



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Future Faces of Physics Award Proposal

Project Proposal Title	PhysX: High School Girls Exploring Opportunities in Physics
Name of School	Utah State University (USU)
SPS Chapter Number	7579
Total Amount Requested	\$500

Abstract

The Utah State University section of the Society of Physics Students recently hosted a pilot event, *PhysX*. High school girls were invited to campus for two days to engage with current physicists, experience the university, and participate in exciting hands-on activities. *PhysX* aims to increase awareness of physics opportunities to girls within Utah.

Proposal Statement

Overview of Proposed Project/Activity/Event

PhysX was first held at Utah State University (USU) in September 2017. The event will proceed similarly to its first year with changes based on previous survey results. In its inaugural year, 18 girls between the ages of 14 and 18 spent two days on campus to learn about college and career opportunities in physics. *PhysX* is embedded in USU SPS's larger outreach program that reaches over 11,000 community members annually by hosting and participating in events like Science Unwrapped, school science fairs, school demo assemblies, STEM at Work, and Physics Day at Lagoon. *PhysX* begins with a Networking Dinner and speaker, in which faculty, graduate students, and university affiliates have the opportunity to enjoy dinner and network with attendees. The Networking Dinner provides initiative and inspiration for the remainder of the event. The speaker for 2017 was Dean of the College of Science and female physicist, Maura Hagen. She spoke of her journey to physics and the career opportunities she has been awarded. After dinner attendees participated in an activity called "The Systems Game", in this game one person must diagnose the actions of a group, similar to how a scientist would observe a problem. To conclude the evening, participants attended a special viewing of *Hidden Figures* before retiring for the night at the University Inn.

Participants met for breakfast with Tonya Triplett, a USU physics faculty member, to ask questions and hear some of her journey to a career in physics. The remainder of the morning was spent participating in hands-on workshops led by current undergraduate female physics students. They explored the physics of explosions by making bath bombs, tested the physics of parabolic flight using a custom built air-powered rocket launcher with hand-made rockets, and met to discuss some of the difficulties underlying minority groups in physics. *PhysX* was closed with a luncheon at the Aggie Marketplace with a final address by Hope Marks, the current SPS President, and prizes donated by event sponsors.

Utah State has been named "Outstanding Chapter" for 12 consecutive years and works tirelessly to provide meaningful events to the community. Changes for *PhysX* 2018 will include the invitation of female undergraduate students to the Networking Dinner, expanded time for each hands-on workshop, time for an in-depth discussion following the movie, and time to speak with the Physics adviser about future course work should they choose to attend Utah State and study Physics.

How Proposed Activity Promotes Physics Across Cultures

Nationwide, women are underrepresented in STEM with fewer than 40% of all STEM bachelor's degrees awarded to women. This trend is amplified in Physics with fewer than 20% of bachelor's degrees awarded to women in 2015. High school course enrollment does not differ significantly by sex which leads to the assumption that female students are not exposed to higher education opportunities in STEM at the same rate as male students. *PhysX* aims to decrease the gender gap in higher education physics majors by providing targeted exposure to female students at the time they must choose where to attend college and what to study upon arrival. By hosting this event in the Fall, we influence a maximum number of seniors before admissions deadlines. Women offer a unique perspective to interdisciplinary teams and have the potential to excel in physics given the information and the opportunity.

Plan for Carrying Out Proposed Project/Activity/Event

The planning for *PhysX* in 2018 will be as follows:

- The event will be organized as a joint venture between the Utah State University Society of Physics Students and Women in Physics Group through the presidency and faculty presence of each group. Planning will begin in Spring 2018 for the Fall 2018 event. Planning and fundraising will be concluded by August 1, 2018 and an agenda detailing accommodations, meals, and activities will be provided to potential participants when registration opens on August 20, 2018.
- In person marketing for *PhysX* will occur at Utah State University’s monthly public science seminar, *Science Unwrapped*, an event hosted by the College of Science. In addition, potential registrants will be reached through *PhysX*’s web page and Instagram account, the USU College of Science Facebook and Twitter accounts, emails to last year’s participants and participants from similar workshops hosted by engineering clubs, and emails to Utah high school STEM teachers, career coaches, and advisers.
- SPS members will participate by planning (3 members) and volunteering (7 members) at the event. Additional volunteers will be recruited from the Society of Women Engineers (3 members), a club that USU SPS has collaborated with in the past, and from entry level physics courses (3 members).
- SPS members Lori Caldwell, Hope Marks, and Vanessa Chambers will provide planning expertise to the 2018 event planning committee. These students founded the event in 2017 with 17 participants and have organized similar larger scale events for the Society of Women Engineers in the past. Tonya Triplett, who teaches introductory physics courses, will provide hands-on activity expertise. James Coburn, the departmental equipment manager, will provide equipment and training.

Project/Activity/Event Timeline

February 2018	Fundraising presentations (Utah STEM Action Center, USU College of Science, USU Dept. of Physics, Space Dynamics Lab, Ophir-Spiricon, Utah Women’s Tech Council)
March 2018	Reserve hotel block Organize learning workshops (4)
August 20	Registration opens Email high school contacts with flyers (STEM teachers, advisers, career coaches)
Aug. 20 – Sept. 28	Social media marketing (PhysX team, USU College of Science, USU Admissions office)
September 28	Registration closes Invite USU Physics faculty and students to Networking Dinner
October 8	Participant packets finalized (schedule, sponsor page, informational pamphlets, promotional items)

October 12-13	PhysX
October 15	Send assessment survey to participants

Activity Evaluation Plan

The Networking dinner that this grant would fund will be evaluated based on number of participants, survey questions about the impact of meeting potential mentors, and verbal feedback from participants. The overall event, *PhysX*, will be evaluated based on: number of participants compared to last year, the degree to which the event increases positive awareness of physics based on survey results, and observations from the event organizers as well as sponsors. Individual student workshops will be evaluated using a qualtrics survey with a ranking scale from 1 to 5 for workshop preparedness, degree of hands-on work, level of difficulty, and level of enjoyment. To ensure a high level of participation in these surveys, completed entries will be entered in a drawing for prizes given at the closing luncheon. Survey results will be evaluated against results from last year's pilot event to look for trends in student metrics such as grade, high school, and stated interest in physics prior to attending *PhysX*.

To evaluate whether *PhysX* promotes physics across cultures, a portion of the event survey will include questions related to meeting new cultural mentors and perceptions related to a female-only event as opposed to other types of mixed gender events.

Budget Justification

Funding from this proposal will be used to provide catering at the event kickoff networking dinner held at the USU Alumni House. By inviting physics faculty and female graduate and undergraduate students to attend this dinner, it provides a unique opportunity for participants to network with their future peers. Building friendships with fellow participants and meeting potential role models is critical for students when deciding what they will study during their time at a university. Catering will be provided by Apple Spice Bakery in Logan, UT.

Funding from other sources includes money from the USU Department of Physics, USU College of Science, Utah Governor's STEM Action Center, Space Dynamics Lab, and a small student registration fee of \$20. In kind donations include gifts from Space Dynamics Lab, Idaho National Laboratories, Northrop Grumman, and the USU Campus

Store. Large equipment will be loaned to the *PhysX* team by the USU Department of Physics. The total proposed budget for *PhysX* 2017 was \$2,500 and it is expected to be a similar number for 2018 including \$499.26 requested from Society of Physics Students.