



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Future Faces of Physics Award Proposal

Project Proposal Title	Expanding the Universe!
Name of School	United States Air Force Academy
SPS Chapter Number	7502
Total Amount Requested	\$300.00

Abstract

Growing interest from our female cadets in engaging K-12 girls in STEM activities prompted us to start the Falcon Physics group – a female cadet-led physics outreach team at the US Air Force Academy. Falcon Physics will provide observatory tours and interactive demonstrations to inspire the next generation of female scientists.

Proposal Statement

Overview of Proposed Project/Activity/Event

Every year 40 - 50 female cadets from the United States Air Force Academy (USAFA) participate in the Girls in the Middle Conference in rural La Junta, CO, inspiring ~200 middle-school girls to continue taking STEM classes and consider careers in STEM. The success of this program and growing interest from cadets has prompted us to start a similar outreach within our local community. We plan to start a Falcon Physics group – a female cadet run outreach program designed to inspire K-12 girls in physics and STEM. The initial outreach activities of this group will build upon the already successful observatory tour program at USAFA. The observatory program typically gives 10-15 tours to local STEM clubs, homeschool groups and Boy Scouts, but there is a gap when it comes to STEM outreach to girls. The Falcon Physics group hopes to fill this gap by specifically targeting local girls’ STEM clubs and Girl Scouts for observatory tours and physics demonstrations. We hope to start by offering at least one tour for a girl STEM club every month with a target of 4 tours and an impact of ~100 girls for this year. The goals of this outreach group and its activities are to promote physics to K-12 girls, introduce girls to strong female cadet role models, and build a community of mentorship for female physics majors at the Academy.

How Proposed Activity Promotes Physics Across Cultures

USAFA is involved with multiple STEM outreach programs in the local community – for example Physics is Phun outreach, Chemistry Magic shows and observatory tours. These programs rely on cadet volunteer support and expose hundreds of children and adults to science. However, there is a void when it comes to physics outreach and mentorship to K-12 girls, a group that is traditionally underrepresented in physics. The creation of the Falcon Physics outreach group and its activities will provide targeted outreach to local girls’ STEM clubs and Girl Scouts and introduce female cadets to mentoring opportunities. These proposed activities will provide opportunities for our cadets to be role models for young girls and lead to a stronger relationship with the local community.

Plan for Carrying Out Proposed Project/Activity/Event

This project builds upon observatory tours and physics demonstrations that are part of the existing STEM outreach at USAFA.

- Personnel – Physics department faculty from USAFA will provide support coordinating the tours; Falcon Physics cadet leadership, including the SPS chapter vice-president, will coordinate cadet volunteers, demonstrations, and guide tours. Cadet volunteers will guide tours and lead demonstrations.
- Marketing –Department faculty will coordinate with STEM coordinators in the local school district to find girls’ STEM clubs interested in observatory tours. We have already communicated with a local STEM coordinator about the project and have identified a Girl Scout group interested in a tour.
- SPS member participation, expertise – A typical observatory tour has at least five cadets and department faculty members, including the observatory director, helping lead the tours and demonstrations. The goal for this project will be the same, with SPS members filling the

leadership roles in the project, and additional volunteers being recruited from across the Academy.

Project/Activity/Event Timeline

In progress – establish cadet leadership for Falcon Physics outreach group, start recruiting volunteers

When funds are available – purchase materials for physics demonstrations

12 Dec 2014 – coordinate with local STEM coordinator and observatory director, finalize tour for January

09 January 2015 –finalize February and March tour dates.

13 February 2015 – finalize April tour date.

15 May – established the Falcon Physics STEM outreach group, provided observatory tours and physics demonstrations to approximately 100 K-12 girls, and inspired future scientist!

Activity Evaluation Plan

We will keep track of attendance, both the number of girls and the number of female cadet volunteers, to evaluate the success of the observatory tours and interactive demonstrations. We will also solicit feedback from leaders of the girls' STEM clubs as well as the cadet leadership of the Falcon Physics group regarding impact of the program, ways to improve the tours, and additional ways to mentor girls in physics. The hope of this program is to start with at least 4 observatory tours. Assuming the model is successful, we would expand the effort to other local venues such as the new USAFA Planetarium. Further, we could present our project results to the Girl Scouts of America and encourage them to emulate the program across the country.

Budget Justification

The goals of this outreach group and its activities involve inspiring K-12 girls about physics and building a community for female physics majors at the Academy. For the observatory tours, we would like to provide members of the Falcon Physics team with Falcon Physics t-shirts. This will help to create camaraderie and unity among the female cadets involved in the Falcon Physics team and readily identify them to their student audiences. The cost of the t-shirts will be \$7.99 each and total \$199.75 for 25 shirts. The remainder of the requested funds will go to supplies for the tours. As part of an observatory tour, cadets typically guide the groups through various interactive physics demonstrations such as hands-on E&M physics demonstrations, (ie. van de Graff generators, Tesla coils, etc.) or how to use a planisphere to find constellations. The supplies for the physics demonstrations will be provided by the Department of Physics at USAFA, so the remaining funds will be used to purchase planispheres that the girls can take with them after the tours. The 15 planispheres we purchase will help supplement the supply of planispheres the observatory obtained from a previous funding source. We hope to make this activity more than a onetime event by giving the girls a planisphere, enabling them to share what they learned with the family, friends, and fellow students.