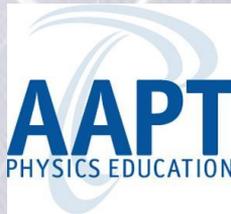


**NJAAPT**

**New Jersey  
American Association  
Of Physics Teachers**



**Spring 2012  
Section Meeting**

**March 23-24, 2012  
Princeton University**

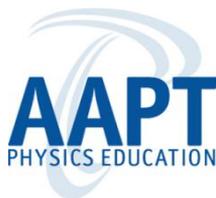
# *Welcome to the New Jersey AAPT Spring Section Meeting!*

The title and focus of the 2012 section meeting is. “*Modern Marvels*”, with topics ranging from modern infrastructure to the energy that makes the marvels of this world possible.

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

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***

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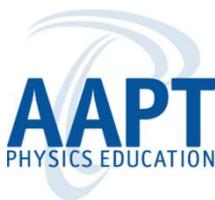
***Jim Ferrara***

***Dave Maiullo***

***Nancy Michaelson***

***Yitzhak Sharon***

***Rich Urban***



# **SCHEDULE of EVENTS**

**Friday March 23, 2012**

## **Jadwin Hall**

- 5:30 – 6:30 p.m. Registration,  
Wine and Cheese Reception
- 6:30 – 7:30 p.m. Dinner -- Buffet style in the  
Joseph Henry Room
- 7:45 – 9:00 p.m. **Jim Krutzler.**  
JK Electrical Services, LLC.  
Cyclotronix, LLC  
*“ My Journey with the Sun ”*

# *SCHEDULE of EVENTS*

**Saturday March 24, 2012**

**McDonnell Hall**

- 8:00 – 9:00 a.m. Registration,  
Coffee, Tea, Bagels
- 9:00 – 9:15 a.m. Introduction and Welcome:  
**Ray Polomski**  
President of NJAAPT
- 9:15 – 10:15 a.m. **Alfonso Gandica**  
Stockton College  
*"Renewable Energy Sources Options"*
- 10:15 – 10:30 a.m. Break
- 10:30 – 11:30 a.m. **Dennis Stabile**  
Port Authority NY/NJ  
*"Bayonne Bridge Navigational  
Clearance Program "*

11:30 – 12:30 p.m. Lunch (included)

12:30 – 1:30 p.m. **Craig Arnold**  
Princeton University  
*"The Mechanics of Electrochemical  
Energy Storage"*

1:30 – 2:00 p.m. Break, Section Announcements

2:00 – 3:00 p.m. **JoEllen Burns Muntz**  
Exelon Nuclear  
*"Nuclear Energy Looking Forward"*

3:00 – 4:00 p.m. **James Olsen,**  
Princeton University  
*"Demo Show"*

# **Jim Krutzler**

JK Electrical Services, LLC.  
Cyclotronix, LLC

*“My Journey with the Sun”*



Jim Krutzler graduated as valedictorian from Middlesex County Vocational and Technical High School in electrical trades and then entered the workforce. He has always been fascinated with electrical and mechanical equipment even before he learned to walk. As the years went by, he often found himself involved with hobbies such as Ham Radio, Photography, Construction, Electronics, Computers and many other avenues of interests. At an early age Jim learned the value of energy and the cost to produce it. Soon thereafter, small solar cells started to appear in calculators and similar devices, and he was intrigued from that point

on that something could produce what appeared to be free power.

From 1998 to the present, Jim has owned and operated a successful electrical contracting company and now recently, along with three others, formed an engineering firm engaged in R&D for the accelerator industry

### **My Journey With The Sun**

There is quite a bit related to solar energy and I can't honestly say I know it all, but I have studied, experimented, installed, and redesigned several systems and types of solar technologies for my own home and I feel I must speak from my own experiences sharing what I have learned, thus the title for my talk "My Journey with The Sun"

I will explain the three types of commercially available solar collectors I have used: PV (photo voltaic) , Flat plate, and Evacuated tube. I will also discuss how I got started with Solar Energy.

Mostly I will speak on the systems I have in use today, how they were constructed, how they work, real world production, the hurdles I faced, and how it was paid for. I'll also speak of my heating system designs and how they are tailored to work with Solar, and address the issues (pros and cons) of being on the grid vs. off the grid.

#### **Website:**

Solar projects: <http://madpower.com/solar/>

Main website: <http://madpower.com/>

# Alfonso Gandica

Stockton College  
Natural Sciences and Mathematics  
School

*“Renewable Energy Sources Options”*



Alfonso Gandica came to this country in 1967 to complete his undergraduate studies in Chemical Engineering at the University of Pittsburgh as a transfer student from Universidad de Los Andes in Bogotá, Colombia. He then completed his graduate work at Pitt, and came to The Richard Stockton College of New Jersey in Pomona, NJ to start the Information and Systems Science Department in 1972.

He joined Atlantic City Electric Company in May 1977 where he held the positions of Procedures Analyst, Systems Analyst, Corporate Planning Systems Coordinator, Manager of Strategic Planning, Manager of Corporate Planning and Senior Engineer, and retired in 1998. He was also Atlantic City Electric's Project Manager for Stockton's Geothermal Field Project and

the Photovoltaic Project on the roof of the Arts & Sciences Building in the mid-1990s,

He is the President and Owner of Strategic Systems Associates (Linwood, NJ) that provides planning and environmental consulting to health organizations, small business, Hispanic business, and international oil and gas exploration companies.

He has been teaching as an Adjunct Professor at Stockton in the Natural Sciences and Mathematics School and the General Studies Division since 1978. He developed a very popular interdisciplinary seminar (“Energy and Ethics”) to help students become more aware of the U.S. energy situation and its economic, environmental and political factors. He also teaches an “Introduction to Latin America and The Caribbean” in the Fall semester.

He is the founder of the Atlantic County Chapter of the American Heart Association and has been a member of the Atlantic Cape Community College’s Board of Trustees, and the Stockton Foundation’s Board of Trustees. He was appointed by Governor Christine Whitman to the New Jersey Commission on Radiation Protection (CORP) in 1996 and has been a member since. He lives with his wife Esther in Linwood, NJ and enjoy their grandchildren in Chicago and northern New Jersey.

### **Renewable Energy Sources Options**

This talk will review the current energy situation in the U.S. and the world with its geopolitical, economic and environmental dimensions. The technical aspects, economics and environmental effects of solar, wind, biomass and geothermal energy sources (the **SWBGES**) will be discussed along with the “Energyville” simulation game developed by The Economist Consulting Group for Chevron. Special emphasis will be given to “**Reinventing Fire: Bold Business Solutions for the new Energy Era,**” the recently published book by Amory Lovins from the Rocky Mountain Institute.

# Dennis Stabile, PMP

Program Manager,  
Bayonne Bridge Navigational Clearance Program  
Tunnels, Bridges & Terminals Department  
Port Authority of NY & NJ

*” Bayonne Bridge  
Navigational Clearance Program”*



Dennis Stabile is employed by the Port Authority of NY and NJ. His current position is Program Manager - Bayonne Bridge Navigational Clearance Program. He is a certified Project Management Professional (PMP) and has a Bachelor of Science Degree in Mechanical Engineering from Manhattan College and a Masters Degree in Business Administration from Baruch College. He began his career with the Port Authority seventeen years ago as a Mechanical

Design Engineer in the Engineering Department. For the last ten years, Dennis has worked in increasingly responsible positions for the Tunnels, Bridges and Terminals Department in the area of Project/Program Management. His portfolio includes managing various engineering /construction projects on the George Washington Bridge, Goethals Bridge, Outerbridge Crossing and Bayonne Bridge as well as serving as Program Manager for the Capital and Operating Program for all three Port Authority Staten Island Bridges. In his current position as Program Manager for the Bayonne Bridge Navigational Clearance Program, Dennis is responsible for the overall management of the scope, schedule and budget of this \$1 Billion program.

### **Bayonne Bridge Navigational Clearance Program**

The Bayonne Bridge, an historical civic engineering landmark, is the fourth longest steel arch bridge in the world, and was the longest in the world at the time of its completion (1931). It connects Bayonne, NJ, with Staten Island, NY, spanning the Kill Van Kull. The primary purpose of the bridge was to allow vehicular traffic from Staten Island to reach Manhattan via the Holland Tunnel.

Today, the 151-foot air draft restriction beneath the Bayonne Bridge is an obstacle for larger ships doing business with marine terminals west of the Bridge. As a result, in December 2010, the Port Authority announced the "Raise the Roadway" alternative to provide the most effective solution to the Bayonne Bridge clearance issue — raising the bridge's roadway to approximately 215 feet to increase the existing 151-foot navigational clearance restrictions. The 64 feet of additional air draft will allow the Port of New York and New Jersey to benefit from the increased deployment of larger, operationally efficient and environmentally beneficial vessels.

# JoEllen Burnz Muntz

Vice President, Performance  
Improvement  
Exelon Nuclear

*"Nuclear Power Looking Forward"*



JoEllen started her career with Commonwealth Edison in 1981. She has participated in the construction and startup of two Braidwood Station Units and the return of service to two LaSalle Station Units. While working as the Regulatory Performance Coordinator for the LaSalle Station, she participated in various regulatory functions with the NRC. Other positions she has held include Regulatory Assurance Supervisor, Chemistry Manager and Training Director. In 2003, she moved to Boston to work as Operations Director for Exelon Power's fleet in New England. In April 2004, she was general manager of Cromby Generating Station, the first female general manager in the history of Exelon's hydroelectric and fossil-

fired generation plants. In November 2004, she became VP of Operations and led the Exelon Power operations fleet until April of 2008 when she returned to Nuclear as the VP of Performance Improvement.

JoEllen graduated from Xavier University with a B.S. in Chemistry. She earned a Masters degree in Information Technology from Northwestern University. She is certified in Boiling Water Reactor Nuclear Power Operations.

JoEllen and her husband, Steve, live in Chadds Ford with their three children and eight dogs of various ages and breeds. When time allows, she skis, sews, knits, gardens, practices yoga and volunteers for various animal rescue organizational events.

### **“Nuclear Energy Looking Forward”**

JoEllen Burns Muntz, Vice President of Performance Improvement at Exelon Nuclear will discuss the U.S. nuclear industry’s renewed dedication to safety post-Fukushima, new regulations and rules implemented in the past year, and the future of nuclear energy in the broader energy mix. With a background in nuclear regulation, JoEllen will also address the industry’s ability to cope with challenges and prepare for unlikely incidents. The industry’s dedication to safety has led to the licensing of the first nuclear reactors in 30 years, an achievement which will also be discussed.

# Craig Arnold

Assistant Professor  
Princeton University

Dept. of Mechanical & Aerospace Engineering

*"The Mechanics of  
Electrochemical Energy Storage"*



Craig B. Arnold is an associate professor at Princeton University in the department of Mechanical and Aerospace Engineering and currently the Acting Director of the Princeton Institute for Science and Technology of Materials.

His research primarily focuses on laser processing and transport in materials with particular emphasis on shaping laser-material interactions for applications in energy storage, photonics, nanoscale patterning, and laser based

direct write technologies. He earned his PhD. in condensed-matter physics from Harvard University in 2000, and was an NRC post-doctoral fellow prior to joining the faculty at Princeton in 2003. Previous awards include the ONR young investigator award (2005) and the NSF Career award (2006).

Craig Arnold received his PhD in Physics from Harvard (2000), and was the recipient of the ONR Young Investigators Award (2005) and the NSF Career Award (2006).

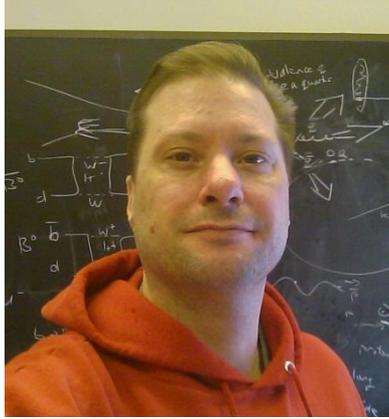
### **The Mechanics of Electrochemical Energy Storage**

Energy storage devices such as batteries and capacitors are well-studied for their electrochemical properties; the ability to convert chemical energy to electrical energy through oxidation and reduction reactions. However, it is less well-known that these same systems can exhibit robust mechanical effects such as a changes in shape or phase during charging or discharging. In this talk, we will examine the intrinsic and extrinsic mechanical forces that can occur in batteries and discuss how the system accommodates them. Taking this notion one step further, we will explore how mechanical phenomena affect electrochemical performance of batteries and ways in which we can mitigate them.

# James Olsen

Princeton University

*"Demo Show"*



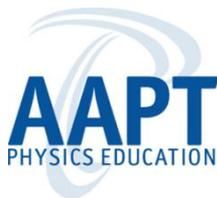
Professor James Olsen received a B.S. in Physics from U.C. Davis in 1992 and a Ph.D. in Experimental Particle Physics from U.W. Madison in 1998, and has been a member of the Princeton Physics Department Faculty since 2002. His research has focused on the fundamental particles and their interactions, in particular, the “flavor structure” of matter and the origin of mass. In 2004, using data collected by the BaBar experiment at the Stanford Linear Accelerator Center, his group was the first to observe a large matter-antimatter asymmetry directly in the decays of mesons including the bottom quark, which was one of several important measurements supporting the 2008 Nobel Prize in Physics. In 2006-7 he served as the Physics Coordinator of this 600-person experiment. Since 2007, Prof. Olsen has been a member of the Compact Muon Solenoid experiment at the Large Hadron Collider (LHC), where he leads the effort to search for the Higgs boson in

its decay to two bottom quarks, the most likely decay mode for this hypothesized particle at its expected mass of 125 billion electron volts. He has taught most of the introductory level undergraduate courses in the Physics Department, as well as a course for non-science majors and a senior level course in particle physics. For the past four years he has been the Director of PHY 103, the calculus-based freshman physics course. In addition to his research and in-class activities, Professor Olsen has engaged in several public outreach efforts, including the Annual Science and Engineering Expo at Princeton and public lectures describing his research at the LHC. He has also been seen on ESPN's Pro Bowl Skills Challenge explaining the "Physics of the Perfect Throw."

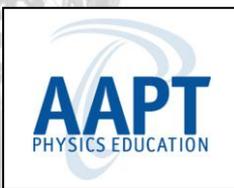
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[www.njaapt.org](http://www.njaapt.org)



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