SOCIETY OF PHYSICS STUDENTS
An organization of the American Institute of Physics

Marsh W. White Award Proposal

Project Proposal Title	Towson Physics Demo Team
Name of School	Towson University
SPS Chapter Number	7338
Total Amount Requested	$300.00

Abstract

Towson University's SPS Chapter plans to do three outreach events, two off-campus and one on-campus at Towson University. By creating fun and engaging events we hope to share our love of physics with young students and encourage them to pursue science careers.

Proposal Statement

Overview of Proposed Project/Activity/Event

- Brief description
  - **Off Campus Activities:** The Towson University (TU) SPS will travel to Towson High School and one elementary school (TBD) during the Spring 2014 academic semester. These events will be a combination of presentation demonstrations and hands-on activities with age appropriate science concepts. Examples include:
    - Pool of Non-Newtonian fluid
    - Modeling planets with spandex and marbles
    - Other E&M, Mechanics, and Optics demos
  - **On Campus Activity:** We will host an event on the Towson University campus during the Spring 2014 academic semester. We will build off the already successful Saturday Science program which presents public science shows twice a month. Saturday Science typically draws 400 – 500 visitors, with most being families with elementary to middle school age children. The program a collaboration between faculty in the TU Fisher College of Science and Mathematics and TU's Hackerman Academy of Mathematics and Science. After the Saturday Science show children and parents will be invited to participate in guided hands-on demos.
- Goals of the project

  Our main goals are to have fun, get students excited about physics, and show students how physics is relatable to their lives. We also want to encourage SPS members to get involved in volunteering and outreach. We hope this will instill an expectation of outreach in future TU SPS chapters and establish an ongoing outreach program.
- Intended audience
  - High school students (several classes)
  - Elementary school students (several classes)
  - Individuals from the public that voluntarily go to Saturday Science (we hope to interact with about 15-20% of the 400-500 community members that attend)
- Background and motivation

  Saturday Science is a very important part of the physics community at Towson. Additionally, the SPS recently collaborated with APS organizers of the March Meeting and the TU Physics department to produce a highly successful public presentation on Physics of Superheroes. Attendance at these events exceeded 400-500 people, showing that the community is interested in physics and young kids will eagerly respond to fun, hands-on demos. Our successes with these events have inspired us to take a more active approach, as opposed to relying on the faculty, and organize outreach events as students. We feel confident that we can carry out a successful outreach event because of the supportive faculty and the atmosphere of teaching and outreach in the department.

How Proposed Activity Promotes Interest in Physics

In the elementary school, we hope to get kids excited about physics and science. We will have mostly hands-on demos that will let the students interact and discover science phenomena. At Towson High School we want to make physics more relatable to the students. We can share our personal experiences with physics (and let them know we're not geniuses!). We will tell them about our SPS and the community that can be built around science. We can show them how physics applies to their lives through demo presentations and hands-on activities. Saturday Science is typically done for large audiences; we would like to individually engage community members with demos afterwards so that they can have a more up-close and personal experience with physics.

Plan for Carrying Out Proposed Project/Activity/Event

- Personnel
  - TU SPS Officers, specifically President Zoey Warecki and Vice President Nathan Prins, will head the project, making sure required actions are taking place, deadlines are met, and volunteers are recruited for each event.
- Marketing
  - Saturday Science is already a very successful event so we will advertise with them.
  - The outreach to other schools will not need marketing since they will be organized through the teachers and administrators who we've been in contact with.
- SPS member participation
  - The entire body of TU SPS members will have opportunities to plan, organize, and participate in these proposed events.
  - This proposal reflects the ideas of all the active SPS members as we've written most of the proposal at our SPS meetings.
  - At least 20 active members have already expressed their interest in volunteering at the outreach events.
- Expertise
  - Approximately 10 physics majors participated in the Physics of Superheroes event and have experience in planning, organizing, and participating in a successful outreach program.
  - Zone 4 Councilor and TU SPS advisor Dr. Jeff Simpson has significant outreach experience as a former National Science Foundation GK-12 Fellow.
  - Department Chair Dr. David Schaefer has significant outreach experience to the community and schools ranging from elementary to high school.
  - Dr. Don Thomas, a former NASA Astronaut and the Director of the Hackerman Academy of Mathematics and Science, has offered to collaborate with us on Saturday Science.
  - Matt Jochmans, physics teacher at Towson High School has experience collaborating with TU students
  - Jim Selway, former physics teacher at Dulaney High School and Teacher in Residence at TU, now serves as a department volunteer. He has extensive outreach experience and will be a great resource for us to consult about how to interest different age groups.

Project/Activity/Event Timeline

- December 15th
  - The elementary school will be identified and the school officials will be contacted to work out logistics of the event
  - Finalize the date to do our Saturday Science outreach event
- February 1st
  - Choose dates for each of the school events and decide which demos will be most appropriate for each of the outreach events and develop an outline of each event
- March 1st
  - Get commitments from volunteers for each date
- March 31st
  - Have one project completed
- April 31st
  - Have all projects completed
  - Reflect and report on the events and begin preparing for next year

Activity Evaluation Plan

- We will do a general estimate of attendance at the Saturday Science event. We hope to get 10-20% of the Saturday Science audience to attend our demos.
- Following the school events, we will ask teachers and faculty to hold an informal discussion with their students and let us know what they thought about it.
- Because we want to create an ongoing outreach program within our chapter, feedback from the SPS volunteers will help determine if we can sustain an outreach program
    - We will debrief each event with the volunteers to see how well received the event was
        - Did we have fun? Would we want to do this again?
        - Did the audience seem engaged and interested? Were they asking questions?
        - Is there anything we could have done better?

Budget Justification

Our SPS chapter will use the funds to effectively carry out our outreach events. We will purchase roughly 20 t-shirts; these shirts will not be event-specific and will be given to volunteers for the outreach events. The t-shirts will display the SPS logo, and show that SPS is a professional organization. Our t-shirts at the Physics of Superheroes helped us stand out amongst the 400+ people.

To create fun, interactive demos we will purchase supplies such as cornstarch, spandex cloth, and liquid nitrogen. With the cornstarch, we plan to make a pool of non-newtonian fluid (a.k.a. oobleck) for the kids to run across. This demo has been very fun and successful in past events. The spandex cloth will be used to model gravity and planetary motion by stretching out the cloth and rolling marbles and billiard balls on it. Most of these supplies can be reused for future events. In addition, the TU physics department already has many demos for electricity, magnetism, optics, and mechanics and it will not cost us anything to use these. Additional funds will be used for transportation to the schools; we will only need to cover gas to the elementary school because Towson High School is adjacent to our campus.

Our SPS chapter has independent funds through our own fundraising and can match funds from SPS National. The TU Student Government Association has additional money that we can apply for if needed.