



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Future Faces of Physics Award Report

Project Proposal Title	Expanding the Universe!
Name of School	United States Air Force Academy
SPS Chapter Number	7502
Project Lead (name and email address)	Anita Dunsmore anita.dunsmore@usafa.edu
Total Amount Received from SPS	\$300.00
Total Amount Expended from SPS	\$265.50

Summary of Award Activity

Combine Moon rocks, telescopes, and shocking physics demonstrations and you have the Falcon Physics STEM Outreach Team's "Expanding the Universe!" project. This female cadet-led outreach team at the US Air Force Academy has inspired the next generation of female scientists with mesmerizing physics demonstrations and out-of-this-world observatory tours! The team hosted an observatory tour with physics demonstrations for a local girls' STEM club and a Moon rock workshop for the Girls Scouts - promoting science, providing strong female role models, and creating a network for female students interested in physics!

Statement of Activity

Overview of Award Activity

This year we started a female cadet-led STEM outreach group at the US Air Force Academy. The motivation for this group was two-fold: 1) it was inspired by the overwhelming success of a STEM outreach event for middle school girls that the cadets do every year in La Junta, CO, and 2) it was driven by a need to build a community of mentorship for female physics majors at the Academy. The group was run by two cadets, Anita Dunsmore and Erin Oetting, and had 21 members. They hosted two successful STEM outreach events at the US Air Force Academy and had to cancel two events due to poor weather conditions. The first event was an observatory tour for a local elementary school's girls' STEM club. The cadets led physics demonstrations and built simple telescopes for a group of 50 girls and parents before giving the group a tour of the Academy's observatory. The girls learned about the optics of telescopes, looked down into a 24" telescope, and used planispheres to identify different constellations in the night sky. This provided a unique opportunity for the girls to interact with the cadets, ask questions about science and college, and also interact with the female faculty members that assisted with the event. Feedback from the cadets and the teacher who organized the tour were extremely positive. After a couple of aborted attempts to host local Girl Scout troops due to inclement weather, we were finally able to host a second event at the US Air Force Academy. As part of the Society of American Military Engineers (SAME) STEM day, the Falcon Physics led a Moon rock workshop for the Girl Scouts. We requested and received Moon rock samples from NASA (!!!) and created an interactive workshop about the geology of the Moon. A geophysicist from the Department of Physics, Capt Carolyn Tewksbury-Christle, provided a short opening presentation. Following this, the Falcon Physics cadets led stations designed to explain different aspects of the geology of the Moon to 60 Girl Scouts and parents. Captain Tewksbury-Christle, a faculty member of USAFA's SPS Chapter who has trained with current NASA astronauts, then took questions from the Scouts—her NASA experiences captured the Scouts' imagination! The cadets, Scouts, and parents really enjoyed this event, and we are hoping to do it again next year. Overall, this project was a success – we were able to inspire girls in K-12 regarding science and start to build a stronger community for our female cadets who are interested in physics and science.

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

The major goals of this project were to inspire the next generation of female scientists through targeted outreach to local girls' STEM clubs and Girl Scouts and introduce female cadets to mentoring opportunities. This project was very successful! The cadets enjoyed working with other female cadets, faculty, and especially the young girls. They embraced the opportunity to be role models for the young girls. Many of the cadets involved in the project were initially interested in the group because of their own experience in STEM clubs and the Girl Scouts.

Overall, this project reached around 100 girls – even after a having to cancel a couple events due to weather. There was a lot of interest from the local community and positive feedback regarding the events we did hope. We plan to continue the Falcon Physics outreach group next year, and hope to provide more tours for the Girl Scouts and local girls' STEM clubs.

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?</p>	<p>The goal of this project was to inspire young girls to pursue physics.</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>	<ul style="list-style-type: none"> • 50 elementary girls and parents • 60 Girl Scouts (ranging from elementary to high school)
<p>How many students from your SPS chapter were involved in the activity, and in what capacity?</p>	<p>The lead for the project was the SPS chapter president (Anita Dunsmore). Of the 21 “Falcon Physics” cadets, only Anita is also a USAFA SPS chapter member. This statistic requires some explanation. Since our Falcon Physics program targets STEM outreach to local school-age girls, we wanted female cadets to lead this effort. Currently, Anita is the only female member of the USAFA SPS chapter. However, we expect female SPS membership to grow next year among our rising sophomore and junior physics majors. Finally, it was very encouraging that 20 non-SPS female cadets got involved to promote STEM to local girls, and some of those cadets may become SPS members next year as well!</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 money provided by SPS was sufficient to start the Falcon Physics outreach team. The demonstrations and materials used in the outreach events were supported by the Department of Physics at the US Air Force Academy.</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>This program was highly successful with the cadets and local community. We expect to continue the project and expand it in the future.</p>
<p>What new relationships did you build through this project?</p>	<p>The cadets involved with the project, specially Erin Oetting, worked to develop relationships with the local Girl Scouts chapters. We expect to use this new relationship to provide more STEM outreach events in the future.</p>
<p>If you were to do your project again, what would you do differently?</p>	<p>The main disappointment with this project was the need to cancel events due to weather. If we could do this project again, we would plan events for the spring and fall.</p>

Expenditures

The main expenses for the project were food, planispheres, and the t-shirts for the Falcon Physics group. The food for each event was provided by Department of Physics faculty. The planispheres given to the girls after teaching them how to use them were provided by funds the observatory had obtained from a different source (the remaining funds will be used to purchase more to replenish the supply). The t-shirts were purchased for the cadets to help create camaraderie and unity among team and readily identify them to their student audiences. The t-shirts were designed by one of the female cadets and will be used by the cadets at future outreach events.

Expenditure Table

Item	Cost
25 Falcon Physics T-shirts	\$265.50
Total of Expenses	\$265.50

Activity Photos



Girls from DCC FLASH club get excited about angular momentum and physics. (Credit: Mr. John-David de La Harpe.)



Cadet Mutoni answers questions from the the DCC FLASH club members. (Credit: Mr. John-David de La Harpe)



Cadet Furtado crushes cans with a little heat and water – demonstrating to a captive audience physics concepts. (Credit: Mr. John-David de La Harpe)



Cadets Rogers and Werkley show local Girl Scout members samples of Moon rocks during the SAME STEM day at US Air Force Academy. (Credit: Dr. Devin Della-Rose)



A Girl Scout takes a closer look at Moon rock samples during a Falcon Physics Outreach Team event at the US Air Force Academy. (Credit: Dr. Devin Della-Rose)



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