



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Marsh W. White Award Proposal

Project Proposal Title	Promoting Physics Outreach with Interactive Demos
Name of School	Missouri Southern State University (MSSU)
SPS Chapter Number	4398
Total Amount Requested	\$500.00

Abstract

MSSU-SPS provides many outreach activities to the local community of all ages on/off campus. With Marsh White Award, we would be able to purchase more equipment to ignite a passion for physics in young impressionable kids via hands-on activities. Cool outreach demos will be made possible by this generous award.

Proposal Statement

Overview of Proposed Project/Activity/Event

Since the founding of MSSU chapter of SPS in 2015, our members have been actively participating in a number of outreach activities on and off campus to cultivate interest in physics and promote science education. One such event is MSSU Regional Science Fair which takes place annually during the last Tuesday of March. Around 100 students from local high school and middle school will compete in senior and junior category under various topics in physics and astronomy, computer science, engineering and mathematics, chemistry and biochemistry, earth and environmental sciences, behavioral and social sciences, cell, molecular and microbiology, human and animal sciences, and plant sciences. MSSU SPS members volunteer judging the physics and astronomy posters 9:30 am to 12:30 pm and engage various student groups in the afternoon 1:00 pm to 3:30 pm with interactive physics demonstrations by conducting activity booths in which the students enthusiastically participate in hands-on activities with greater interest and curiosity.

MSSU SPS also participates in Joplin's premiere community cultural event - THIRD THURSDAY! Every Third Thursday (March to October) thousands of people gather in Joplin Downtown to enjoy local traditions, music, entertainment and food. Missouri Southern hosts Third Thursday in September every year and our physics station is a crucial part of this event. We engage general public of all ages with some super cool demos, watch them get excited while witnessing physics in action. Apart from the two major events, MSSU SPS participates in several outreach events on/off campus throughout the year for preschool kids (Lion Cub Academy), elementary school children (Spring Grove Primary @ Galena, Columbia elementary first graders, Carl Junction 2nd and 3rd graders, 4th and 5th graders at Thomas Jefferson Day school), college students, and the local community.

We are in the process of updating our demo list and we would like to upgrade our demos to be more in line with a broader audience in order to increase participation, improve involvement and upsurge more passion and curiosity for physics. We intend to build a 56-inch X 26-inch bed of nails, a "Wave Pendulum" with 15 Billiard Balls, and purchase some demo kits to add to our outreach repertoire. With the Marsh White Award and support from our department, we hope to take our outreach to the next level focusing broader impact.

How Proposed Activity Promotes Interest in Physics

Interesting and interactive physics demonstrations helps to inspire students, incite their curiosity to look deeper into the concepts and reinforce their critical thinking. Wave pendulum and bed of nails are such demos that instantly creates interest among the audience because its mesmerizing, its fun, its interactive and it looks like magic, but it's actually Physics!! MSSU chapter of SPS constantly work towards making an impact at the local community in every possible way by participating in numerous physics outreach activities throughout the academic year and encourage interest in physics among students at all levels.

By adding the proposed two highly interactive and interesting demos to our outreach list, and purchasing demo kits, we will be able to make the biggest impact among our audience, especially among kids of all ages. We, the Missouri Southern chapter of the Society of Physics Students strongly believe that we are ideal candidates to receive Marsh W. White Award to help support our outreach activities that are primarily focused on promoting interest in physics among students and general public in and around the community.

Plan for Carrying Out Proposed Project/Activity/Event

- Joshua Numata (MSSU SPS Treasurer) will be in charge of planning, purchasing, implementing and with successful completion of the project with help from our SPS members, guidance and support from our chapter advisor Dr. Sundararajan.
- Cade Hensley (our President) and Gabe Wooden (our VP) will assist with scheduling the project work every week and monitoring every step.
- Ashley Bluemel (our Secretary) will keep track of the progress and maintain a project report on different stages of the project.
- Marketing – We will be advertising our events through MSSU SPS social media, Campus Activities Board (CAB) office, Presence (student engagement software for all student organizations on campus) and by distributing flyers.
- SPS member participation – Approximately 10-15 SPS members will be volunteering with building the project, participating in events and presenting during the outreach. We will also be collaborating with the Chemistry club and Women in Science club on campus throughout the project.
- Expertise – Jacob Shields (SPS member) will be provide technical assistance in building the bed of nails and Dr. Marsh (Physics Professor, SPS member) will be supervise construction of the wave pendulum.

Overall, our chapter of SPS will work collectively in putting this project together and performing demos at our outreach events.

Project/Activity/Event Timeline

January 2020 – Purchasing the materials from Home Depot/Lowes and ordering demo kits

February 2020 – Building our first project – Bed of nails. SPS members will be meeting once or twice a week for an hour to work on the project.

March 2020 – Build the framework for wave pendulum before Spring break. After the break, we will be planning for Science fair event during which we will demonstrate the Bed of nails project. Our SPS members will present the concept of pressure to the audience, facilitate thought-provoking discussions on the topic, demonstrate a mini bed-of-nails with balloon and perform the newly built real bed of nails with caution.

April 2020 – We will complete building the wave pendulum and demonstrate this project during outreach events at local schools. We will also be presenting our new demos during the Third Thursday event in September 2020.

SPS officers and members will be meeting biweekly to check on the progress, discuss next steps, assign tasks, plan events and collaborate with other clubs on campus.

Activity Evaluation Plan

The success of the project in meeting the goals of the award will be evaluated as follows:

- Audience excitement is directly proportional to the success of the project.
- Distributing bingo cards on our activities to encourage maximum participation in every activity booth. Picking a winner among the ones who completed all the hands-on activity.
- Feedback from the participants, students, school teachers and general public.
- Record the progress of the project and outreach activities by taking pictures and videos to be included in the final report.

Budget Justification

The requested amount of \$500.00 will be used to purchase parts (included in Budget Proposal) needed to build the projects and demo kits in order to upgrade our outreach repertoire. Any additional expenses for the project will be requested from the department budget.