse glasses and solar viewing telescopes, and listening to and feeling the vibration of solar powered toys. The

temperature change on this already crisp Fall morning was also noticeable.

The next total solar eclipse in the continental US is on April 8, 2024. For your free pair of solar eclipse glasses, visit the CSU Spur Hydro Building in Denver, Colorado. Check out this video for more information and tips for safely viewing an eclipse:

lsop.colostate.edu/2023/10/13/everything-you-need-to-know-about-solar-eclipses/



PhysicsQuest Teacher Kits

Look out for Little Shop of Physics in this year's APS PhysicsQuest kit! Over the summer, LSOP was asked by the American Physical Society (APS) to develop 4 activities to go along with this year's kit. The focus of the activities is waves and their applications. These *Making Waves* kits are designed to spark curiosity and a deep appreciation for science, and align with our LSOP mission to make physics fun and accessible for all students!

Cherie Bornhorst, our Teacher in Residence, and former Little Shop of Physics intern and current HS science teacher, Brenna Sydow, teamed up to create videos that go along with each activity! You can check them out, or request your own FREE kit:

aps.org/programs/outreach/physicsquest/

American Association of Physics Teachers Section Meeting

In November, LSOP teamed up with the CSU Physics Department to host the American Association of Physics Teachers Colorado/Wyoming Section meeting. The theme of the meeting was *Energizing Physics Education!* and we were joined by over 30 participants in total, including physics professors, 2-year college instructors, high school teachers, and university physics students.

The day started off with 3 presentations from the High Energy Physics group at CSU. Professor Bob Wilson presented *What is Mass—Really? From Democritus to Higgs*. Professor Josh Berger followed up by presenting *Cosmology and High Energy Physics*. And finally, Professor Julia Gehrlein presented *Neutrinos: Nature's Ghost Particles*. All 3 professors joined us for lunch, and answered many follow-up questions about their research in particle physics.

The afternoon was full of interactive presentations and workshops. Shane Wood from QuarkNet led activities from QuarkNet's Data Portfolio, an excellent, free, online resource for K-12 teachers. The Denver Area Physics Teachers group presented *Circular Motion*, and teachers were rewarded with materials to take back to their classrooms! Little Shop of Physics intern, Cecilia Dauer, presented *Iron Physics*, a make-and-take workshop where teachers used their creativity to build their own hands-on science demos. High school teacher, Caryoln Crapo presented *Harry Potter Physics*, activities based on a summer camp that she designed. Science teacher Nadene Klein presented with her math colleague, Joe Schneiderwind *Building Bridges to Interdisciplinary Collaboration*.

It was an amazing day of connecting with such passionate educators and students!



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