

Spring 2019 Meeting of the Southeast PA Section (SEPS) of the AAPT

March 29-30, 2019

Hosted by the Department of Physics at Villanova University

Registration: <http://tinyurl.com/aapt-seps-2019>

Early Bird Deadline 3/25

Friday evening, March 29, 2019

6:00-7:15 **Dinner + Registration**

dinner catered by Maggiano's, King of Prussia

7:30-9:00 **Bill Berner, University of Pennsylvania**

***Educational Boundary Conditions: A Report from the
High School – College Discontinuity Zone***

9:00 - ??? **Astronomy Observing (weather permitting)**

Saturday, March 30, 2019

8:00-9:00 **Registration/Breakfast**

Hot breakfast catered by Villanova University

9:15-10:30 **Eugenia Etkina, Rutgers University**

***Investigative Science Learning Environment (ISLE):
Learning Physics by Practicing It***

10:45 – 11:45 **Angelo Armenti, Villanova University**

The Physics of Sports and Excel Spreadsheets

12:15-1:30 **Lunch,**

Poster Session, and Informal Tours of Villanova Labs

1:30 – 2:30 **Contributed Papers and Demos**

1:30 – 2:30 **Saturday afternoon workshop:**

*“Eight Challenging Labs for High School / College”
Led by Barry Feierman, Westtown HS (ret.)*

3:00 - ??? **Post-Conference Discussion / Wrap-Up**

Please contact meeting host, Jeremy Carlo, with any questions!

jeremy.carlo@villanova.edu

Abstracts for Invited Presentations

Friday evening invited speaker: Bill Berner, University of Pennsylvania

*“Educational Boundary Conditions: A Report From the
High School – College Discontinuity Zone”*

A distillation of insights, highlights and hindsights gleaned from 50 years in high school and college physics classrooms. Or more to the point, an embarrassed admission that I could have done this job a lot better if I had lived my life backwards.

Saturday invited speaker: Eugenia Etkina, Rutgers University

*“Investigative Science Learning Environment (ISLE):
Learning Physics by Practicing It”*

Success in the 21st century is determined by one’s ability to pose problems and seek multiple solutions, to evaluate assumptions, and to cope with uncertainty in the answer. Around the world the knowledge of content (conceptual and quantitative) stops being the only goal of education. The engagement in the processes of science emerges as another equally important goal. How do we help our students achieve both? In this talk I will describe a learning system for physics courses that naturally and seamlessly engages students in the above practices, helps them develop the 21st century abilities, and can be implemented without major revisions to the infrastructure. The learning system, called Investigative Science Learning Environment (ISLE), helps student learn physics by systematically engaging them in the processes that mirror the practice of physics. It is based on the findings of brain research, history of physics, and physics education research and is supported by a set of comprehensive curriculum materials and numerous studies of student learning. In this talk I will discuss elements of ISLE and show how to use ISLE framework to design curriculum materials with examples from DC circuits and optics.

Saturday invited speaker: Angelo Armenti, Villanova University

“The Physics of Sports and Excel Spreadsheets”

The physics of many sports—including e.g., baseball, softball, tennis, soccer and golf—requires solving coupled differential equations in order to predict the trajectories of those various projectiles. Because of their strong math backgrounds, physics and science majors can readily handle air-resistance forces compounded with Bernoulli lift forces that affect the motion of all spinning objects. The students in my Physics of Sports course for arts majors typically lack strong math backgrounds but are receptive to learning how to solve those same real projectile motion problems using difference equations to calculate and plot the various trajectories quite accurately using Excel software. Spreadsheets appear well suited to calculate and project the trajectories of spinning baseballs, tennis balls, and golf balls.

Saturday afternoon workshop: Barry Feierman, Westtown School (ret.)

“Eight Challenging Labs for High School / College”

Barry Feierman will set up eight tables of demos/labs that will be challenging for the best of your students. Over a forty year career, teaching at both the high school and college levels, he has managed to come up with some labs that are a challenge conceptually or mathematically (or both). Topics will include motion, dynamics, conservation of energy, electric circuits, thermodynamics, and resonance.