



## Future Faces of Physics Award Proposal

<b>Project Proposal Title</b>	<b>CSUSM Society for Diversity in Physics</b>
<b>Name of School</b>	<b>California State University San Marcos</b>
<b>SPS Chapter Number</b>	<b>0853</b>
<b>Total Amount Requested</b>	<b>\$500</b>

### Abstract

The CSUSM Chapter of SPS proposes to conduct physics outreach to 8<sup>th</sup> grade students from San Marcos Middle School in San Marcos, CA. This school has a large number of students from underrepresented minority groups as well as socioeconomically disadvantaged students. This proposal seeks support to perform an astronomy outreach activity with these students and to take them on a field trip to the nearby Palomar College Planetarium.

### Proposal Statement

#### **Project/Activity/Event**

Tighter budgets, standardized tests, and heavier workloads have resulted in fewer field trips in recent years. Educational field trips have been shown to enhance a student's learning about a specific topic [1]. Furthermore, it will give diverse and financially disadvantaged students equal opportunity to experience things outside the classroom that their families may not be able to afford. Our program will involve Mrs. Brice's 8<sup>th</sup> grade science students as they begin studying the solar system. These students will be taken on a tour to the local Palomar College Planetarium, which is approximately 15 minutes away from the middle school. After

the field trip we will test the students' knowledge by participating in a group class activity where they will investigate the concepts of relative size and distance by creating a basic model of our solar system.

Recent studies suggest that same-ethnicity mentors can have a strong influence on students' desires to pursue STEM-related activities. The diversity of our SPS Chapter is similar to the demographics of the middle school, such that women and minority SPS members will be serving as mentors for these middle school students. The proposed project will address two pressing needs: (1) increasing underrepresented minority students' interests in STEM; and (2) promoting college readiness and awareness of STEM careers among students and teachers. Assuming this event is a success, we will continue to pursue support for more schools to incorporate more educational field trips into their teaching curriculum. Our SPS will also expand upon its outreach efforts to engage students at other local schools where there are numerous minority and socioeconomically disadvantaged students.

### **How Proposed Activity Promotes Physics Across Cultures**

Minorities and low-income students express enthusiasm for science at a young age, yet they remain underrepresented in the STEM workforce [2]. Inequities in STEM educational experiences due to limited resources, underprepared teachers, or sociocultural influences can cause many of these students to lose interest in science and mathematics during early adolescence. Unfortunately, many middle schools, particularly those in low-income communities, don't have the resources to carry out science outreach programs that can hook these students and provide them with a real- world context for learning. By February 1 of each year, every school in California is required by state law to publish a School Accountability Report Card (SARC). The SARC contains information about the condition and performance of each California public school. The San Marcos Middle School 2014-2015 SARC reports student enrollment by group percentages are 76.6% Hispanics or Latino, 2% African American and 78.9% socioeconomically disadvantaged [3]. Our proposed project will be serving the need to increase and motivate these students.

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

- Personnel – As a Co-President of our CSUSM SPS Chapter, I will take the lead on this project and organize the logistics..
- Marketing – Our SPS alumni Lauren Gerhart is presently in the CSUSM Teacher Credential Program and a teacher's aide at San Marcos Middle School. She has been in contact with Mrs. Brice, the 8<sup>th</sup> grade science teacher. Her involvement ensures large participation from the San Marcos Middle School students.
- SPS member participation - We have 12 active members in our chapter who are interested in participating.

- Expertise - Our CSUSM SPS Chapter is well positioned to carry out this project. We have performed numerous physics outreach events both on campus and in the community. These include participation in the “STEM in your Backyard” events in Vista, CA; performing multiple rocket launches as part of CSUSM’s “Super STEM Saturday;” hosting tours of our Physics Labs; and mentoring local students participating in the “Student Spaceflight Experiments Program.. Our CSUSM Physics Department will help support us with supplies, and the outreach arm of the CSUSM STEM Center is willing to provide us with protocols on surveys and their pedagogical expertise.

### **Project/Activity/Event Timeline**

The event will be held during the weeks leading up to our annual CSUSM Super STEM Saturday on March 11. The Planetarium tickets will be purchased within the first week of funds being awarded to the SPS chapter.

January- Plan the event and consult with faculty and outreach personnel on activities.

February- Rehearse the activity.

March 9- Palomar College Planetarium Event.

March 11- Super STEM Saturday.

### **Activity Evaluation Plan**

To assess the success of the event, we will keep track of attendance. In addition to tracking the number of students reached, we will have the students take a brief survey on their experience. The survey will gauge student enjoyment and interest in science.

### **Budget Justification**

The costs associated with this event are for purchasing the planetarium admission for the participating students. Mrs. Brice teaches five periods of 8th grade science. There are 180 students in her classes. The Palomar admission is \$4 per student. We are working to negotiate a discount for these tickets, and there may be additional assistance from the CSUSM Physics Department to cover the remaining costs.

### References

- [1] Jones F, Harris S. “Benefits and Drawbacks of Using Multiple Instructors to Teach Single Courses.” *College Teaching* 60: 132–139, 2012.
- [2] Zhang J. “U.S. Commission on Civil Rights Report.” *Encyclopedia of Bilingual Education* doi: 10.4135/9781412963985.n336.
- [3] SAN MARCOS MIDDLE SCHOOL School Accountability Report Card [Online]. <http://sarconline.org/sarcpdfs/7/37737916039093.pdf> [15 Nov. 2016].