



# SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

## Marsh W. White Award Proposal

Project Proposal Title	Promoting Physics to the Community
Name of School	University of Southern Mississippi
SPS Chapter Number	6626
Total Amount Requested	\$500.00

### Abstract

Our chapter at The University of Southern Mississippi aims to promote physics throughout the community, mainly focused towards students. There is an annual event in downtown Hattiesburg called Hubfest. This allows us to demonstrate physics in the subjects of optics, sound, and thermodynamics to the general public.

# Proposal Statement

## Overview of Proposed Project/Activity/Event

- Brief description – We normally attract groups of 20-30 people at a time. Our demonstrations include short, manageable experiments that normally include liquid nitrogen and lasers. Our biggest hit has been cooling marshmallows with liquid nitrogen and giving them out to our audience. This has proven to be successful because it allows the audience to interact and freely question what we're doing, but isn't unbelievably time consuming, so we easily reach thousands of people in one day. Our society has been participating in Hubfest for nearly ten years, so we are confident in our knowledge of the experiments and our ability to convey the important principles related to these demonstrations.
- Goals of the project – We will thoroughly explain each demonstration to our audiences, and allow them to ask questions and interact throughout the experiments. This project will attempt to further expand people's knowledge of physics and further expand their knowledge of the Society of Physics Students.
- Intended audience – Hubfest usually sees an audience of around 30,000 people, mostly including the Hattiesburg community but also many from the surrounding cities. It has been proven to be a great attraction for Hattiesburg. We attract an array of people from all ages, which is our main focus. We want to address as many people as possible, and especially attract children and young adults in order to promote the study of physics and science in general.
- Background and motivation – With so many people attending Hubfest, setting up a booth during the event creates exposure which is both seen and heard in the general vicinity. Showing off lasers, popping balloons, and handing out marshmallows cooled in liquid nitrogen appeals to the senses, which allows for audiences to interact with, and even get a taste for, what they are seeing. As a physics student, promoting outreach often comes with the task of teaching audience members about the very topics we learn in class - how the phenomena actually work - which amounts to sharing what we love.



## How Proposed Activity Promotes Interest in Physics

The Marsh White Award will allow us the opportunity to attend Hubfest. Hubfest is an incredibly large event that attracts vendors from seven neighboring states. Not only is this a fun event that allows us to directly interact with the community, Hubfest also allows us to promote the study of science. Participating in such a large event allows us to create a relationship with the community. Once we make a direct impact on the people, it is easier to communicate to them the basic necessity of science and how fun it can be. Events such as these are also important for us to attend because it promotes a basic understanding of applied physics. Although some of the demonstrations are quite small, they illustrate concepts found in both the classroom and the natural world. Besides catching attention from surrounding people, popping balloons with lasers opens discussions of wavelength, color, and energy absorption. Many students from the surrounding area go to schools with little to no resources, so the Marsh White Award would provide much needed exposure to scientific ideas. Participation in this event also strengthens our chapter by developing our experience in outreach. The experiments performed show a variety of phenomena, which not only appeal to the senses, but also earn a hearty, "How did you do that?" When handed a cold, hard marshmallow, kids' faces will twist with confusion and their eyes widen with delight. When audiences are allowed to interact with the booths and actually experience them, their curiosity peaks, they learn more, and remember the time they spent there.

## Plan for Carrying Out Proposed Project/Activity/Event

- Personnel - The Hubfest event coordinator is responsible for making sure that everything runs smoothly. The SPS members are responsible for meeting deadlines and planning accordingly.
- Marketing - Hubfest is a massively populated event that will be advertised by many people other than what our group advertises.
- SPS member participation - More than ten members of our SPS group are expected to volunteer at Hubfest in 2017. Volunteers may be recruited from our department as well to have students-faculty relations.
- Expertise - Many of the senior SPS members have had extensive experience working in the labs with optics. Many members are also at the junior or senior level and have had experience in outreach for multiple years.

## Project/Activity/Event Timeline

January, 2017: Registration for Hubfest opens on January 1. In this month we will get registered for Hubfest and begin discussing the event at the bi-weekly group meetings. We will also be ordering diffraction grating glasses online and getting them shipped to the university. This may take a long time to receive, so January is a must for this.

February, 2017: We will decide what demonstrations we will be having and start designing the club t-shirts for the event. We hope to get in shipments of diffraction grating glasses for Hubfest by this time.

March, 2017: In the beginning of March, t-shirts will be completed and ordered. This is done early so that the shirts will be received in proper time. We will also get a finalized list of volunteers and coordinate with each other in order to determine meeting times and work shifts.

March 31, 2017: Final preparations for the event will be completed. By this date, we will be packed and ready to go.

April 1, 2017: Day of Hubfest

7am: Unload equipment and set up booth. The faculty advisor usually aids in this process.

9am: Physics demonstrations start.

5pm: Hubfest ends. Booth is broken down and faculty advisors help haul equipment back to the university.

## Activity Evaluation Plan

Although it initially seems silly, the most obvious and effortless indicator of about how many people came to the booth can be given by the number of marshmallows remaining at the end of the day. Many people approach the booth and say, "I remember you guys had the marshmallows last year." This indicates that the booth is both memorable and enjoyable enough to be approached again an entire year later.

We also plan on recording how many groups of people approach the booth and how many also stay to listen to and watch the demonstrations. During demonstrations, we will count the number present who are actively listening and record how many people listened to each demonstration. Parents typically quiz their kids on what they learned, which shows that the parents value the information being presented by the booth.

## Budget Justification

- 1.) Balloons - We put the balloons in liquid nitrogen to demonstrate what happens to a gas when it is cooled. We also use lasers to pop the balloons.
- 2.) Thermoelectric generator - We use this for demonstrations in thermodynamics. This device powers a fan using a temperature difference.
- 3.) Liquid nitrogen - We have used 3-10 liters of liquid nitrogen in recent years. We use it to cool different things like flowers and marshmallows.
- 4.) Double axis diffraction glasses - These glasses break up white light and are a gateway to a lesson on light.
- 5.) Batteries - The lasers we use to pop the balloons are powered by batteries.
- 6.) Marshmallows - The marshmallows attract a younger crowd which helps get children interested in science early on.
- 7.) Flowers - The flowers are dipped in the liquid nitrogen and crushed.
- 8.) Produce - We cool products like bananas and apples and shatter them on the table. This often attracts viewers of all age.
- 9.) Hand sanitizer - We distribute marshmallows to children so it is important to keep our hands clean in order to prevent spreading germs.
- 10.) Paper towels - A lot of food items melt after they have been dipped in the liquid nitrogen and the paper towels will keep our demonstration area clean.
- 11.) Wet wipes - We will use these for the same reason we use the paper towels.
- 12.) Case of water to drink- The event is held in the middle of the day so it will probably be hot out.
- 13.) Hubfest registration - This is the cost to rent a booth from the year 2016.
- 14.) Racquetballs - This is also another item that we dip in the liquid nitrogen. When we throw the balls onto the ground they shatter like glass.
- 15.) T-shirts - This will indicate our affiliation to the public and will encourage participation of our society members.