



# SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

## Future Faces of Physics Award Report

*Instructions: Please complete each section after reading the purple text describing what should be in that section. Then delete the purple text.*

Project Proposal Title	Taking Classroom Physics Further: Promoting Interest in Physics in the local Community
Name of School	Texas State University
SPS Chapter Number	6682
Project Lead (name and email address)	Elizabeth LeBlanc – EL1137@txstate.edu
Total Amount Received from SPS	\$292.00
Total Amount Expended from SPS	\$292.00

### Summary of Award Activity

With the Future Faces of Physics Award, granted by the National Society of Physics Students, the Texas State University (TXST) SPS Chapter was able to build a bed of nails for demonstration purposes to be used at local outreach events. The completion of this demonstration is a great addition to the TXST SPS demo inventory that highlights mechanics concepts, to fulfill the requests of the local science teachers and coaches. With its completion, our SPS chapter was able to perform an outreach event for middle schools students, with an emphasis on mechanics concepts.

## Statement of Activity

### Overview of Award Activity

With the funds provided by the National SPS organization, our chapter was able to purchase the supplies for, and build, a bed of nails to be used as a demonstration during outreach events. The project consisted of the build, and one outreach event at Goodnight Middle School.

The build presented a team building activity experience for our SPS members who participated. The outreach event consisted of SPS members participating in “Champs Day” at Goodnight Middle School, a day for honoring good grades and behavior of middle school students that occurred at the end of the academic year. At this event, SPS members used the bed of nails, in conjunction with a gravity well demo and a “Jumping Ring” solenoid demo. Many of the middle school students had seen the gravity well demo and the bed of nails in video clips during class, so having these demonstrations gave them the opportunity to gain hands on experience, and engage at a higher level with the concepts presented.

Originally, our chapter had intended using the bed of nails at as many local schools as possible. However, it was discovered that the High School in San Marcos had recently built its own bed of nails, so we decided not to use it there. Due to safety concerns with the younger students in elementary schools, it was also decided that the bed of nails would not be used at elementary schools either. That left us with Middle School students, who responded positively to the demonstration. We were able to take the bed of nails to Goodnight Middle School, where approximately 80 students were able to interact with the demonstration, which included an SPS member laying on the bed and an opportunity for students to tangibly inspect the bed.

This year, our SPS chapter was able to perform demonstrations at every level of public school in the San Marcos Consolidated Independent School District (SMCISD). The bed of nails was an excellent addition to the collection of demonstrations that our chapter currently has for outreach events, particularly for the middle school audience. Our chapter and department place a lot of emphasis on local outreach, so this project helped strengthen our ability to accomplish this.

Many of the middle school students who participated in the event were familiar with the concepts presented by the bed of nails, however very few of them had ever seen one in real life. Through the use of probing and leading questions, our SPS members were not only able to present the students with a unique opportunity to see and touch a bed of nails, they were also able to reinforce and help students understand the difference between force and pressure.

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

San Marcos, Texas is a city of two identities: local citizens and university students and/or staff. Though both the city and the university continually seek to work together and promote unity, many local citizens and local students in particular, do not feel connected to the university. SMCISD is comprised of 72.8% Hispanic students and 68.75% of SMCISD students are economically disadvantaged. With such a high percentage of students being economically disadvantaged, many students feel that a higher education is simply not an option for them.

By bringing physical concepts to the students that are fun and engaging, presented by college students in their local community, we hope to encourage these economically disadvantaged and underrepresented students to more critically consider continuing their education into college. Through the use of reformed teaching methods by asking probing questions, we are able to engage students in the scientific process by encouraging inquiry and self-exploration.

Because our event dealt with local school outreach involving direct interaction with diverse student populations, a very effective method of evaluation presents itself in documenting the outreach event through media and directly observing how much fun the students are having with the demonstration and gauging how much the students gain from the demonstration educationally. Based on this, adjustments to the demonstration can be made each time the bed of nails is used, and those changes can be evaluated on the above stated criteria comparatively.

As part of "Champs Day", students at Goodnight Middle school had the option to engage in small board games, arts and crafts, dancing, our demonstrations, or they could socialize amongst themselves. Due to the structure of the event, which was self-selective, it was easy to determine if students found the demonstrations fun and entertaining by the amount of time they spent at the demos. Typically, a group of approximately 10 students would approach our demos, and engage for approximately 10-15 minutes. During that time, we would show students the gravity well demo, the bed of nails, and the Jumping Ring demo. These demos worked well together, as the gravity well demo is incredibly interactive and drew students from across the room due to its size. Once students were engaged with the SPS membership, we were then able to show them the bed of nails and encourage inquiry on subjects that they were more familiar with, such as the concepts of force and pressure. Many of the students were familiar with the demonstrations that we had from videos shown in their science classes. By bringing demonstrations that the students already had some knowledge about, they were much more willing to engage and hold a dialogue with the SPS members present. Based on this, the event was deemed a success.

The only issue that presented itself was that there were many requests from students to lie down on the bed of nails themselves. However, due to safety concerns, this was not allowed. This was the only issue that came up, that our chapter felt warranted evaluating further. At an event at a school, where there are only students (no parents), we have not determined a safe way to allow students to participate in this way. We do feel, though, that at events where parents are with their kids, such as the San Marcos STEM Fair (see forthcoming chapter report for more details), where parents and their kids are participating, if a parent grants express permission, then we will allow students to lie on the bed with our instruction and supervision.

## Key Metrics and Reflection

The Future Faces of Physics Award is designed to promote projects that cross cultures. What cultures did your project attempt to bring together?	<b>The local San Marcos culture and TXST university culture</b>
How many attendees/participants were directly impacted by your project? Please describe them (for example “50 third grade students” or “10 high school volunteers”).	<b>~80 middle school students</b>
How many students from your SPS chapter were involved in the activity, and in what capacity?	<b>8 SPS members were involved. 3 participated in the outreach event, and 5 helped to build the demo.</b>
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?	<b>While the initial pricing of supplies indicated that SPS funding would be sufficient, it was not. An additional \$50 would have covered the costs of the entire project.</b>
Do you anticipate repeating this project/activity/event in the future, or having a follow-up project/activity/event? If yes, please describe.	<b>This demo is intended to become a staple in our available demos that we use at outreach events, particularly at the middle school level</b>
What new relationships did you build through this project?	<b>N/A. Our organization has a well developed rapport with the local schools</b>
If you were to do your project again, what would you do differently?	<b>Many students wanted to be able to lie on the bed of nails themselves. Due to safety concerns, we did not allow this. However, if we can determine a way to overcome the safety concerns, allowing students to lay on the bed of nails would be a huge improvement to the demonstration.</b>

## Press Coverage (if applicable)

N/A



## Activity Photos



**Figure 1: TXST SPS Bed of Nails Build. For the image on the left, starting on the left, Dr. David Donnelly, SPS chapter advisor, and SPS members Sam Cantrell and Kim Moreland are shown. Photo taken by SPS member, Colin Donnelly, who also assisted with the build**



**Figure 2: Goodnight Middle School Outreach event. Here, the gravity well demonstration is shown, with SPS President, Elizabeth LeBlanc (blue shirt) shown, center, with students engaging in the demonstration by rolling marbles along the spandex material. SPS member David Jaime is also shown, right (plaid shirt). Photo taken by SPS member, James Talbert.**



**Figure 3: In the upper left, SPS President, Elizabeth LeBlanc (Blue shirt) is shown lying on the bed of nails while SPS Outreach Committee Co-Chair, James Talbert (gray shirt) leads student discussions about the concepts involved. The bottom picture shows a student getting a closer look at the bed of nails. Photos taken by SPS member, David Jaime**

**An important note about these photos:**

The parents of the middle school students shown have not signed photo release forms. Due to this, any photos with middle school students should be used for internal purposes only, and should not be publicly displayed.