

NJAAPT

**New Jersey
American Association
of Physics Teachers**



**Spring 2014
Section
Meeting**

**March 14-15, 2014
Princeton University**

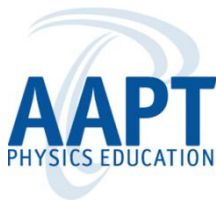
Welcome to the New Jersey AAPT Spring Section Meeting!

The title and focus of the 2014 section meeting is “*New Directions in Physics and Physics Education*”, with discussions on Dark Matter (Friday Dinner Meeting), the Next Generation Science Standards (NGSS), the AP Physics course revisions, and ending with participatory sessions in small breakout groups and a Demonstration Share-A-Thon.

Special thanks to Geoffrey Gettelfinger from Princeton University for his help and the use of Princeton facilities. Thanks also to the Executive Board for all of their planning efforts, and to Jessie Blair for coordinating the catering arrangements.

We especially thank our guest speakers, who have taken time out of their busy schedules to be here.

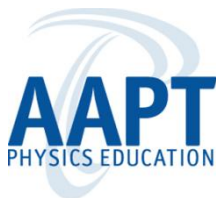
We hope that you will find the meeting informative and enjoyable, and we look forward to seeing you at future events.



NJAAPT EXECUTIVE BOARD

<i>Ray Polomski</i>	President
<i>John Valente</i>	Vice-President
<i>Tiberiu Dragoiu</i>	Treasurer
<i>Nancy Michaelsen</i>	Recording Secretary
<i>Joseph Spaccavento</i>	AAPT Section Rep.

***Jessie Blair
Pat Drury
Jim Ferrara
Dan Kaplan
Dave Maiullo
Yitzhak Sharon
Justin Son
Rich Urban***



SCHEDULE of EVENTS

Friday March 14, 2014

Jadwin Hall

- 5:00 – 6:00 p.m. Registration,
Wine and Cheese Reception
- 6:00 – 7:00 p.m. Dinner -- Buffet style in the
Joseph Henry Room
- 7:00 – 8:30 p.m. **Chuck Keeton**
Rutgers University
*“A Ray of Light in a Sea of Dark
Matter”*

SCHEDULE of EVENTS

Saturday March 15, 2014

McDonnell Hall

- 8:00 – 9:00 a.m. Registration,
Coffee, Tea, Bagels
- 9:00 – 9:10 a.m. Introduction and Welcome:
Ray Polomski
President NJAAPT
- 9:10 – 10:10 a.m. **Will Vanderveen**
RVCC
*“Are You Ready for the “Next
Generation” Science Classroom?”*
- 10:10–10:25 p.m. Break
- 10:25-11:25 p.m. **Joe Stieve**
“AP Physics Course Revisions”

11:25 – 12:40 p.m. Lunch

12:45 – 1:30 p.m. Breakout Session I
Attend one of the following:

- *NGSS*
- *New AP courses*
- *SGO*

1:30 – 2:15 p.m. Breakout Session II
Attend one of the following:

- *NGSS*
- *New AP courses*
- *SGO*

2:15-2:30 Break, set-up for demonstrations

2:30 – 3:30 p.m. **Demonstration Share-A-Thon**
Spring Meeting attendees will share demonstrations and ideas.

- Justin Son
- Dan Kaplan
- Pat Drury

Charles R. Keeton II

Rutgers University
New Brunswick, NJ

*“A Ray of Light in a Sea
of Dark Matter”*



Like other astronomers of his generation, Charles Keeton attributes his interest in space to the success of the Voyager missions and the Space Shuttle program in the 1970s and 1980s. After earning a B.A. from Cornell University and Ph.D. from Harvard University, Dr. Keeton did research at the University of Arizona and the University of Chicago before joining the faculty of Rutgers University in 2004. Dr. Keeton has observed with the Hubble Space Telescope as well as observatories in Arizona, Hawaii, and Chile. His research has been featured by National Public Radio, MSNBC.com, and New Scientist magazine.

In 2010, Dr. Keeton received the Presidential Early Career Award for Scientists and Engineers from President Obama.

A Ray of Light in a Sea of Dark Matter

What's in the dark? That question that has been asked by generations of children and cosmologists alike. The answer, in our universe, turns out to be surprising and rich. The space between stars is filled with an exotic substance called "dark matter" that exerts gravity but does not emit, absorb, or reflect light. The space between galaxies is rife with "dark energy" that creates a sort of cosmic anti-gravity causing the expansion of the universe to accelerate. Together, dark matter and dark energy account for 95% of the content of the universe.

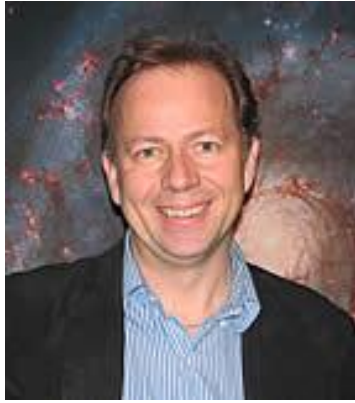
Cosmologists face a conundrum: how can we study substances we cannot see, let alone manipulate? A powerful approach is to observe objects whose motion is influenced by gravity. The principle of using motion to study mass has been applied to planets, stars, galaxies -- and even light itself. Einstein predicted that gravity can act like a lens to bend light, but he failed to foresee how rich the phenomenon could be. Today we see hundreds of cases where the gravity of a distant galaxy distorts our view of a more distant object, creating multiple images or spectacular arcs on the sky. This book presents an accessible description of how gravity affects light and how astronomers use it to probe dark matter. Gravitational lensing is now a key part of the international quest to understand the invisible substance that surrounds us, penetrates us, and binds the universe together.

<http://www.physics.rutgers.edu/~keeton/>

Wil van der Veen

Raritan Valley Community College

*“Are You Ready for the
“Next Generation” Science Classroom?”*



Dr. Wil van der Veen has a Ph.D. in astrophysics from the University of Leiden (Netherlands). He has been involved in astronomy research for over fifteen years. Currently Dr. van der Veen is the Director of the Science Education Institute at the New Jersey Astronomy Center at Raritan Valley Community College. He has designed and presented hundreds of workshops in astronomy, general science, and inquiry-based learning both nationally and internationally (Thailand, Jordan). Currently he is involved in several programs to help K-12 educators and school districts prepare for the implementation of the Next Generation Science Standards.

Are You Ready for the “Next Generation” Science Classroom?

The State of New Jersey has started the formal process of adopting the Next Generation Science Standards (NGSS). When adopted, implementation is expected to begin in the 2015-2016 school year. These new standards will likely affect all aspects of science teaching and learning for at least the next decade.

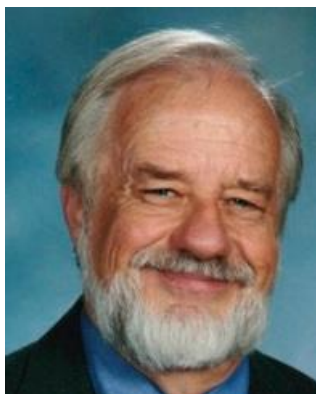
The NGSS presents a new vision for science education and is based on *A Framework for K–12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. This Framework provides our best understanding of how our nation’s students learn science and what is needed to create a competitive 21st century workforce. The Framework further provides justification for the conceptual shifts that the NGSS presents, and helps to illuminate what is new and different about the NGSS compared to current classroom practices. The main impetus for the NGSS and the Framework is the idea that K-12 science instruction be built around three dimensions that are intertwined and mutually supportive: Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas.

This presentation will provide an introduction to the NGSS and the Framework on which it is based. We will briefly reflect on how these new standards may affect physics instruction. The breakout sessions will provide additional opportunities to discuss the potential implications of the NGSS for the “next generation” science classroom.

Joe Stieve

Retired Physics Instructor,
AP Physics Consultant

“AP Physics Course Revisions”



Joe Stieve retired last June after forty-eight years as a high school physics teacher. He taught AP Physics for forty of those years in a large variety of public and private high schools. He has a MS in physics from Purdue University. Joe has been a College Board AP Physics consultant since 1985 and was an AP Reader/Grader over a period of ten-years. He has presented many one-day AP Physics workshops and been the instructor for AP Physics summer institutes at a large number of institutions. He is continuing his training and work with the College Board during the transition to the new AP Physics courses.

Abstract:

In 2002 the National Research Council released the results of a two-year study of high school instruction in mathematics and science, in which suggestions were made to improve those programs. The College Board at that time decided to undertake a study of its Advanced Placement programs and Exams. In response to those studies new curricula and exams for the various science have been gradually introduced. The AP Physics B has been totally reworked into two new courses, AP Physics 1 & 2. These courses will be in place starting with the 2014-2015 school year. Today's presentation and breakout session discussions will be about these revisions in the approach and content for the introductory algebra and trigonometry based AP Physics courses.

Demo Share-A-Thon

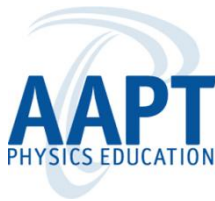
Dan Kaplan, Manalapan HS

John Valente, MAST HS

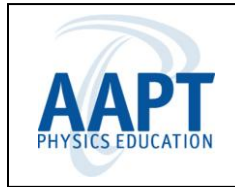
Justin Son, Marlboro HS

Pat Drury, Lenape Valley Regional HS

Ann Tabor-Morris, Georgian Court University



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