



American  
Association of  
Physics  
Teachers

## *Spring Meeting*

**Northern California/Nevada Section**

**Friday, March 27, 2009**

**Saturday, March 28, 2009**

*Hosted by*

***PASCO scientific***

*Manufacturer of Physics Apparatus,  
Probeware, and Software*

**Friday Evening Social: 6:00 – 8:30 pm**

**Saturday Meeting: 7:45 am – 4:20 pm**

**Local Host: Ann Hanks**

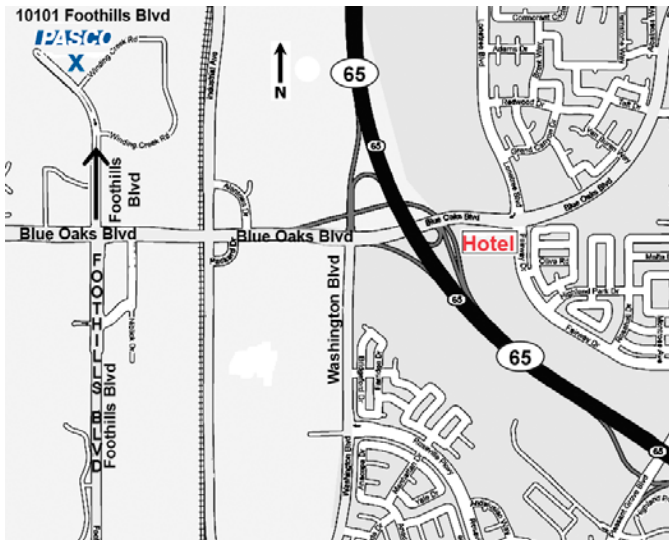
email: [ahanks@pasco.com](mailto:ahanks@pasco.com)

(916) 786-3800 ext.349

[www.ncnaapt.org](http://www.ncnaapt.org)

## Directions to PASCO

PASCO is located in Roseville northeast of Sacramento.  
10101 Foothills Blvd., Roseville, CA 95747-7100



*Parking is free.*

### **Directions from I-80:**

Exit at Highway 65 (65 originates at I-80 and goes North), go about 2 miles and exit on the right on Blue Oaks Blvd and keep to the right to West Blue Oaks Blvd so you go up and over Highway 65 to the West. Then you keep on Blue Oaks, going up and over the railroad tracks, make a right (toward North) onto Foothills Blvd, go 0.4 miles and turn right onto Winding Creek and left into PASCO's parking lot.

### **From the north on Highway 65:**

Exit on the right on Blue Oaks Blvd and turn right at the first light (at the end of the off-ramp) onto Blue Oaks. Then you keep on Blue Oaks, going up and over the railroad tracks, make a right (toward North) onto Foothills Blvd, go 0.4 miles and turn right onto Winding Creek and left into PASCO's parking lot.

***Need help? Call Ann on her cell phone at 916-216-0643.***

## **Accommodations**

### **SpringHill Suites**

10593 Fairway Drive

Roseville, California 95678

Phone: 1-916-782-2989

Toll-free: 1-800-228-9290

\$99/night (Ask for PASCO rate) Includes Breakfast and Internet Access

### **Directions to SpringHill Suites from I-80:**

Exit at Highway 65 (65 originates at I-80 and goes North), go about 2 miles and exit on the right on Blue Oaks Blvd and keep to the left to East Blue Oaks Blvd. Turn right at the stop light onto Blue Oaks Blvd (going East). Turn right at the next stop light onto Fairway Drive and then immediately turn right into the SpringHill Suites parking lot.

# *Friday Evening Social*

**March 27<sup>th</sup>, 2009**

**Reception at PASCO 6:00-8:30 pm**

*Complimentary Refreshments*

**Invited Talk at 7:00 pm:**

## *“The History of PASCO”*

**Paul Stokstad Founder and President of PASCO**

Come hear how Paul started  
PASCO in his parents' garage 45 years ago.  
**PASCO** stands for Paul A. Stokstad Company.

## **Attention New Physics Teachers! PTSOS is here to help you!**

PTSOS is an NCN-AAPT-sponsored project funded by a donation from the Karl Brown Foundation that assists physics teachers in their vulnerable first years of teaching.

PTSOS has expanded and now offers two sets of three workshops; one at San Mateo High School hosted by Paul Robinson, Dan Burns, and Stephanie Finander, and the other at Rio Americano High School hosted by Dean Baird and Steve Keith.

The next workshop will be in the Fall. New teachers should email Stephanie Finander at [sfinander@aol.com](mailto:sfinander@aol.com) for more information on how to get signed up.



# Program

**SATURDAY, March 28**

**Morning Session, PASCO Lunchroom**

**7:45 Registration, Coffee, Donuts and Other Culinary Delights**

*Registration is free for first-time attendees and students*

*The rest of us pay only \$20—which includes lunch.*

*A bargain at twice the price!*

**8:55 Welcome and Announcements**

**9:00 Show & Tell**

Share your favorite demonstration or teaching tip. Since new teachers and section members will be at this meeting, you are encouraged to dust off some of your oldies but goodies. If you have handouts, please bring 75 copies. Time limit is 5 minutes per person or you risk the dreaded GONG!

**10:00 Teaching Physics with Multi-Station Activities**

**Invited Speaker: Charles Hunt**

**American River College, [HuntC@arc.losrios.edu](mailto:HuntC@arc.losrios.edu)**

Learn about an alternative to the traditional lecture with demonstrations. Get your students out of their seats and involved. The students rotate through 8 to 10 stations, performing micro-experiments usually done as demonstrations in front of the class. Students really seem to enjoy this approach and it involves a much more participatory style of learning.

*Program continued on next page*

## Program Continued

**11:00**      **Tour of PASCO**

**12:00**      **LUNCH: PASCO Lunchroom**

Lunch is included with your registration! Best of all, here's your opportunity to converse with interesting luminaries like yourself! Lunches will be a variety of sandwiches and sodas. Cookies for dessert!

**12:45-1:50**    **Business Meeting/PASCO Give-away**  
**Report from the Officers and other business.**



The employees at PASCO have cleaned out their closets. There is everything from Resonance Tubes to ScienceWorkshop® sensors.

This is demonstration equipment which we no longer exhibit at shows, or it is equipment which has been redesigned and no longer matches the catalog description.

PASCO's 5-year warranty does not apply to the equipment given away. But remember that technical support is always free at PASCO.

# Contributed Papers

## 2:00 What is an Electron?

**Richard Kidd, Diablo Valley College (retired),  
Pleasant Hill, CA      kiddri@sonoma.edu**

A student once asked me this question and appeared very dissatisfied when I replied that we have many precise measurements of its properties but no knowledge as to the electron's structure, leading it to be often considered to be a point particle. Recently, my interest in the question was rekindled by a plausible suggestion as to electron structure in a science fiction story. I calculated its feasibility along with those of some historical models, including several suggested by A. H. Compton, in terms of what we do know.

## 2:20 A Proof of the Maximal Efficiency of the Carnot Cycle

**Duygu Demirlioglu, Holy Names University,  
Oakland, CA      duygu@hnu.edu**

When discussing heat engines, standard physics textbooks state that the most efficient cycle operating between two reservoirs at fixed temperature is the Carnot cycle. On a PV diagram the Carnot cycle appears to be a peculiar figure bounded by two isotherms and two adiabats. How do we show students that this cycle is indeed the most efficient one? How do we prove Carnot's theorem in an elementary course? We will present a simple, visually elegant proof, a transformation of the oddly shaped Carnot cycle into a simple geometric figure, and a calculation of the efficiency of the cycle by essentially reading it off a diagram.

*Program continued on next page*

# Contributed Papers

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## 2:40 Orbiting Satellites and Elevators Through the Center of Earth

**Paul Robinson, San Mateo High School,  
San Mateo, CA      [laserpablo.com](http://laserpablo.com)**

Suppose you could bore a tunnel through the center of the earth. Further suppose you could pump all the air out of this tunnel to eliminate air friction. What would happen if you devised an elevator that dropped all the through to the other side? This would be one heck of a ride--such an elevator would be like an 8,000-mile Drop Zone at Great America! How long would it take for you to reach the other side of the earth? How long would a round trip be? And how fast would you end up going at the center of the earth? It turns out the round trip time of the elevator is exactly the same time it takes a satellite to orbit the earth—about 90 minutes! This means it would take the elevator 45 minutes to reach the other side of the earth—an impressive feat considering it required no fuel! Why is the time (or period) of the elevator the same as an orbiting satellite? The solution to this problem makes an excellent review problem for either introductory college or AP students.

## 3:00 Using YouTube Video in the Classroom

**CJ Chretien, Leadership Public Schools,  
Richmond, CA      [groovitude@gmail.com](mailto:groovitude@gmail.com)**

YouTube can be a great, and free, educational tool for the classroom as well as for your own professional development. I will give you some ideas of how you can use YouTube videos in your classroom as well as how to download YouTube videos since it is blocked at many schools. Lastly I will introduce the new NCNAAPT YouTube channel, which is a great way to share teaching ideas within our community.



# Contributed Papers

(continued)

## 3:20 IceCube, Bringing Cutting-Edge Science into the Classroom

**Casey O'Hara, Carlmont High School,  
Belmont, CA    [schmasey@stanfordalumni.org](mailto:schmasey@stanfordalumni.org)**

In December-January of 2009-2010, I will be going to the South Pole to work with researchers from the IceCube Neutrino Observatory, in conjunction with PolarTREC and the Knowles Science Teaching Foundation (KSTF). The IceCube telescope is the largest research project ever attempted in Antarctica, being built to map out the universe by detecting high-energy neutrinos and cosmic rays. I will be traveling as a PolarTREC teacher to the South Pole in December of 2009 to help work on the IceCube project, while working with five other KSTF Teaching Fellows to bring the IceCube project into our classrooms by following the expedition via an online journal and webinars. This collaboration is being used as a means of exciting students about current polar research and will allow students insight into what "real" scientists do. This presentation will focus on an overview of the IceCube Neutrino Observatory, and the nature of collaboration between IceCube, PolarTREC, and the Knowles Science Teaching Foundation.

## 3:40 One Year With a \$1000 High-Speed Video Camera

**Dean Baird, Rio Americano High School,  
Sacramento, CA    [dean@phys.org](mailto:dean@phys.org)**

The Casio EX-F1 is a digital still camera with first-in-its-class high-speed video capabilities. In addition to being able to capture full-resolution still images at 60 frames per second, it can capture video at 300, 600, and even 1200 fps. Since the standard video playback rate is 30 fps, the EX-F1 can "slow down" events to 1/10<sup>th</sup>, 1/20<sup>th</sup>, or 1/40<sup>th</sup> of their natural speed. For \$1000, you can be Harold Edgerton! One year later, no other consumer camera competes with the EX-F1 for high-speed captures. I'll show some clips and discuss the strengths and weaknesses of this breakthrough camera.

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# Contributed Papers

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## **4:00 Concept Mapping Software in a High School Physics Class"**

**Lee Trampleasure, Carondelet High School,  
Concord, CA      lee@trampleasure.net**

Concept maps, or graphic organizers, are a means to organize concepts to form a visual representation of the relationships between these concepts. Research shows that some students gain a better understanding by 'mapping' concepts in a spatial manner rather than the more traditional outline format. In my academically-diverse high school physics class, many students struggle to grasp the relationships between the words we use. I will present the software CmapTools, examples of concept maps created by my students (including hand-drawn maps), and results of a survey of these students on their perception of the value of CmapTools. CmapTools is free software that runs on Windows, Macs, and Linux. It is both robust and easy to learn. CmapTools was developed by the Institute for Machine and Human Cognition (of which I am not affiliated). IMHC also provides CmapServer, a free program that allows people to share maps over the internet.

## *End of Meeting*

## **Upcoming Events**

**2009 AAPT Topical Conference - Advanced Laboratories  
July 23-25 at University of Michigan - Ann Arbor, MI**

**Summer National AAPT Meeting, 2009, July 25-29, Ann Arbor, MI**

# **American Association of Physics Teachers**

**Northern California/Nevada Section  
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Attention: Physics Staff

Address Correction Requested



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