

Marsh White Award Final Report

Drexel University – June 2007

The Drexel University chapter of SPS, although a young chapter, has since its inception been interested in doing physics outreach to not just the Drexel community but to the community of Philadelphia as well. In order to provide a jump start to this goal we applied for the Marsh White Award back in November of 2006. Our proposal of “Low Temperature, Levitation, and Legendary Experiments” was shaped around the idea of promoting the SPS National Organization’s association with the Absolute Zero campaign, as well as doing experiments what we thought were “cool” and would inspire, excite, and educate our audience.

The award fund was matched by Drexel’s Physics Department. While some of our demonstrations consisted of existing demos from the Low Temperature Lab and the Physics Department Demonstration Collection, we have used the SPS Award to fund the following demonstration equipment, supplies and travel costs:

Budgeted Expenses for Marsh White Outreach

1. Flowers for Liquid Nitrogen demo	- \$ 8.00
2. Transportation to Science Leadership Academy	- \$ 10.80
3. Doppler Rocket	- \$ 59.00
4. Chladni plates	- \$178.00
5. Right Angle Prism	- \$ 10.00
6. Free-fall tube	- \$ 31.91
7. Stirling Engine	- \$ 109.00
8. Optics Set	- \$ 12.75
9. van de Graaff Jr and discharge electrode	-\$ 206.19
10. Air cannon	- \$ 19.00
Total:	\$644.65
SPS Fund Award	\$300.00
Drexel Physics Dept Matching Fund	\$ 344.65
Balance	\$ 0.00

Using these funds, we have performed *both on-campus and off-campus outreach* to high school students. The on-campus high school outreach was done on March 8, 2007

as part of the events surrounding Drexel's Annual Kaczmarczik Lecture/Open House event when 1000 students, faculty and parents from the Greater Delaware Valley visit Drexel's campus to listen to a renowned physicist (this year, it was Nobel Laureate James Mathur) deliver a popular physics lecture. Prior to the lecture proper, participants assembled in Drexel's Great Hall and were treated to demonstrations of the effects of low temperature on matter. This was arranged and performed by SPS student members, in collaboration with the Low Temperature Lab directed by Prof. Ramos, and the Campaign for Absolute Zero. Pictures of the event which impacted and entertained many high school students (even those not necessarily interested in science). Demonstrations such as Mr. SQUID, breath liquefaction and magnetic levitation were arranged on a table manned by SPS students. Absolute Zero brochures and physics recruitment brochures were also disseminated at the short 40-minute event. Our successful outreach was featured in the National Press Release column Absolute Zero:

http://www.absolutezerocampaign.org/press_room/index.htm

More information can be found at Drexel SPS Chapter's website:

<http://www.physics.drexel.edu/SPS.html>

It was also featured, along with our Marsh White Award on the main physics website:

<http://einstein.drexel.edu/>

On June 6, 2007, Drexel's SPS Chapter members led by physics freshmen majors Charles Marine, James Monahan, Tim McJilton and SPS Advisor Prof. Roberto Ramos, made the first of several planned *off-campus high school outreach activities*. This was to 25 members of the Student Science Club at the Science Leadership Academy (SLA) in urban Philadelphia. SLA is a brand new public high school sponsored by the Franklin Institute Museum. Its first batch of students, currently all freshmen, represent the diverse minority composition of Philadelphia and are undergoing a rigorous, college-preparatory curriculum with a focus on science, technology, mathematics and entrepreneurship.

The 40-minute presentation to SLA consisted of demonstrations of low temperature effects on matter (superconductivity, magnetic levitation, freezing petals, reducing wire resistance in a "giant flashlight") using liquid nitrogen; experiments with polarization filters, optical activity with Karo syrup; Galileo's free fall experiment in an evacuated tube. The strategy we adopted employed inquiry-based demonstrations wherein we asked students to predict outcomes of experiments and provide hypotheses, performing the actual experiment and then modifying their understanding.

This event was made possible with the help of SLA Principal Chris Lehmann, SLA Science Club Advisor Matt VanKouwenberg and SLA Teacher Gamal Sherif, who were appreciative of the first university-based outreach that SLA has experienced. Our SPS members were even invited to be future judges or consultants in their school science fairs. SLA faculty expressed great interest in establishing a long-term relationship with our chapter. Finally, in addition to SLA, we are planning future demonstrations in 2007-08 to other area high schools such as nearby Moorestown High School (NJ) and Marple

Newton High School (Pennsylvania) – whose faculty have expressed interest in getting SPS to perform outreach. Pictures of this off-campus outreach can be found at:

<http://www.physics.drexel.edu/sps/outreach.html>

***Drexel SPS Physics Roadshow @
Science Leadership Academy
Feedback Sheet***

We'd like to get your feedback! Did you like our show? What did you enjoy best?
Let us know by writing comments below.

Name:	Comments:
Shareesa Bolders	The experiments were awesome, fun and knowledgeable.
Yousuf Khaled	I like liquid nitrogen
Jerome McLeod	Super conductors!
Eric Williams	cool (literally)
Latyshia Lukey	FUN!!
Patrick W.	Holograms!!! Yay
Hector Marquez	SOOOO Cool!!!

Electronic Scan of Page 1 of our Feedback Sheet, signed by students from the Science Leadership Academy (Philadelphia). There were many other memorable after-event remarks by the SLA freshmen. One remarked, "I have always wanted to experiment with Liquid Nitrogen....Now, I am happy and content!"

Drexel SPS Off-campus Outreach to Science Leadership Academy (Philadelphia)



Drexel SPS students demo Galileo's free-fall experiment in vacuum.



A high school freshman discovers how Electrical resistance comes down with Temperature.



High school students grab beads of liquid nitrogen While observing the Leidenfrost effect.

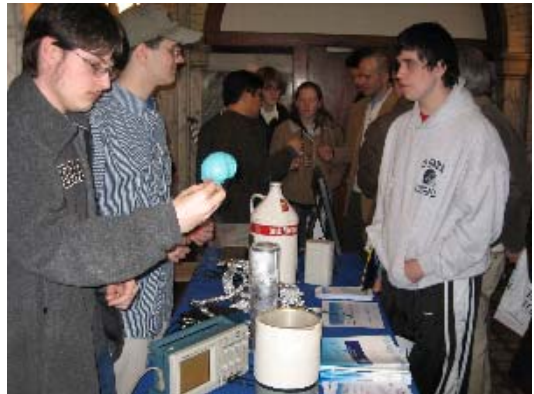


SPS member Tim McJilton explains the workings of a "giant" flashlight.



High school freshmen at the Science Leadership Academy get lots of hands-on experience while studying the effects of temperature on matter (petals immersed in liquid nitrogen) and the formation of virtual images that give rise to optical illusions.

Drexel SPS On-campus Outreach to 1000 high school participants during Annual Kaczmarczik Lecture



High school students, parents and faculty attending the Annual Kaczmarczik Lectures/Open House Get a treat to a buffet of low-temperature physics demonstrations, courtesy of Drexel SPS Chapter and Drexel's Low Temperature Lab, in partnership with the Campaign for Absolute Zero.

ABSOLUTE ZERO and the Conquest of Cold

[HOME](#) | [ABOUT ABSOLUTE ZERO](#) | [GET INVOLVED](#) | [NATIONAL PARTNERS](#) | [ASK THE EXPERTS](#) | [PRESS ROOM](#) | [DISCUSSION BOARDS](#) | [UNDERWRITERS](#)

PRESS ROOM

[Press Kit](#) | [Press Releases](#) | [Promotional Flyer](#)

Welcome to the *Absolute Zero* Press Room. Here you will find the latest news releases, feature stories, background information and fact sheets about the public television series and the outreach campaign. In addition, newsworthy information about the campaign activities being undertaken by National Partners will be included. We also will provide reporters with a resource list of spokespersons.

The Latest News

- *Absolute Zero* discussed during "Voice of America" story. Read the [transcript](#) and/or listen to the story ([MP3](#)).
- *Absolute Zero* Web seminar with Nobel Laureate Bill Phillips announced by NSTA - [Find out more](#)
 - Read NSTA's [announcement](#)
- **Four more organizations join as new National Partners in the *Absolute Zero* campaign. They include:**
 - Center for UltraCold Atoms
 - The Physics Instructional Resource Association
 - TryScience.org
 - Society for Advancement of Chicanos and Native Americans in Science
- National Society of Hispanic Physicists joins as a National Partner in the *Absolute Zero* campaign.
- National High Magnetic Field Laboratory highlights *Absolute Zero* campaign in the education section of their [Web site](#).
- NASSMC - Here is the December Issue of the NASSMC News Bulletin: <http://www.nassmc.org/bulletin.html>
- **Dear National Partners:** Want to promote *Absolute Zero* to your members and constituents, hand out information at meetings or conferences? Now you can with the *Absolute Zero* Promotional Flyer. Download the following PDF file and distribute the "Cool News" about the upcoming PBS series and outreach campaign.

[Download the PDF](#) 

Contact [Allan Childers](#) if you would like the flyer co-branded with your

Current events

This week on the Engineering Campus of UW-Madison, the school is holding its biennial Engineering EXPO (see <http://engineeringexpo.wisc.edu/>), Thursday through Saturday (April 19-21). As a part of the three-day activities, the Cryogenics group will be hosting an exhibition featuring measurements to determine Absolute Zero (as described in the Community Education & Outreach Guide), and an interactive display highlighting phase changes between gas, liquid, and solid. Visitors to the exhibit will also be treated to a sample of ice cream made on site with liquid nitrogen. Students from the Madison area's middle and high schools attending the EXPO should go away knowing how to convert between the Celsius, Kelvin, Fahrenheit, and Rankine temperature scales, and be able to identify the value of absolute zero temperature on each of these scales. Based on previous Engineering EXPOs, the expected attendance over the three days will be near 10,000.

RECENT Events

NSTA Web Seminar: Absolute Zero: The Cold, Hard Facts About the Coolest Stuff in Physics
Nobel Laureate Dr. Bill Phillips, a leading researcher in the physics of ultra-low temperature atomic gases. From his laboratory at the National Institute of Standards and Technology, Dr. Phillips told the tale of how and why he and his colleagues made the coldest gases ever seen, provided engaging ideas on how to make the physics of the ultra-cold appealing to middle and high school students, and described demonstrations for formal and informal educators.

[Find out more](#)

organization's logo.

- Russell Donnelly, the Principal Investigator for the campaign and series, was featured in *Inside Oregon*, the official newsletter for employees of the University of Oregon. Read the article here: <http://duckhenge.uoregon.edu/io/article?id=384>

Many of the Campaign's National Partners have featured the *Absolute Zero* in their publications, on their web sites and in announcements to their members. Here are a few highlights:

- Optical Society of America - Announces Partnership - <http://www.osa.org/News/pressroom/release/11.2006/absolutezero.aspx>
- SPS - The Society of Physics Students has dedicated some pages on their site for participation in the campaign: www.aip.org/education/sps/partnerships/absolutezero.htm
- www.nassmc.org/bulletin/mar06bulletin.html
- Cryogenic Society - http://www.cryogenicsociety.org/industry_links/
- ASHRAE: - www.ashrae.org/students/

Thursday, March 8 - 1 p.m. to 4:30 p.m.

Drexel University's Physics Dept's [12th Annual Kaczmarczik Lecture](#) was attended by 1000 participants, including 700 high school students from the Greater Philadelphia School District. The speaker was 2006 Physics Nobel Laureate John C. Mather. Prior to the lecture, physics laboratories held an open house. [A table of low-temperature demonstrations was set up by Prof. R. Ramos and Society of Physics Students during the Reception](#) for the 700 high school students. Hands-on demonstrations featured a SQUID, magnetic levitation with superconductors, breath liquefaction and cooling of electrical circuits to liquid nitrogen temperatures. Film clips about *Absolute Zero* were shown. Flyers showing outreach activities and information about the *Absolute Zero* Campaign/PBS Documentary were distributed.

Saturday, February 24 - 10 a.m. to 3 p.m.

[National High Magnetic Field Laboratory's annual Open House](#)

Absolute Zero was featured at the lab's annual Open House, which attracts close to 4,000 people from the Southeast. The Lab had a booth with a cryogenics demo (staffed by the Lab's *Absolute Zero* Experts). Print flyers were distributed. The event featured hands-on demonstrations, tours, games, informational videos, food, give-aways and the chance to meet and chat with scientists and other Mag Lab staff.

[Contact Us](#) [Site Map](#) [Privacy Policy](#) [Terms of Use](#)

Thank you to our Underwriters: National Science Foundation, Alfred P. Sloan Foundation.

Credits: 2006 - Design and Development: [Devillier Communications](#) and [Wood St.](#) Content - [Devillier Communications](#). All Rights Reserved.