



# SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

## Future Faces of Physics Award Proposal

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Project Proposal Title	CSUSM for Diversity in Physics
Name of School	California State University, San Marcos
SPS Chapter Number	0853
Total Amount Requested	\$500.00

### Abstract

The CSUSM chapter proposes to conduct an outreach event with local middle schools with the purpose of performing science outreach for kids from underrepresented minority groups and socioeconomically disadvantaged communities. This would be done with a planetarium field trip, guest talks, and hands on activities with joint efforts of CSUSM and Palomar College.

### Proposal Statement

#### **Overview of Proposed Project/Activity/Event**

As the nation progresses technologically, it is important to fill jobs in the STEM field to keep the nation economically and technologically competitive [1]. As much of science comes from people making observations and sense of the real world, it would make sense to include opportunities for the students to be able to make such observations. Field trips serve as a way for students to not only go more in depth in subject matter but they also serve to engage students in ways that are not possible in a classroom [2]. The purpose of the project is to not only increase interest in physics and the sciences but to also provide such opportunities to underrepresented minorities and socioeconomically disadvantaged students. The planetarium event plans to fulfill various aspects of that through a planetarium show to inform and give the experience a planetarium has to offer, demos to show how science works in the real world, hands-on activities to give the students a chance to experiment and test out things themselves, student presentations to give an outline of what it's like to pursue a STEM field, and an industry representative to serve as an expert in the field and an example of life after studies.

Last year, we took 256 students from San Marcos Middle School(SMMS) and Woodland Park, both with underrepresented minorities and financially disadvantaged students, to the local planetarium. This year we want to continue and improve on the event given our previous success by increasing the number of students we incorporate and providing more hands on activities for the students to keep them engaged. A middle school in Escondido has also reached out to us to extend our Planetarium event to include them in March.

Given the time we have planned for the event, it would fall accordingly with the time the middle schoolers are learning about the solar system. As many of the students from these middle schools may not be aware of or have the opportunity to visit a planetarium. This would teach students about what a planetarium is and how it functions as well as gaining knowledge that comes from visiting one. Combined with various forms of expertise in the field, this would thus expand on what the students know about the college and career opportunities as well as insight about the universe[3].

## How Proposed Activity Promotes Physics Across Cultures

While an interest in science may occur early in one's life, it is around middle school and high school that this interest may drop due to social influences. People of low income or underrepresented minority groups are also more likely to attend under resourced schools which decreases the number of students from either group to go on to pursue a degree in challenging subjects such as those in the STEM field [4]. The 2016-2017 School Accountability Report Cards (SARC) for SMMS and Woodland Park show that 88.8% and 59.3% of the students are non-white and 78.8% and nearly 50% of the students are socially disadvantaged, respectively [5][6]. It is thus our job to provide resources that the schools may not have available to encourage students to pursue further studies in STEM

Lack of role models is another issue that many minority groups tend to decrease in higher education in the sciences. While there may be a small increase in the percentages of women and people of color in post secondary institutions over the years, it is our job to make sure that those numbers increase to motivate and educate the next generation of students. As our chapter is composed of both women and underrepresented minorities, we hope to serve as people the students can relate to. This project would serve to not only showcase what studies in physics and the sciences has to offer, but also to increase the diversity there is within.

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

- Personnel - SPS President, Jesus Perez, and I as vice president will lead and gather a committee of students to help prepare and organize the event. We participated in the event before so we have experience with the process and procedures
- Marketing - As we have met and worked previously with the middle schools and Palomar college, we would be able to use those connections to ensure participation for the event
- SPS member participation - At the minimum there will be 5 SPS members that will volunteer. ACS has also confirmed with us their participation for the event. There will also be volunteers from the Palomar STEM Center
- Expertise - Our SPS members have had experience doing outreach, such as STEM In Your Backyard, our university's larger version Super STEM Saturday, After School Community Service Learning Project (CSL) at middle schools, as well as having experience from past years of this event. Some even took a physics education class that is offered at our school

## Project/Activity/Event Timeline

**Fall Semester** - Plan event and meet with faculty and outreach personnel on event and activities

**October** - Collaboration with Chemistry Department/ ACS for Physics & Chemistry Show on day of event

- 10/27/18 ChemEXPO - SPS sends volunteers to help with rocketry booth in turn ACS helps SPS on day of planetarium event

**November** - Meet with the STEM coordinators of Palomar College

**Winter break** - Contact companies/ institutes for collaboration

**January** - Recruit volunteers

**March** - Planetarium event for Escondido

**Spring break** - Rehearse the activity

**April 2019** - Get permission slips signed

**May 2019** - Purchase tickets

**May 28/30** - Planetarium event

## Activity Evaluation Plan

We will conduct pre and post activity surveys to assess the students understanding of STEM as well as their interest and thoughts on pursuing a STEM field

## Budget Justification

The main cost of the event is the tickets for admission for the planetarium show. Since some of the kids could not make it last year we would expect to have a larger number of attendance as opposed to last year between the two schools. If we assume 270 students at \$4.00 a ticket, we would need \$1,080. We are requesting \$500 from this award and applying for additional funds from our university's Office of Diversity and department to match our needs. We have been and will continue to fundraise as well to cover some of the costs.

### References

- [1] Hossain, M. M. (2011, November 30). How to Motivate US Students to Pursue STEM (Science, Technology, Engineering and Mathematics) Careers. <https://eric.ed.gov/?id=ED533548>
- [2] Behrendt, Marc, and Teresa Franklin. "A Review of Research on School Field Trips and Their Value in Education." *International Journal of Environmental and Science Education*, vol. 9, no. 3, 2014, pp. 235–245., [eric.ed.gov/?id=EJ1031445](https://eric.ed.gov/?id=EJ1031445).
- [3] Jones F, Harris S. "Benefits and Drawbacks of Using Multiple Instructors to Teach Single Courses." *College Teaching* 60: 132–139, 2012.
- [4] MacLean, Lisa M. *Cracking the Code : How to Get Women and Minorities into STEM Disciplines and Why We Mus.* Momentum Press, 2017.
- [5] San Marcos Middle School Accountability Report Card [Online].
- [6] Woodland Park Middle School Accountability Report Card [Online].