

NJAAPT Newsletter

April, 2007

President's Message

Spring arrived officially for the NJAAPT on Friday March 16 to mark the opening of our Sectional Meeting at Princeton University. Although it was greeted by snow and ice, a majority of those registered made their way to Jadwin Hall and enjoyed a wonderful evening with a buffet dinner and a very enlightening talk by Alan van Heuvelen.

As Saturday dawned and the first glimmer of sunlight appeared the Princeton area looked like a winter wonderland all coated in ice. Again, we were surprised and overjoyed by the response of the NJAAPT membership with a larger number of attendees than we anticipated early in the morning. Since all the speakers were present, we had a terrific time being informed about the latest research in physics education. Read Nancy Michaelson's article in the newsletter and John Roeder's summary on our website, and do not forget to look at the great photos from the event taken by **Jim Kovalcin**.

We are grateful to all our speakers, some of whom traveled a very long distance to be with us and to share their expertise. A special ***Thank You*** to **Jessie Blair** for coordinating the catering, decorating and registering the participants, **John Valente** for his assistance in making the event run smoothly, **Yitzhak Sharon** for his tireless effort in setting up the schedule along with **Eugenia Etkina**, **Paul LaMarche** of Princeton University for obtaining the necessary facilities, and **Ye Ma** of Princeton University for his technical assistance, and **Nancy**

Michaelson for her production of the program

What does all of this mean to the NJAAPT? It demonstrates that we are a section that has many members who are interested in the improvement of their backgrounds to provide the best possible education for their students. We applaud those who attended under adverse conditions for their dedication to the teaching profession. It also means that meetings that are planned are meaningful to the membership in a variety of ways. It shows that we are a vital and lively section that can be more involved in the methods that are used in the classroom by providing appropriate topics for workshops and meetings.

On this last point, as we prepared for the afternoon sessions, I was approached by a couple of members who proposed a topic for a workshop and asked for advice as to how to best implement the idea. This is what we hope to inspire – members who have a good thought as to what might interest other members. If you have some proposal for a workshop, please contact an executive board member and then attend an executive board meeting to make the formal proposal and request funding for the event. You have good ideas and why not share them with your colleagues. Think seriously about sponsoring a workshop and spreading what you do with the other members of the NJAAPT.

Ray Polomski

2007 Spring Sectional Meeting Report

By Nancy Michaelsen

“Neither rain nor snow nor sleet nor hail shall prevent...” That motto apparently also applies to those intrepid physics teachers who attended this year’s NJAAPT Section Meeting on March 16th & 17th. March, in its madness, didn’t win this round!

The theme of this year’s section meeting was Physics Education Research (PER), and how it impacts teaching and learning processes.

Friday evening started a bit late, as people arrived (safely!) at Princeton University, after braving the slippery roads from a severe winter storm. After some socializing and dinner, Alan van Heuvelen of Rutgers University spoke about Physics education and the changing needs of the workplace. This was followed by an interesting discussion among the participants, some of whom formerly worked in industry prior to teaching. The tour of the Princeton Observatory was cancelled, since weather wasn’t permitting.

Saturday was a full day, with five guest speakers and a brief talk by the Executive Director of AAPT. Approximately 75 people were in attendance.

Joe Redish from the University of Maryland discussed the insights from neuro-, cognitive-, and behavioral sciences in understanding students’ misconceptions, and how to use this knowledge to design learning environments.

Eugenia Etkina of Rutgers University spoke of the historical development and

the principles behind the Investigative Science Learning Environment (ISLE) method of teaching Physics.

Rachel Scherr from the University of Maryland discussed how to evaluate student reasoning by observing mechanistic reasoning, “sense-making” behaviors, and students’ gestures when discussing a science problem.

Toufic Hakim, the recently-appointed Executive Director of AAPT spoke about his vision for improving the benefits and outreach of the AAPT organization, and about the importance of articulating the relevance of physics education.

Bob Goodman, a recent NJ Teacher of the Year, spoke about the “Physics First” program that has been successfully adapted at Bergen County Technical HS, resulting in great improvements in science interest and enrollment, as well as increased AP participation and test scores.

Michael Lawrence, a teacher from West Orange High School and co-director of the Rutgers Astrophysics Institute, spoke of his experience in using Physics Education Research (PER) in his own teaching, and provided many examples and resources.

The meeting was quite interesting and informative; the only downside was not having enough time for further discussion. Some people expressed an interest in having future sessions on PER topics, where such presentations and discussions might continue.

The Executive Board, with help from a number of people, worked tirelessly to put the program together. Consider becoming involved for next year!

And, don’t forget that the summer AAPT National Meeting will be from July 28-August 1, in Greensboro, NC.

Fred Pregar's Demo Corner

Illustrate the rhyme:

No force on earth however great
Can stretch a wire however fine
Into a horizontal line
Unless of negligible weight.

Safety glasses are required with this one in case the cord snaps.

Have two students hold a long piece of strong cord horizontally, say from the front to the back of the room. Hang a weight on the cord at its center point. Try various weights starting with a kilogram mass and substitute smaller and smaller ones. In each case have the students pull on the cord to see if they can keep it from being pulled down at the center. Until you get the weight so small that the stiffness of the cord itself prevents it from sagging it will always be pulled down in the middle. If the cord is long enough just the weight of the cord will produce the sag. The sag is apparent if you sight along the cord, therefore the need for the safety glasses. There must be an upward force to counter the downward force of the weight and the only way it can be produced is with a vertical component of the tension in the cord. Therefore the cord cannot be horizontal; it must sag. To produce the equilibrant with the smallest amount of sag requires a very large tension.

You can analyze this with a vector diagram.

An example is a long towline, say a tugboat pulling a barge. The line always

sags. Ice storms often provide disastrous applications of this effect. If an electric wire is relatively taut between two poles a small amount of additional force pulling down on it will produce a lot of additional tension in the wire. A relatively thin coating of ice on the wire can cause it either to snap or to pull the pole over.

Cosmic Ray Detector Workshop

Rutgers University, in association with QuarkNet and the NJAAPT, will be holding a cosmic ray physics workshop on Saturday morning, May 19. This workshop is directed toward physics teachers and interested students. There will be an introduction to the physics of cosmic rays and a discussion of their possible sources. There will be a demonstration of the detection of cosmic rays using scintillator counters and a cloud chamber will be used to provide visualization of cosmic ray tracks. Current forefront research in cosmic rays will be presented in a talk on a large-area experiment in the Utah desert for detection of ultra-high energy cosmic rays. Four hours of NJ professional development credit will be available for participation in the workshop.

Following this introductory workshop, we plan to hold a series of follow-up workshops in the summer or fall in which cosmic ray detector kits will be distributed to interested teachers for use in their classrooms. We will provide instructions on their use at these

workshops and form a group that will communicate regularly by email and meet periodically to discuss physics and compare results and experiences. This group will also be a part of the North American Large-area Time-coincidence Array (NALTA) that allows high schools nationwide to share cosmic ray data and analyses through a distributed computing Grid. Please join us for great fun and physics as together explore one of the great mysteries of the universe.

For more information on the workshop, please contact Steve Schnetzer at steves@physics.rutgers.edu or by phone at (732)445-5035. RSVP by May 10 is appreciated.

Steamboat Trip on the Delaware River

Last call to reserve your spot for our trip on a restored steamboat on the Delaware River on Saturday, May 5. The trip departs from the Lambertville dock and proceeds along the river for a two-hour cruise. Imagine yourself onboard taking in the scenery of New Jersey and Pennsylvania with all the history that made this region famous. But the trip should also provide lessons that can be used in the classroom when discussing engines, steam power, and associated topics.

If you are interested, contact Joe Spaccavento at spacshelby@yahoo.com. The cost is \$20/adult and \$10/child when accompanied by an NJAAPT member.

AAPT Summer Meeting July 28 – Aug. 2, 2007

Will you be attending the AAPT Summer Meeting in Greensboro, NC? This is always a fun time and a way to refresh yourself in preparation for the upcoming school year.

This year's venue is at the University of North Carolina in Greensboro, NC. The setting is ideal for a family vacation and the scenery is supposed to be spectacular. Why not take the opportunity to meet physics teachers from around the country and partake in attending the interesting talks and paper sessions that are planned.

If you ask anyone who has attended even one of these, you will be surprised by their enthusiastic response – one that should make you want to go.

For further information on the theme of the meeting, lodging, registration, and what to do in the area, visit the official website: www.aapt.org.

AAPT Membership Offer

As a reminder to all of our membership that belonging to the NJAAPT does not automatically enroll you in the AAPT. The current structure of the AAPT is that the national is the umbrella organization which is responsible for the coordination of events and benefits of its members in the US and internationally. The section is a separate entity whose function is to serve its membership.

It is possible to belong to one and not the other or to belong to both. In an effort to increase the national base, the AAPT is offering what amounts to a year's membership at half the cost. For a person to take advantage of this, an application form must be completed and signed by the section representative to attest to the fact that the person is a section member in good standing. If you are interested in taking advantage of this opportunity, contact Joe Spaccavento at spacshelby@yahoo.com and request an application.

The AAPT is interested in attracting new members so this provides the means of reducing the financial cost to the professional. The criticism in the past has been that the dues are high and for some this has been the reason not to join. Discussions are now underway at the national to set up a series membership dues based on the person's job description and the magazines chosen as part of the package. This has been explained by the AAPT Executive Officer, Toufic Hakin at the AAPT Winter Meeting in Seattle and at our Spring Section Meeting in Princeton.

This is an opportunity that is too good to pass up – take advantage of it soon.

Items Affecting the NJAAPT

In the past various items that have a serious effect on the NJAAPT have been mentioned and it is important that the membership be aware of the impact that results.

- **Membership Renewal** – our dues have not changed in over 20 years and many have been associated with the NJAAPT for a very long time. Please check the date your membership expires on the mailing label and please keep your membership current.
- **Mailings** – most of our members are informed of the activities of the NJAAPT by mail. It is no surprise that in the past few years the cost of postage has risen and has done so again. Each time a newsletter is printed and sent by mail the cost exceeds \$200. In regard to reducing the operating expenses for the section, it would be desirable if we could become an organization that communicates with its members by electronic means – emails.
- **Email Addresses** – in conjunction with the mailings discussed above, the need to have a current email address for the receipt of information is crucial. If you have already provided an email address but it has changed, please send an email with the correct address to Ray Polomski: r7429@optonline.net for inclusion in the database. *Please consider receiving your information from us by email – it will help very much.*

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