

Project Proposal Title	Shining Light on the World of Optics
Name of School	University of the Sciences
SPS Chapter Number	5619
Total Amount Requested	\$484.87

Abstract

Our SPS chapter at the University of the Sciences wants to be as influential as possible to underrepresented groups in STEM. For this project we will go to Upper Darby High-school (economically disadvantaged and high population of minority students) and present various influential optics demonstrations in multiple sessions.

Proposal Statement

Overview of Proposed Project/Activity/Event

- **Brief description** – The physics department at the high-school is quite small, so we will hold multiple sessions throughout the school day in which science classes can come to learn more about the fields of physics and STEM. This way we can present to a larger group of students and attempt to generate more interest in physics with the hopes of growing the physics class size at the high-school.
- **Goals of the project** – As previously mentioned, the emphasis on physics at the high-school is small. So small in fact that there are not many physics classes left, and physics professors are forced to teach other classes. In doing this event, we hope to inspire the students and generate more interest in physics so that in the future there will be larger physics classes and a greater emphasis on physics both at the high-school and also in the students' futures. We will ask the students to fill out questionnaires after the event in order to gauge their feelings and receive feedback.
- **Intended audience** – The target audience is high-school students from underrepresented groups such as women and minorities, specifically those underrepresented groups at a high-school that is economically diverse and not located in a very affluent area.
- **Background and motivation** – Every year, our chapter of SPS works very hard to do multiple outreach events, because we care about spreading our love for physics and inspiring the younger minds. We place special emphasis on providing outreach events to students who are typically not represented well in the fields of physics and STEM. We pick topics that we ourselves are interested in, but that also are fun to demonstrate and explain to others. This year we chose optics, for the mentioned reasons and also because our advisor has previously been in connection with SPIE - the International Society for Optics and Photonics, which has an extensive resource website from which we can get optics demo ideas and materials. We chose Upper Darby High-school because one of our SPS members involved in this event graduated from there and knows quite a bit about the struggling physics department at the school and also the largely minority student body.

We are planning to be set up in one of the physics labs at Upper Darby High School. There will be a demonstration at each table with the similar ones grouped together, and along with a SPS member to explain and help the students work the demonstration on their own. The demonstrations will be scattered around the room in no specific order. We plan to have a 10-15 minute time intervals for each demonstration. We hope to have 4-5 students per group. The high school has a block schedule meaning their classes are 80 minutes long, that gives them enough time to go through all the demonstrations in one class period.

How Proposed Activity Promotes Physics Across Cultures

Our event will take place at Upper Darby High School. Upper Darby is known to have lots of different traditionally underrepresented groups and minorities in physics, and by introducing them to interesting experiments and letting them learn hands-on the awesomeness of the optics could inspire them to pursue futures in physics. Our goal is to open physics to minorities and underrepresented groups and encourage them to explore their full potential as scientists. A few of our chapters members that are in the demographic of the underrepresented groups in physics will attend this outreach to show the students that everyone can do physics no matter the background.

The students of Upper Darby High School are not encouraged to take physics anymore and the level of physics students is decreasing. These students also do not have a relationship with professionals in physics or even STEM. This can be an opportunity for us to build some type of relationship with the students and help steer them into the right direction in physics or STEM.

Plan for Carrying Out Proposed Project/Activity/Event

- Personnel - SPS Members Brett Conti, Despina Nakos, and Alyssa Petroski will be in charge of planning and carrying out the event, under the guidance of our chapter advisor, Dr. Ramos. Other SPS members will help at the event.
- Marketing - Event flyers will be distributed to Upper Darby High School two weeks prior to our event. Teachers at the school will explain to their students that our group will be visiting and will also encourage participation.
- SPS member participation - Project leaders Brett Conti, Despina Nakos, and Alyssa Petroski along with an additional 4-6 SPS members will volunteer at the event.
- Expertise - SPS members will use their knowledge of modern physics and optics to explain demonstrations. Dr. Ramos will provide additional insight if needed.

Project/Activity/Event Timeline

Early February 2019 - All demo orders will be placed. A time and day for the event will be established with Upper Darby High School

Late February/Early March 2019 - SPS Members will begin familiarizing themselves with the demonstrations. Groups of students will be assigned a group of demonstrations. Each student group will write-up an explanation of their demos in anticipation of the event.

Late March/Early April 2019 - The day prior to the event, all participating SPS members will meet for a final review of the demos, and the entire group will run through a simulation of the event.

Late March/Early April 2019 - SPS Members will travel to Upper Darby High School to present on optics to high school students. Immediately following the event, surveys will be distributed to students to determine the impact of our event.

Late April 2019 - Additional follow-up surveys will be distributed to the students who attended our event to determine the lasting impact.

Activity Evaluation Plan

SPS Members will take note of the backgrounds and the number of students in attendance and how they participate. Immediately following the event, students will be given a survey, which will tell us what demos they liked, what they did not like, what we can improve for future events, and if they would consider pursuing physics in the future. If a diverse group of students does indicate that they are more interested in physics after our event, we will consider it a success. If the results of the lasting survey, that will be distributed two weeks after the event, still indicate that the students are interested in physics, we will consider our event a major success.

Budget Justification

As a newer chapter we do not have optics demonstrations and the budget will be used to buy new demos that our chapter can use to take to Upper Darby High School. Each demo was chosen because of the fun that can be done with it. It is important to keep the students interested throughout the time we are there and having fun and engaging demos can make all the difference. With these physics demonstrations we can impact more high school students and encourage them to consider a physics or physics-related career. The budget will also cover transportation to/from the site using the most efficient way. We will be using one of the SPS members' car to transport the demonstrations and the other team members will meet up at the High School.