Fall 2023 Meeting

Southeast PA Section

of the American Association of Physics Teachers

Hosted by the Department of Physics at Widener University
Coordinated by Dr.Xin Du xdu@widener.edu

Friday evening, October 20, 2023
Joint Meeting with the Delaware Valley Amateur Astronomers (DVAA)
Radnor Township Building, 301 Iven Ave., Wayne, PA 19087
Radnorshire Room; use 2nd floor entrance to building
This portion of the meeting will be live streamed via YouTube.

7:00-7:30 **Arrival, Socializing Time**

7:30-7:40 **Welcoming Remarks**
DVAA & SEPS Staff

7:40-8:00 **DVAA Committee Presentations**

8:00-9:30 **Invited Speaker**
Dr. Paul T. Baker, Assistant Professor of Physics, Widener University:
Hearing the gravitational wave background with a galaxy-sized detector

This past June the North American Nanohertz Observatory for Gravitational Waves (NANOGrav) and other members of the International Pulsar Timing Array (IPTA) published the first evidence for the stochastic gravitational wave background. The observed signal is consistent with one produced by an ensemble of many supermassive black hole binaries in distant galaxies. We will discuss sources of very low-frequency gravitational waves, and how a pulsar timing array, like NANOGrav, works to detect them. Then we will discuss the signal that NANOGrav observed and compare the findings to those from our IPTA colleagues.

Saturday morning, October 21, 2023
Widener University
Kapelski Learning Center, 658 E 14th St, Chester, PA 19013

8:00 **Registration Table opens** Kapelski Learning Center Lobby

8:30-9:15 **Registration/Breakfast** Kapelski Learning Center Lobby
Continental breakfast catered by Widener University

9:15-9:30 **Welcoming Remarks** Kapelski Learning Center 100
Paula Miller, Abraham Lincoln High School - *President, AAPT-SEPS*

Xin Du, Widener University: Welcome to Widener's main campus

9:30-10:30 **GuestSpeaker** Kapelski Learning Center 100

Dr. Eric Brewe, Drexel University: *Modeling Instruction, student engagement, and neurobiological impacts*

Modeling Instruction is an active learning strategy for introductory physics built on the premise that science proceeds through the iterative process of model construction, development, deployment and revision. We describe the role that participating in a Modeling Instruction class has in learning and then explore how students engage in this process in the classroom. We begin with a background on models and modeling and describe how these theoretical elements are enacted in the introductory university physics classroom. Recent work has been a neuroimaging study of students pre and post-instruction. We describe the development of this project, the varied analyses of

neuroimaging data in an educational context, and the findings. Among the findings are neurobiological changes pre to post instruction, differences in activation patterns during physics reasoning tasks, and identification of a three-part brain network that correlates with science anxiety during resting state. We conclude with a discussion of future work.

10:30-11:00 **Coffee Break** Kapelski Learning Center Lobby

11:00-11:45 **Invited Speaker** ***(via Zoom)*** Kapelski Learning Center 100

Mary Spruill, Executive Director of National Energy Education Development (NEED) Project

Started in 1980, The National Energy Education Development (NEED) Project began as a one-day celebration of energy education when National Energy Education Day was recognized by a Joint Congressional Resolution. In the same year, President Jimmy Carter issued a Presidential Proclamation stressing the need for comprehensive energy education in our schools, a reduction in our dependence of fossil fuels, and increasing energy efficiency and the use of renewable energy technologies. Since its founding over 40 years ago, NEED has kept its Kids Teaching Kids philosophy as a fundamental principle of NEED programming – encouraging students to explore, experiment, engage, and encouraging teachers to embrace student leadership in the classroom. NEED trains and assists teachers in harnessing the energy of the classroom – the energy of students. NEED is expanding and evolving to best meet the needs of both teachers and students – in the classroom and beyond. In just the last decade The NEED Project has grown to encompass a curriculum portfolio of 100+ teacher and student guides designed to engage and teach teachers and students about energy. At the same time, the training opportunities offered by NEED expanded to include a variety of teacher professional development and training for educators and school district energy personnel as well. NEED's work in after school programs, student clubs, scouting groups, and home school networks also continues to grow.

12:00-12:30 **Business Meeting** Kapelski Learning Center 100

12:30-1:30 **Lunch –** *catered by Widener University Boxed Sandwiches*
Kapelski Learning Center Lobby

Poster Session

- Geoff Nunes - Web-based Video Analysis for Student Experiment.
- Doug Kurtze – Demystifying Separation of Variables

1:30 – 3:30 **Demonstrations and Contributed Talks**
Kapelski Learning Center 100

- Bob Schwartz - An investigation of a wireless charger
- Craig Halpern - An old take on the centripetal force lab
- Jay Bagley - The innovation of unmanned vehicles and how they are presently being used in the sciences
- Bill Berner - A Gatorade Altimeter
- Martin Melhus - Numerical Integration of Trajectories at a Student Level
- Andrei Blinkouski - Integrated Curriculum in Mechanics and Calculus-I at Penn State Abington within the NSF S-STEM Project
- Barry Feierman - Lie detector, Ohm's Law, tricky circuit, projectile motion
- Jim Ferrara - Changes to the AP Physics exams

Thank you for attending the 2023 AAPT SEPS Fall Meeting!
Safe travels home, and we hope to see you for our next meeting!
Thank you to Widener University for hosting our meeting!

Widener University

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