



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Future Faces of Physics Award Report

Project Proposal Title	California State University San Marcos's aim for Diversity in Physics
Name of School	California State University San Marcos
SPS Chapter Number	0853
Project Lead (name and email address)	Jesus Perez Perez244@cougars.csusm.edu
Total Amount Received from SPS	\$500.00
Total Amount Expended from SPS	\$500.00

Summary of Award Activity

The Future Faces of Physics award helped California State University San Marco's aim for diversity in physics goal by contributing a significant portion to their second annual planetarium field trip. Last year the results from the pre and post surveys we administered showed potential indication of the field trip having a career/ college-major influence on the students. This in addition to the event being in demand by everyone involved from the teachers to the students, made it a no-brainer to expand and work towards making this a recurring event.

This year the CSUSM chapter took the 8th grade students from San Marcos and Woodland Park middle school to the local planetarium at Palomar college. A total of 338 students attended the field trip, which included a movie on the cosmos inside the planetarium, an interactive plasma demonstration by representatives from General Atomics, liquid nitrogen themed demos by two chemistry professors from the college, an alumni panel, and a physics and chemistry science show to finish off the day.

Statement of Activity

Overview of Award Activity

Our project took the 8th grade students from San Marcos middle school (SMMS) and Woodland Park Middle School(WPMS) to the local planetarium at Palomar community college where they had a day full of physics themed activities. We had 123 students from SMMS and 133 from WPMS for a total of 256 number of students. Since the planetarium can only hold 180 people at a time we had to split the middle schools into two different days. So SMMS attended on 6/5/18 and WPMS on 6/6/18. SMMS is only a 15-minute walk so on their day all our volunteers met at the middle school and walked the students over to the planetarium. WPMS on the other hand required buses, so our volunteers guided them over from the college's parking lot once they were dropped off.

On each day, the schools arrived around 9:30am to the college and from there we proceeded to split them up into two large groups of 3 smaller groups in each one. So for example since SMMS middle school had 120 total students then we had 2 groups of 60 students called group A and group

B. Then within A and B we had 3 smaller groups of 20 students. Once this was settled; group A went in for the first planetarium showing of *Explore the Solar System* while group B went off to the breakout sessions. As group B was finishing up the sessions, the planetarium film was ending and thus the groups then switched. The schedule for the film and events can be seen below.

Group A	Group B
10:00am - Explore the solar system	10:00am - Breakout session 1
11:15am - show ends, head to NS building	10:25am - Breakout session 2
11:30am - Breakout session 1	10:50am - Breakout session 3
11:55am - Breakout session 2	11:15am - sessions end, walk to planetarium
12:20pm - Breakout session 3	11:30am - Explore the solar system
12:45pm - sessions end, go to lunch area	12:45pm -- Show ends, go to lunch area

At 12:45pm the students and volunteers would have lunch while some of the students prepared their materials for the physics and chemistry science show that was put on after lunch. Then after the show and final remarks were all said and done, the students for SMMS were walked over by our volunteers and staff and WPMS students were walked over to their buses the next day.

Palomar College was able to provide enough clinch bags for the students. The bags had logos of all the parties involved from the university, the school district, SPS, and Palomar college. Inside the bags were CSUSM folders, pencils, NASA stickers, flyers with information on taking free summer courses at Palomar community college, information from the American institute of Physics website regarding high school physics.

Impact Assessment: How the Project/Activity/Event Promoted Physics across Cultures

Since the goal is to promote physics across cultures, we decided to reach out to the schools that had high number of the cultures that traditionally have been underrepresented in physics. The demographics from San Marcos and woodland park middle school can be seen below:

Student Enrollment by Subgroup

Student Group	Percent of Total Enrollment
Black or African American	2.8%
American Indian or Alaska Native	0.4%
Asian	4.9%
Filipino	2.8%
Hispanic or Latino	47.7%
Native Hawaiian or Pacific Islander	0.5%
White	40.7%
Two or More Races	0.1%
Other	0.1%
Student Group (Other)	Percent of Total Enrollment
Socioeconomically Disadvantaged	46.7%
English Learners	10.1%
Students with Disabilities	13.4%
Foster Youth	0.0%

Woodland Park Middle School

Student Group	Percent of Total Enrollment
Black or African American	1.9%
American Indian or Alaska Native	0.2%
Asian	3.2%
Filipino	2.3%
Hispanic or Latino	80.6%
Native Hawaiian or Pacific Islander	0.4%
White	11.2%
Two or More Races	0.0%
Other	0.2%
Student Group (Other)	Percent of Total Enrollment
Socioeconomically Disadvantaged	78.7%
English Learners	27.7%
Students with Disabilities	15.0%
Foster Youth	0.1%

San Marcos Middle School

We promoted physics by means of fun and interactive activities that introduced them to the field, opportunities in the field, and direct feedback from people who they could relate to. We know it can be hard to create your own footsteps, which is why we also made sure to provide a diverse pool of people presenting and volunteering at the event. This was done to help promote the idea of mentorship, as it can be crucial at this stage in their academic career.

All together the project had 3 major goals:

- 1) Design a field trip that helped impact student learning associated with Physics and the sciences.
- 2) Provide a positive learning atmosphere and mentorship role for students to feel connected to STEM and Physics through educating the masses with PowerPoint Presentations as well as hands-on learning activities.
- 3) Promote the Applied Physics Department at California State University San Marcos and share the opportunities/benefits a student has while attending this university through stories and testimonials provided by the members of SPS.

We had 3 breakout sessions that the students could attend. One of them was given by a representative of General Atomics, a private sector company that is housed in San Diego, CA. They presented demonstrations on plasma using a tesla coil and neon light tubes. The second presentation was given by two chemistry professors from the college that were of Hispanic background. They did demonstrations on the fun properties of liquid nitrogen, in an outdoor setting. Then the 3rd presentation was hosted by current students involved in research or alumni of our university. During the 1 and a half hour film the students had enough time to rotate through all three breakout sessions. All this exposé to what a life in science could entail, showed to them by people who they could relate too was the main method we planned on to promote physics across cultures.

Impact Assessment: How the Project/Activity/Event Influenced your Chapter

This project was not accomplished by one individual person. It was an entire community effort that contributed in some way. We had people and departments from our chapter, San Marcos middle school, Woodland park middle school, the school district, the planetarium, the STEM center at Palomar college, and multiple departments on our campus. I am happy to report that the Physics chapter at our university is well known around the city of San Marcos. This project allowed for many of our members to work on and develop professional skills that allowed them to gain experience in organizing a grand event.

A committee was brought together that encompassed individual specific goals, but worked together as a team to accomplish the task. These members are;

Josefa Gregorio – A now graduate of CSUSM, former co-president of our SPS chapter, and recent hire by Quantum Design, played many crucial roles. In preparing the event, she helped in acquiring buses, contacting departments at our university and leading the field trips the days of.

Natividad Pestana – A now graduate of CSUSMS, helped in preparing the pre and post surveys. She worked on refining and expanding the ones from last year to allow us to use this year's data as a second set. A great contribution was helping us digitize the survey to an online system to allow for smoother analysis and publication of the results.

Carina Maciel – Is entering her senior year. This past 2017/2018 academic year she was the secretary of our SPS chapter and conducted undergraduate research in one of our university's lab. She oversaw communication with the departments at Palomar College and the planetarium. She will be this incoming academic year's SPS vice president.

Leticia Damian – Is now entering her senior year and moving up to become an officer for our chapter. She helped in acquiring and preparing material for our event. She contacted and coordinated with community members for contributions to expand our field trips. For example, she acquired enough stickers from NASA to place in the student's goodie bags. She fulfilled her role in all this while taking on her first wave of upper division physics courses in her recent decision to pursue a PhD after her bachelors.

Jesus Perez – Is entering his senior and will be taking on the role of SPS president. He was the lead on this project and was the main communication between the parties involved.

Let it be known that the members on this committee received State Senator awards for their outstanding community service that came from their work in SPS events this year, including their enormous contributions to the planetarium field trips. These committee members along with our

members from the chapter, the chemistry(ACS) club on our campus, and various other department's collaboration efforts made this event as wonderful as it was. New connections and relationships were made that will make next year's event grander.

Key Metrics and Reflection

<p>The Future Faces of Physics Award is designed to promote projects that cross cultures. What cultures did your project attempt to bring together? (Please be as specific as possible.)</p>	<p>The goal of our project was to reach the cultures that have been traditionally been underrepresented in the physics and other STEM fields. The middle schools that we worked with had high number of students under the socioeconomically disadvantaged category and included many cultures like, hispanics(80.6%,47.7%) for San Marcos Middle School and Woodland park middle school respectively.</p>
<p>How many attendees/participants were directly impacted by your project? Please describe them (for example "50 third grade students" or "10 high school volunteers").</p>	<p>We had a total of 256 middle school students attend. We have 15 volunteers from our universities physics and chemistry department and about 5 from palomar college.</p>
<p>How many students from your SPS chapter were involved in the activity, and in what capacity?</p>	<p>We had a committee specifically for the planetarium preparation consisting of 5 members. Then we also had about 7 active SPS members volunteer the days of. The problem was that the dates were too far after our finals that many of our members were at REUs or in had summer class commitments.</p>
<p>Was the amount of money you received from SPS sufficient to carry out the activities outlined in your proposal? Could you have used additional funding? If yes, how much would you have liked? How would the additional funding have augmented your activity?</p>	<p>The funding from the SPS award was only a portion of the total cost in expanding the event this year. While it was a significant and crucial portion, it was not enough to cover the entire budget. We sought to complete the funding by reaching out to other departments on our University. The remaining balance was \$1,400.00.</p>
<p>Do you anticipate repeating this project/activity/event in the future, or having a follow-up project/activity/event? If yes, please describe.</p>	<p>We definitely intend to have this event next year. There are two main goals this time around. The first being expanding the event itself with more interactive demos and presentations. The second goal here is to build up the next cohort of officers that will value the impact of such outreach work. My colleagues and I are graduating this coming May(2019) and so it is important that we make this a recurring annual event for the middle schools in the San Marcos district.</p>
<p>What new relationships did you build through this project?</p>	<p>We built stronger and new relationships between CSUSM, our local middle schools, and our local community college.</p>
<p>If you were to do your project again, what would you do differently?</p>	<p>This was the second time around that we have done this project. Holistically speaking, everyone involved in the project from the teachers, speakers, volunteers, and especially the students, loved the event. Our data from last year showed indications of the event having career/college major influences, which</p>

is why we did not hesitate to run this event again. This year we had more than double the amount of students and the data is still being processed.(We plan to release a report based of the data in the fall of 2018 with the analyzed data.) However, with having great speakers and presentations, what we still seek is to have more hands on demos for the students. This would require more money and time on the day of the event. We look forward to working towards accomplishing this event next year.

Press Coverage

We reached out to the communications department at our university this time around and they were able to send a photographer to the event. We are hoping to get some sort of story out of this event in the fall of 2018.

Expenditures

The costs associated with this event included purchasing admission to the Planetarium for the 256 students. The Palomar Planetarium admission was \$4 per student. In addition we had to buy 30 more for the volunteers and staff who were with the group. There are more students, however some did not attend due to prior field trip commitments like a band or Avid field trip. We had multiple departments on campus donate items or funds. Our donations came from the Office of Inclusive Excellence, our physics department, Center for Research and Engagement in STEM Education (CRESE) and the Office for Training, Research and Education in the Sciences (OTRES). Also, Palomar college was the donor of the clinch bags.

Expenditure Table

Item	Please explain how this expense relates to your project as outlined in your proposal.	Cost
Planetarium tickets	Cosmos film & presentation	\$644.00
Planetarium tickets	Cosmos film and presentation	\$500.00
CSUSM folders	College exposure	\$275.00
District bus (x3)	Transportation of students	\$225.00
Pizza for volunteers	Food	\$80.00
Total of Expenses		\$1,744.00

*The green highlighted item represents the direct usage of the Future Faces of Physics award.

Activity Photos



Picture 1: Volunteer Joe Ayalla leading the students to the planetarium



Picture 2: Students preparing to break off into the film and breakout sessions



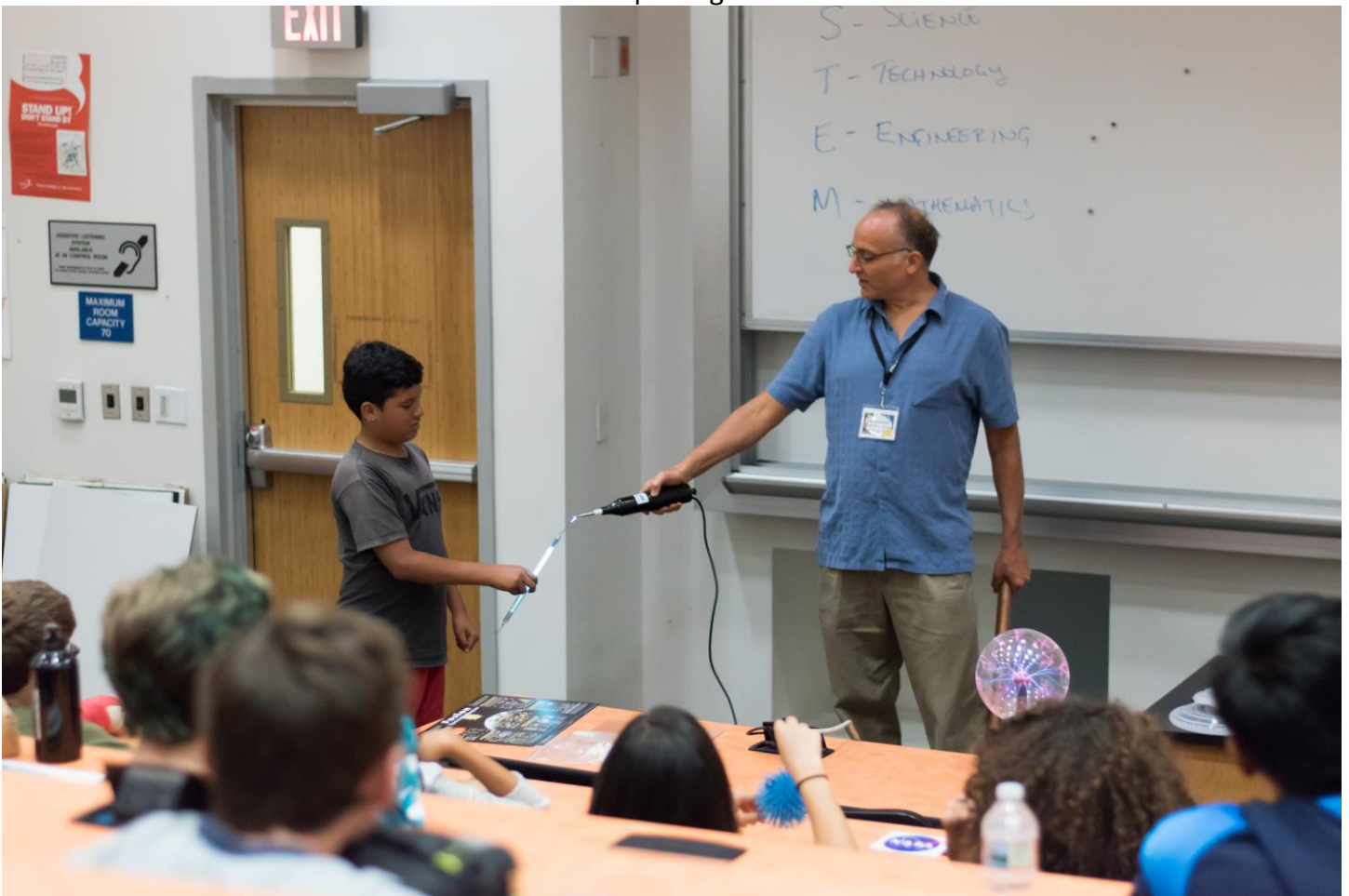
Picture 3: Palomar College Planetarium



Picture 4: Dr. Finkenthal, representative for General Atomics and the Physics department chair at Palomar college demonstrates Faradays law to these middle school students.



Picture 5: Preparing for the film



Picture 6: Dr. Finkenthal demonstrating plasma!



Picture 7: The CSUSM chemistry department captivating the audience



Picutre 8: Alumia Cosnuelo Saucedo talking about her journey through STEM



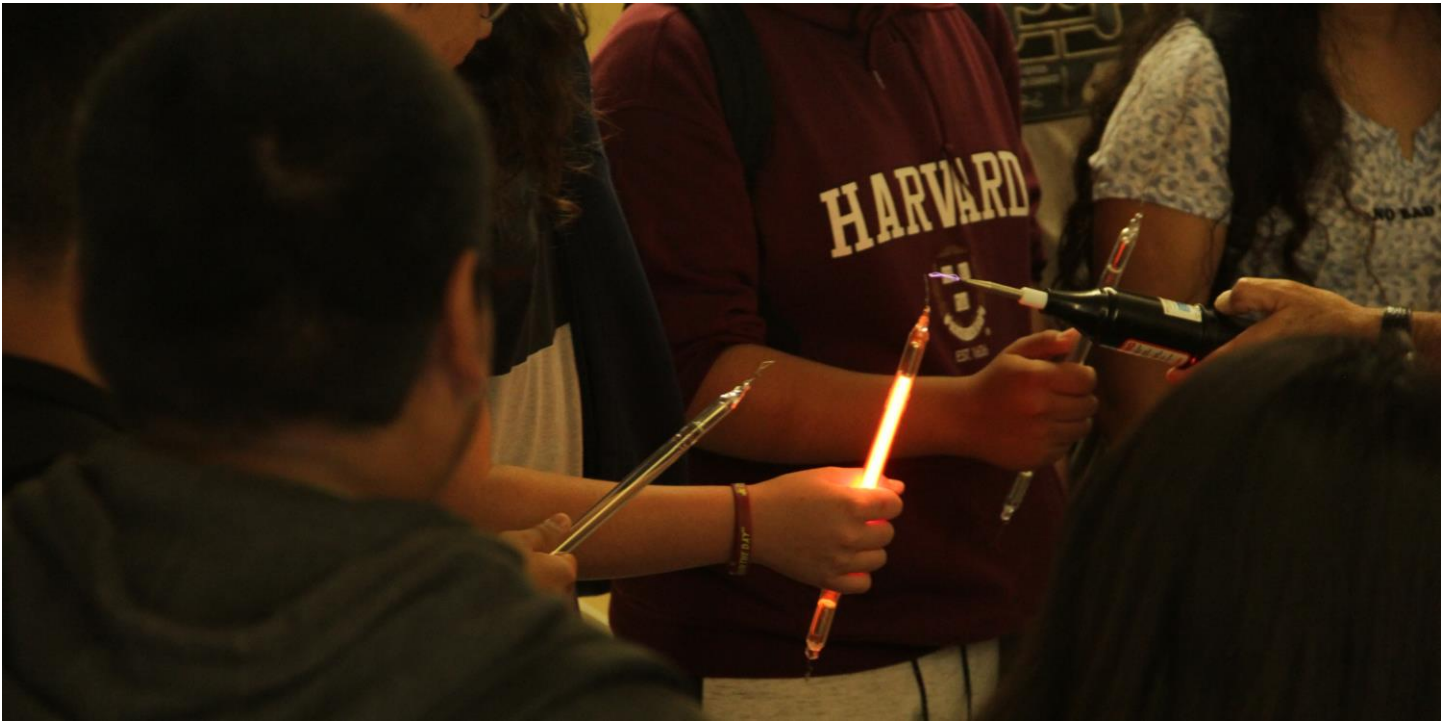
Picture 9: Turning water into a rainbow!



Picture 10: Playing with liquid nitrogen



Picture 11: A student and professor drop a puffer ball from the third floor after freezing it in liquid nitrogen's



Picture 12: More plasma physics



Picture 13: Rick from General Atomics talking about plasam physics



Picture 13: Hands on experinece with science



Picture 15: Woodland Park Middle School



Picutre 16: Preparing the folders and bags with goodies!



Picture 17: Woodland Park Middle School



Picture 18: Everyone wants in on science.

*photo credit : Felix Flores, Volunteer.

Guest Speakers

Chemistry Breakout Session

**North end of the NS building*

"Live! with the members of the Gaseous Atomic Society (G.A.S.)" Presented by Shannon Andrews and Dr. Luz Carrillo

Physics Breakout Session (NS-136)

Rick Lee - General Atomics

CSUSM/Palomar Breakout Session

(NS-137)

Alumni Panel:

Consuelo Saucedo

Enrique Sosa

A special thanks to this years sponsors!



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Thanks to our wonderful volunteers!

Miguel Moraleja	Carina Maciel	Meagan Rawls
Nyawal Tut	Bethsy Resendiz	Sharai Mendez
Joe Ayala	Mireya Juarez	Alyssa Dubord
Crystal Murguia	Phil Bruning	James Abernathy
Roberto Leon	Yuri Rodea	Leticia Damian
Felix Flores	Jesus Perez	Natividad Pestana
Jose Olvera	Oscar Solorzano	Alejandro Zafra
Josefa Gregorio	Enrique Sosa	Chris Melendez

CSUSM SPS Planetarium Outreach Event



June 5, 2018

San Marcos Middle
School



Front and back of event flyer

About this Event

Last year, the CSUSM Chapter of Society of Physics Students (SPS) organized a physics outreach event for 8th grade students from San Marcos Middle School. The first cohort of students were from Mrs. Brice's 8th grade science students. The CSUSM SPS received a grant from SPS National.



Background on the Future Faces of Physics Award/Grant

This project is aimed at "supporting projects designed to promote physics across cultures," and is designed to promote the recruitment and retention of people from groups historically underrepresented in physics.



Group A

9:00am – Volunteers head over to San Marcos Middle.

9:30am – Walk over students from SMMS to the planetarium

9:50am – Students make their way to the planetarium show

10:00am – Explore the solar system

11:15am – Show ends, walk over to NS building

11:30am – Breakout session 1 (NS-136)

11:55am – Breakout session 2 (*Outside)

12:20pm – Breakout session 3 (NS-137)

12:45pm – Sessions ends, walk over to lunch area

12:45pm – Lunch time

1:15pm – Lunch ends

1:15pm – Physics and Chemistry Science show! (*Outside)

1:35pm – Science show ends

1:35pm – Walk students over to MD building

1:45pm – Students begin surveys

2:05pm – Students finish the surveys

2:10pm – Begin walking back the students to San Marcos Middle

2:30pm – Students arrive to San Marcos Middle School

**North end of the NS building*

Group B

9:00am – Volunteers head over to San Marcos Middle.

9:30am – Walk over students from SMMS to the planetarium

9:50am – Students make their way to the NS building

10:00am – Breakout session 1 (NS-136)

10:25am – Breakout session 2 (*Outside)

10:50am – Breakout session 3 (NS-137)

11:15am – Sessions end, walk to planetarium show

11:30am – Explore the solar system

12:45pm – Show ends, walk over to lunch area

12:45pm – Lunch time

1:15pm – Lunch ends

1:15pm – Physics and Chemistry Science show!

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**North end of the NS building*



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If you have any questions, please contact the SPS National Office Staff
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