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AAPT-CPS Newsletter

AAPT American Association of Physics Teachers
PHYSICS EDUCATION **CPS** Central Pennsylvania Section

www.aaptcps.org

VOLUME 7

JANURAY 10, 2012

Spring Meeting at University Park

by Mike Doncheski

Robert L. Park

An Air Force Officer during the Korean War, his study of physics began after the war at the University of Texas, where he graduated Phi Beta Kappa with High Honors in 1958. The Marston Fellow at Brown University, he was awarded a PhD in Physics in 1964. He was at Sandia National Laboratory until 1972, when he accepted an appointment as Professor of Physics and Director of the Center of Materials Research at the University of Maryland. Five years later he was named Chair of the Department of Physics and Astronomy. In 1983 he was recruited by the American Physical Society to open a Washington Office where he became the Washington Voice of Physics. For the next twenty years he divided his time between the University and the Washington Office, often testifying before Congress, appearing on television and radio news programs, and writing op-eds for major newspa-



Dr. Robert L. Park

pers. In 2003 he returned to the University full time. He continues to write his occasionally controversial column, What's New. He is the author of Voodoo Science: the Road from Foolishness to Fraud (Oxford, 2000), and Superstition: Belief in the Age of Science (Princeton, 2008).

THE LAST ENDANGERED SPECIES

Science has given Homo sapiens control of our planet, but few people are scientists. More than 90% of the population continues to hold unquestioning beliefs in superstition, making ignorance the greatest threat to the continued survival of our species. Science, with its insistence on openness and physical evidence, has a responsibility to inform the world of what is known about causes and cures, even if the truth offends some people. Examples range from reputed hazards of cell-phone radiation to cures by homeopathy and acupuncture.

Meet the Current AAPT-CPS

Executive Officers

President : Michael Gallis



Dr. Michael R. Gallis is an Assistant Professor of Physics at Penn State Schuylkill where he has been teaching since 1990. He received his PhD in Theoretical Physics from Penn State in 1990. His original research interests were in the Dynamics of Quantum Open Systems with applications to Quantum Decoherence and Measurement Theory. His current focus is on developing visual materials for use in Astronomy and Physics Courses, and maintains a YouTube channel for his 3-D animations.

Vice President : Stephen Van Hook



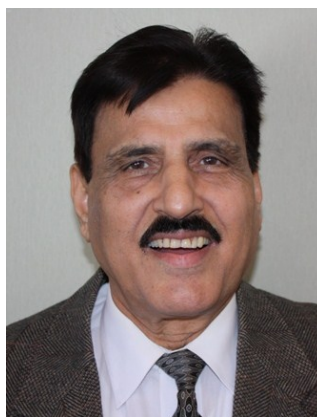
Dr. Stephen J. Van Hook is Lecturer in physics at Penn State University Park. He received his M.A. in physics from the University of California at Berkeley, and his PhD in physics from the University of Texas at Austin, where he worked in the Center for Nonlinear Dynamics. His current research interest is in Physics Education Research at both the K-12 and University level and he is the co-Director of the K-3 Research-based Inquiry Physics Experience (RIPE) project. He taught at Georgetown University and Bowling Green State University before coming to Penn State in 2007.

Secretary: Mehmet Goksu



Dr. Mehmet Goksu is an Assistant Professor of Physics at Millersville University of Pennsylvania since August 2007. He received his Ph.D. from Case Western Reserve University in 2002. He taught several Physics courses at Truman State University for three years as an assistant professor before he joined the faculty at Millersville. He is a condensed matter experimentalist with extensive experience in low temperature physics. His research interests include quantum computing, Edgemagnetoplasmons, projects on physics education, and renewable energy. He has a strong interest in sustainability and energy related issues are his passion. He has supervised several successful senior projects on renewable energy since he joined the department.

Treasurer : Sardari Khanna



Dr. Sardari Khanna is Professor of Physics at York College, Pennsylvania since 1965. He received his Ph.D. from Saugar University, India. His thesis was in the area of Solid State Physics. He has been on the E-Board of the Academic Senate as a Treasurer for the last 32 years. The York College has set up an Academic Senate Scholarship last year in his name to honor him for his long and distinguished service.

High School Rep : Dave McCachren



Dave McCachren has been teaching physics in the Mifflin County School District since 1973; currently at Mifflin County High School. He received his BS (1973) and Med (1977) in Physics Education from Indiana University of Pennsylvania. He has been a PTRA Representative since 1995.

Section Rep: Lynn Aldrich



Dr. Lynn K. Aldrich is an Associate Professor of Physics at Misericordia University and has been teaching physics there since 1988. She received her Ed.D. in Science Education from Temple University and her M.S. in Physics from the University of Alabama in Birmingham. Her research interests include topics in Physics Education such as self-efficacy in pre-service elementary teachers of science and service learning in introductory physics classes.

Meet the Current AAPT-CPS Executive Officers

Two Year College: Greg Dolise



Gregory Dolise is an Associate Professor of Physics at Harrisburg Area Community College. He teaches astronomy as well as physics courses in traditional and online formats. Greg has worked in the aerospace sector, where he specialized in star simulation and space optics. An early job was with Perkin-Elmer on the Hubble Space Telescope. Greg performed measurements for vibration testing of the secondary mirror, and helped with design and fabrication of the star simulator to test the Optical Control system and Fine Guidance System of HST. Later jobs with Bendix Aerospace involved star simulation for satellite navigation systems. Greg has written test banks for astronomy and physics texts and is currently involved in a project for teacher certification exams.

Web Master: John Reid



Dr. John D. Reid has been a Professor of Physics at Lock Haven University since 1997. From 1981-1985 he worked for 4 years at Lockheed Missiles and Space Co., in Sunnyvale, CA, as a Satellite Operations Engineer. He received his Ph.D. in Experimental High Energy Physics from Penn State in 1993. Before teaching at Lock Haven, he did his graduate work on Charmonium Spectroscopy at Fermilab, and postdoctoral work with Penn State and Vanderbilt University on Strange Quark Matter at Brookhaven Lab.

Past President : Michael Doncheski



Dr. Michael A. Doncheski is a Professor of Physics at Penn State - Mont Alto and has been teaching physics there since 1996. He received his PhD in Theoretical Elementary Particle Physics from Penn State in 1990, and prior to his current position held postdoctoral research appointments at the University of Wisconsin - Madison and Carleton University in Ottawa, Ontario. His research interests include Beyond the Standard Model Physics and Visualization Techniques in Teaching Quantum Mechanics.

AAPT-CPS Spring 2011 Conference

The 59th Annual Conference of the American Association of Physics Teachers, Central Pennsylvania Section (AAPT-CPS) was held Friday the 11th and Saturday the 12th of March 2011 at Penn State Schuylkill. Dr. Mike Gallis, from Penn State Schuylkill, was responsible for organizing the conference.

There was an all day workshop on Friday run by the Physics Teachers Resource Agents (PRTA) for physics teachers. The workshop, entitled *Using Engineering to Teach Physics Concepts*, provided an opportunity to share ideas for using engineering projects to learn basic Physics concepts. Dave McCachren of Mifflin County High School in Lewistown, PA and Pat Callahan of Delaware Valley Regional High School in Frenchtown, NJ conducted the workshop.

The poster session was held Friday afternoon followed by the conference reception and banquet at the Hidden Streams Café of Penn State Schuylkill. After the banquet dinner, Dr. Stephen Couch, Director of Academic Affairs of Penn State Schuylkill, gave a welcoming address. The public keynote address was held in the Morgan Auditorium at Penn State Mont Alto. The address, *From Scopes to Kitzmiller: The Legal Battle Regarding Teaching Evolution in Public Schools*, was presented The Honorable Judge John E. Jones III, perhaps best known for his landmark ruling in the intelligent design case, *Kitzmiller v. Dover Area School District* in which the teaching of intelligent design in public school science classes was ruled to be unconstitutional. His talk traced the legal cases starting with the Scopes trial in Tennessee up to today, including *Kitzmiller*, and highlight the reasons for the jurisprudential progression.

Morning and afternoon plenary sessions were held on Saturday. There were 10 oral presentations. The presentations were well attended, and covered a variety of topics pertaining to physics and physics education.

The General Business meeting was held before lunch. After the afternoon plenary session, there was a Demo Show (an idea picked up from the joint meeting with SEPA section the previous year), presentation of award certificates to student presenters and drawing for door prizes.

Physics Demonstration Page: The Glowing Pickle

-by Mike Doncheski, Penn State Mont Alto

This is an interesting demonstration that is sure to get a standing ovation. Followed by everyone trying to exit the room due to the interesting smell generated. I first saw this demonstration in the classic Penn and Teller book, *How to Play with Your Food* (Villard Books, New York, 1992), but it was used by Don Herbert (Mr. Wizard) on The Tonight Show with Johnny Carson, January 24, 1990. I am not aware of any earlier public appearances of the glowing pickle.

There are also some scholarly publications about the glowing pickle, for example:

1. Jeffrey R. Appling, Fredrick J. Yonke, Richard A. Edgington and Steve Jacobs, *J. Chem. Educ.* **70**, 1993, p. 250
2. Peter M. Weimer and Rubin Battino, *J. Chem. Educ.* **73**, 1996, p. 456
3. Michelle M. Rizzo, Tracy A. Halmi, Alan J. Jircitano, Martin G. Kociolek, Jerry A. Magraw and David L. Dozark, *J. Chem. Educ.* **82**, 2005, p. 545.

This is a physicist's version of the flame test; the brine in which the cucumber is pickled to produce a dill pickle provides an excellent source of sodium and enough conductivity so that Ohmic heating can burn the cucumber. That provides the energy to excite electron in sodium; the de-excitation of electrons produces sodium D line emission at 589.00 nm and 589.59 nm.

The demo is fairly easy to set up, and I've seen or heard of a variety of arrangements; Penn & Teller's "Pickle machine" is a very polished and permanent piece of apparatus, but you can put one together with some items that are, no doubt, sitting around unused in your physics lab:

1. Take an old but serviceable extension cord (2 prong plug is fine), separate the wires and attach alligator clips.
2. Hold the dill pickle vertically in a beaker clamp on a ring stand.
3. Put 2 screws or nails ("electrodes") into the pickle; I put the electrodes horizontally, one near the top and the other near the bottom.
4. Attach alligator clips to electrode.
5. Plug in, wait about 10 seconds then bask in the yellow-orange glow!

Cautions: the body of the pickle will be consumed near the electrodes, so at some point one or the other electrode will loosen to the point that it falls out.

Fun:

1. With enough hands (probably 2 people), you can actually run the light through a grating spectrometer and observe the sodium D lines.
2. The pickle will glow near one electrode or the other, so approx. half the pickle will light up; I recall a situation where the glow flipped from one electrode to the other, but I wouldn't swear to it. I haven't explored why it's one electrode or the other.
3. Penn and Teller discuss "The Incredibly Dangerous Glowing Pickle Machine" in *How to Play With Your Food*. "When a regular old dill pickle is skewered on two metal pins and 110 ac, regular old U.S. of A. house current is run through the pins, the pickle glows a ghostly yellow. It's the most beautifully goofy science thing you will ever see."

<http://www.youtube.com/watch?v=MNuxYqT87X8>

<http://www.uselessinformation.org/pickle/index.html>



Open Source Physics Resources

This workshop is a great chance to interact and share ideas with other physics teachers. It will focus on Open Source Physics. Many resources will be demonstrated as well as showing resources that are available for your use. There will be many hands on activities and a chance to discuss how to implement these activities in your classroom. This is a great opportunity to meet with physics teachers from other schools, learn what they are doing, and discuss and exchange ideas.

Physics is much more than a body of knowledge. It embodies habits of thought, philosophical attitudes, broad concepts, and basic skills that can be developed slowly all year and can last a lifetime. Please bring to the workshop a “best” practice that you have found to be effective that you would be willing to share with the other participants. These exchanges of ideas are valuable to all of us as we practice the art of teaching physics.



AAPT-CPS

From the AAPT-CPS Constitution...

The objectives of the Central PA Section of the American Association of Physics Teachers (AAPT-CPS) are to:

- advance the teaching of physics in the colleges and universities of Central Pennsylvania and environs,
- promote a professional spirit and acquaintanceship among the members of the Section, and
- encourage instruction in physics in the secondary schools of the region served by the Section.

OTHER NEWS:

- Please visit the Section website: <http://www.aaptcps.org> which contains lots of useful information and links to Physics teaching resources.
- Volunteers for executive board membership are always welcome; please contact any current board member for information about serving!
- PTRA workshop to be held in Fall 2012 location to be determined.
- The AAPT-CPS Annual Meeting and PTRA workshop will be held in Spring 2013 at Millersville University; further information to follow.

Newsletter compiled by Mike Doncheski. Please direct all comments and submissions to mad10@psu.edu