Southern Atlantic Coast Section of the American Association of Physics Teachers

October 24-25, 2014
College of Charleston
Charleston, SC

Local Organizing Committee
Dr. Narayanan Kuthirummal       Dr. Linda Jones
Dr. Sorinel A. Oprisan          Dr. Gardner Marshall
Ms. Cynthia Hall                Ms. Alfair Meredith

Organizing Committee Chairperson
Dr. Ana Oprisan
843-953-7582 (office)
843-469-0913 (cell)
oprisana@cofc.edu
General Information

The main meeting will take place in the School of Sciences and Mathematics Building (SSMB) Auditorium at the College of Charleston, 202 Calhoun Street, Charleston, SC 29401 (GPS coordinates: latitude= 32dgr 47' 5.15" N and longitude= 79dgr 56' 23.82" W).

All Saturday afternoon workshops will be held in Harbor Walk West building (HWWE) on 360 Concord Street, Charleston, SC 29401 (GPS coordinates: 32dgr 47' 28.32" N and longitude= 79dgr 55' 35.906" W).

Parking
One block away from the SSMB there is a private parking garage (see map above) on 89 Saint Philip St., Charleston, SC 29403 (GPS coordinates: 32dgr 47' 10.013" N and longitude= 79dgr 56' 19.399" W).

Another private parking closer to Harbor Walk West building (HWWE) is the Aquarium Garage on 24 Calhoun St, Charleston, SC 29401 (GPS coordinates: 32dgr 47' 23.764 " N and longitude= 79dgr 55' 40.466 " W).

Street parking may be available (http://www.charleston-sc.gov/index.aspx?NID=148): “All on-street City of Charleston parking meters are active and require payment Monday through Saturday, from 9 a.m. to 6 p.m. (excluding Sunday and official city holidays). […] There is a standard rate of 80 minutes per dollar […]”

Emergency contacts
Physics and Astronomy main office: 843.953.5593
Dr. Ana Oprisan (cell): 843.469.0913
Dr. Sorinel A. Oprisan (cell): 843.327.2696
Program at a Glance

Friday, October 24, 2014

5:00 pm - 6:00 pm  Registration (SSMB Atrium)

6:00 pm  Dr. Michael J. Auerbach, Dean of the School of Sciences and Mathematics, Opening Remarks (SSMB Auditorium)

Dr. Robert C. Hilborn, Associate Executive Officer of the American Association of Physics Teachers

7:15 pm - 8:00 pm  Reception (SSMB Atrium)

8:00 pm  Dinner on your own.
A list with dining places within walking distance will be provided during registration (see also http://oprisana.people.cofc.edu/SACS_AAPT_2014/).

Saturday, October 25, 2014

7:30 am - 8:00 am  Registration & Breakfast (SSMB Atrium)

8:00 am - 10:00 am  Plenary Presentations (SSMB Auditorium)

10:00 am - 10:30 am  Coffee Break & Student Poster Session (SSMB Atrium)

10:30 am - 12:30 pm  Plenary Presentations (SSMB Auditorium)

12:30 pm - 1:00 pm  Lunch & Student Poster Session (SSMB Atrium)

2:00 pm - 4:00 pm  Workshops (Harbor Walk West Building)

The organizing committee is grateful to our sponsors

• School of Sciences and Mathematics, College of Charleston
• Department of Physics and Astronomy, College of Charleston
• National Science Foundation (IOS – 1054914 grant)
• Charleston Chapter of Sigma Xi - The Scientific Research Society
Plenary Presentations
Saturday, October 25, 2014
School of Sciences and Mathematics Auditorium, College of Charleston

Session chairperson: Dr. Linda Jones, College of Charleston
Contributed Talks - Session 1 between 8:00 am - 10:00 am
All talks are 15 minutes (including questions and discussions).

8:00 am - 8:15 am
Becoming a Scientist: Development of Research Skills through Senior Research Projects
Sawaiz Syed, Dr. Brian Thoms, and Dr. Xiaochun He
Department of Physics & Astronomy, Georgia State University, Atlanta, GA

This presentation will highlight the learning experiences and the research skill development of a physics major. It is critically important to prepare students through well-planned advanced physics lab in order to make real contributions to research projects under faculty mentorship. The advancement of technology makes students complacent to not learn about how the devices they use work at a fundamental level. The advanced physics lab at Georgia State University is designed to train students with skills in programming with LabView, computer interface with sensors and data acquisition, Monte Carlo simulation, technical writing, etc. A very successful outcome from the training in the advanced physics lab is well demonstrated through my senior research project at Georgia State University in developing a low-cost and robust radiation sensor network. Each sensor node has a modular design which consists of a Geiger tube and its power supply, microcontroller, and wireless transceiver. The server is currently implemented with a credit-card size minicomputer (Raspberry Pi). One of the important applications of this project is to provide low-cost real-time monitoring of any radiation safety environment. It also has potential application in homeland security to gather data for early detection of radiological weapons.

8:15 am – 8:30 am
Acoustic method for the coefficient of restitution measurement
Sorinel Oprisan and Ana Oprisan
College of Charleston, Charleston, SC

During the impact of a spherical ball with a hard surface part of the kinetic energy is lost to sphere deformation and sound generation. The restitution coefficient measures the fraction of the ball’s speed after impact with respect to its initial speed. We used an acoustic method to estimate the coefficient of restitution for spherical balls made of different materials.
8:30 am – 8:45 am

**PhysTEC at Georgia State, and Middle School Science in the Atlanta Region**

Frank Lock
Georgia State University, Gainesville, GA

The Georgia State University Physics and Astronomy department is in its second year of a three year PhysTEC grant. Information about the program will be presented. The presenter is the 2014 - 2015 Phystec Teacher In Residence at GSU. Information gleaned from observations of five Teaching Candidates (student teachers) in middle school classrooms will also be presented.

8:45 am – 9:00 am

**Exploring Nuclear Physics at an Introductory Level**

Gardner Marshall\(^1\) and Dean Spyropoulos\(^2\)

\(^1\)College of Charleston, Charleston, SC 29401; \(^2\)Charleston County School of the Arts

Introducing high school and freshman college students to theoretical research can be difficult due to the high entry barrier and prerequisite knowledge. In this talk I present an interesting example of a project in nuclear physics that captures the feel and flavor of theoretical work while remaining accessible to talented students with only calculus level background. The project consists of exploring the consequences of a stronger Coulomb force law. I will present the results of a talented high school student I am working with now on this project.

9:00 am – 9:15 am

**Atomic Force Microscopy for Student Projects**

J.B. Sharma
University of North Georgia

The advent of desktop Atomic Force Microscopes (AFM's) have opened up a novel possibilities of exploring material surfaces and structure at the nanometer scale. The UNG physics department has just acquired a desktop AFM and is working to integrate it into K12 outreach, teaching and research. The possibilities for joint projects with chemistry and biology is also being explored. This talk will explain the principles of AFM operation, examples of images obtained and the methodology by which they are analyzed.

9:15 am – 9:30 am

**Teaching Scientific Reasoning to Liberal Arts Students**

Louis Rubbo
Coastal Carolina University
University courses in conceptual physics and astronomy typically serve as the terminal science experience for the liberal arts student. Within this population significant content knowledge gains can be achieved by utilizing research verified pedagogical methods. However, from the standpoint of the University, students are expected to complete these courses not necessarily for the content knowledge but instead for the development of scientific reasoning skills. Results from physics education studies indicate that unless scientific reasoning instruction is made explicit students do not progress in their reasoning abilities. How do we complement the successful content based pedagogical methods with instruction that explicitly focuses on the development of scientific reasoning skills? This talk will explore methodologies that actively engages the non-science students with the explicit intent of fostering their scientific reasoning abilities.

9:30 am – 9:45 am
**Flipping a Lab**
Al Walters
University of North Georgia, Gainesville GA

For the first lab in a second semester, Trig-Based Physics course, I decided to have the students design a lab involving a spring and harmonic motion. It was a small class, consisting of 6 lab groups and I was interested in the various approaches the groups would develop. The lab was conducted over two class periods (Thursday and the following Tuesday, allowing time for research). I will discuss the different approaches proposed initially and the final iteration that was finally conducted.

9:45 am – 10:00 am
**The Magic of IPython Notebooks when doing computational physics with EJS**
Larry Engelhardt, Francis Marion University

We will demonstrate the utility of "IPython Notebooks" which provide a FREE Mathematica-like interface that allows you and your students to write nicely formatted reports, do symbolic computations, and carry out numerical simulations, all within a single document.

10:00 am - 10:30 am
**Coffee Break & Poster Session (SSMB Atrium)**
Session chairperson: Dr. Linda Jones, College of Charleston
Contributed Talks – Session 2 between 10:30 am – 12:30 pm
All talks are 15 minutes.

10:30 am - 10:45 am
Encouraging Active Student Engagement during Tutorial Sessions
Laura Kiepura and Joshua Von Korff
Georgia State University, Atlanta, GA

This year, Georgia State University (GSU) introduced a new structure for the lab section of the calculus-based Introductory Physics class. Students now spend the first hour of lab class working through a tutorial group activity from the Tutorials in Introductory Physics activity book by the University of Washington PER Group before completing a more traditional lab. The tutorial session is meant to help students deepen their conceptual understanding of physics by engaging them in extensive discussion and argumentation. One obstacle to effective administration of the tutorials is convincing the students to embrace the intensive social demands of this discussion and argumentation. As a current undergraduate Learning Assistant responsible for guiding students through the tutorials, I will present the methods I have used to encourage and support active student engagement during the tutorial session of lab class.

10:45 am - 11:00 am
More from Less
Rob Spencer
T.L. Hanna High School, Anderson, SC 29621

Most traditional problems have specific questions following the description of the problem. Goal-less problems just have the description. Students working goal-less problems solve more per problem and develop a keener sense of what physical models and representations to use. Goal-less problems will be discussed and shown to be a vehicle to get more from less.

11:00 am - 11:15 am
Desert Island Survival Physics 101
Mikhail M. Agrest
Trident Technical College & The Citadel, Charleston, SC

"Give me a fulcrum and I will move the world" - shouted Archimedes, finding a perfect solution. Which is the best? A solution implemented with a perfect tool, or the Desert Island Survival Solution - one, executed with bare hands? A student stuck at a Desert Island on her way back from the Spring Break. Being inspired by her teacher's solving problems via reasoning from the conceptual principles all the way to the answer; she did come up with a result without the unavailable
Internet, but had an error that led to an incorrect answer. Another student based his answer on the information acquired from the Internet. Just a few steps led to the absolutely correct solution. Which work you would assign a higher grade? The author will share some examples of providing unnecessary information as well as examples of how to find solutions from limited, but sufficient conceptual information [1,2].


11:15 am - 11:30 am

**Motion capture and modeling**

Long Pham

University of North Georgia, Gainesville, GA 30566

Tracker is a free video analysis program developed by Douglas Brown at Cabrillo College that allows for frame-by-frame tracking of objects on a video. In addition to the traditional motion capture and analysis, this program also includes dynamic model simulation. Here, the user inputs theoretical force parameters and Tracker plays the theoretical model motion superimposed on the real-world motion. I will discuss a few activities that we do in our honors physics 1 course that use Tracker.

11:30 am - 11:45 am

**How to deal with large course withdraw**

Alexis Nduwimana

Georgia Perimeter College

Physics is a discipline that is hard for many students. Some students persist for month and initiate course withdraw. Schools want instructors to improve retention without compromising quality. I will discuss ways I have tried to improve course retention, with challenges and successes.

11:45 am - 12:00 pm

**Transient signals and the time-frequency relationship**

Milind Kunchur

Department of Physics and Astronomy, Univ. of South Carolina, Columbia, SC

Transient signals and the time-frequency relationship

Frequency response and time-domain performance are often assumed to have a reciprocal relationship. While the reciprocal relationship indeed holds for simple
linear systems, such as an RC low-pass filter, for complex systems such as human auditory pathways, the limits of the two can be less correlated. This is one of the misunderstood issues in high-fidelity sound reproduction. In this talk I will discuss some of the elements affecting musical timbre and the related requirements for accurate music playback and the role of frequency and time-domain performance of components.

12:00 pm - 12:15 pm
Assessment Focused Flipped Classroom
Edward Forringer
Georgia Gwinnett College

In an attempt to combine the benefits of both traditional lecture and "flipped classroom" teaching, I have developed a classroom structure which I would like to share with my fellow teachers. I'll share preliminary data on effectiveness and student reactions. I'll also discuss the benefits and challenges of trying to "flip the classroom" with students at the open access institution where I teach.

12:15 pm - 12:30 pm
Teaching Lab via Distance Education; Enabling Student Teams
Lee Lindner
College of Charleston, Charleston SC 29424

Distance Education is taking root on many campuses across South Carolina. Perhaps the most challenging course to teach online is science lab. A meteorology lab class was taught this past summer at the College of Charleston, and the experience will be conveyed as well as the difficulties encountered. Most challenging is getting students to organize into groups and then to effectively use technology to work on labs together. Discussion boards were mostly effective in allowing students to get familiar with one another and team up, as well as to ask questions much as one would do in a regular class. Most students were able to effectively use video conferencing to work together and see their work develop as they did it. Faculty must be accessible to each team while they are working on their exercise. Having a well thought out timeline for students to follow, but allowing for students to turn in a few assignments late, resulted in completion of the course by all who started. Additionally, sample labs will be presented (particularly those that involve physics), course structure will be discussed, and challenges with lecture and communication will be addressed.
Poster presentations  
Saturday, October 25, 2014  
School of Sciences and Mathematics Auditorium, College of Charleston

Posters will be displayed during the entire meeting starting at 8:00 am, on Saturday, October 25, 2014. Poster presentations take place between 10:00 am - 10:30 am and between 12:30 pm - 1:00 pm. Please remove the posters no later than 3:00 pm on Saturday, October 25, 2014.

Poster # 1  
**Increasing Coulomb’s Electrostatic Force and its Effects**  
Dean Spyropoulos\textsuperscript{1} and Gardner Marshal\textsuperscript{2}  
\textsuperscript{1}Charleston County School of the Arts,  \textsuperscript{2}College of Charleston

By increasing the strength of the Coulomb force, the universe would prove to be very different, if not completely divergent. Key to this truth is the understanding of the relationship between Coulomb's Law and the Nuclear Force in nucleons of respective atoms. The Nuclear Force, in the close quarters of 1-10 femtories, is much stronger than the electrostatic repulsion from Coulomb's Law. However, beyond a distance of \(~10\) femtometer, the Nuclear Force will be reduced to an almost negligible magnitude. This is unlike the Coulomb force which weakens gradually as distance increases. For very large nuclei, the electrostatic repulsion of Coulomb's Law will take over and cause the nucleons to become unstable. This leads to the question of how the periodic table, interstellar formation, and cosmic formation in general would be different if the constant of Coulomb's Law was greater by even a small percentage. We investigate the answer to this question.

Poster # 2  
**Development of Low-cost and Robust Radiation Sensor Network**  
Sawaiz Syed, Dr. Brian Thoms, and Dr. Xiaochun He  
Department of Physics & Astronomy, Georgia State University, Atlanta, GA

This poster presents the result of my senior research project at Georgia State University for developing a low-cost and robust radiation sensor network. Each sensor node has a modular design which consists of a Geiger tube and its power supply, Atmel AVR microcontroller, wireless transceiver. The server is currently implemented with a credit-card size minicomputer (Raspberry Pi). Future iterations of this project will use WiFi communication, which can be easily expanded and integrated into any existing environmental monitoring network. The sensor is designed for deployment of sensor array within 20-meter range. One of the important applications of this project is to provide low-cost real-time monitoring of any radiation safety environment. It also has potential application in homeland security to gather data for early detection of radiological weapons. The
students in advanced physics lab will be actively involved in assembling and testing the sensor nodes and will use this system for group research projects.

Poster # 3
I-IMPACT Noyce Project - Attracting and Supporting Successful Career-Changers and Professional Educators in the Physics Classroom
Jacquelyn Brennan, David Rosengrant, and Greg Rushton
Kennesaw State University, Kennesaw, GA

Kennesaw State University received a Robert Noyce award from the National Science Foundation and created an Initiative to Increase and Mentor Physics And Chemistry Teachers (I-IMPACT) program. The program supports career-changers called Teaching Fellows as well as current professional educators called Master Teaching Fellows. The project has multiple goals depending on the group: (a) a successful transition from industry into the classroom for the Teaching Fellows (TFs) (b) development of teacher leaders for the Master Teaching Fellows (MTFs) (c) increasing retention of both groups of educators. Purposeful interactions between the groups allow for all to learn from each other’s diverse experiences. We are currently in our third year (of six) and have eight MTFs/TFS in Physics and eight MTFs/TFs in Chemistry. This poster highlights the three years of this project and the professional development pathway. Furthermore, as a Georgia Tech alumnus I will follow my personal pathway into this project. I started with an invitation to learn more about their partnership with Kennesaw State University, have conducted research on the project, and am in my last year of the MAT program.

Poster # 4
Using a summer camp as a recruitment tool for physics and chemistry teachers
Philip D Money, Kennesaw, Dr. David Rosengrant, and Dr. Michelle Dean
Kennesaw State University, Kennesaw, GA

At the start of the summer in 2014, Kennesaw State University implemented a project to recruit future physics and chemistry teachers. This project also falls under the umbrella of a recently awarded Noyce grant. We used a summer physical science camp as a recruitment tool. The camp consisted of three days of training for the camp leaders and a week-long summer camp with the students. The camp consisted of two days of chemistry activities, two days of physics activities and one day of a tour of Kennesaw State University. The camp attendees were rising eighth graders from local high needs schools in Cobb County. We focused on two different student populations to recruit into teaching: local high school seniors and undergraduate students from Kennesaw State University. The main goal in testing recruitment was to see how candidates felt
about different activities as well as interactions with students and interests in teaching.

Poster # 5
Data Analysis of a Year-long Eye-Tracking Study on Undergraduate Elementary Education Students during Physical Science Lecture
David Rosengrant and Amanda Burke
Kennesaw State University, Kennesaw, GA

This study investigates the gaze patterns of pre-service elementary education students in their physical science lecture. Our goal is to better understand the relationships between gaze patterns and student attention during class. If we better understand what keeps our students attention or what distracts them, then we can have increased attention, which increases what they learn. To accomplish this task, we used a portable eye-tracker, Tobii Glasses. We are able to record what a person sees, what they say or hear and most importantly where they are looking. This investigation includes when, for how long and what students focus on in the classroom (i.e. demonstrations, instructor, notes, board work, and presentations) during a normal lecture. We used the data to compare students’ gender, age, location in the classroom, note-taking preference and achievement to where each student focused his or her attention.

Poster # 6
Monte Carlo Simulation of the Bragg Peak Spreader for the Proton Beam Therapy
Richard Justice, Michael Ngo, and Tatiana Krivosheev
Clayton State University, Morrow, GA

The focus of this study is to create and improve the process of making a spread out Bragg Peak (SOBP) so that Proton Beam Therapy can be more readily available to patients with cancers that are more difficult to treat with conventional methods. The candidate of choice for creating the SOBP is a tank filled with water and bubbles. This particular part of the study focuses on the impact different gases used to make the bubbles has on creating the SOBP. The gases used are air, hydrogen, ammonia, and methane gas.

Poster # 7
Monte Carlo Simulation of a Novel Bragg Peak Spreader for Proton Cancer Therapy
Samuel Adams, Diedra Shorty, and Tatiana Krivosheev
Clayton State University, Morrow, GA

While conventional X-ray therapy is a much more accepted form of treatment for cancerous tissues, we turn our research to a lesser known therapy that utilizes
protons instead of X-rays. Proton therapy is highly efficient because it can minimize the damage to surrounding healthy tissue but maximize the precision of the dose delivery. This precision comes from the ability of protons to only deposit their energy once they have reached a certain depth and release it in its entirety – the effect known as a Bragg Peak. Because of this effect, it is necessary to use spreaders to create what is called a spread out Bragg peak that will precisely target the entire affected area. Conventional spreaders, made of materials like Plexiglass, are specially made for each patient, which is expensive and inconvenient. We propose and test a novel spreader which uses a thin walled glass tank filled with water and air bubbles. The spreading of the peak is achieved by varying the size of the bubbles and their intensity. We present the results of the Monte Carlo simulations of the spreader using GEANT4 Monte Carlo simulation software.

Poster #8
Transport studies in superconducting films
Charles Dean and Dr. Milind N. Kunchur
Department of Physics and Astronomy, Univ. of South Carolina, Columbia, SC

This presentation discusses some of our measurement techniques used to study superconducting films. Superconductors have wide variation in resistance -- from zero at low temperatures to a large "normal-state" value above the transition temperature $T_c$. This presents a special challenge, because the act of measuring resistance requires a current to be passed: if resistance is not absent, then Joule heating will occur causing the temperature to rise, which in turn changes the resistance being measured. One option is to use very low values of current, but this misses some of the exciting physics that is unique to the high-current density regime. We overcome this problem by using pulsed currents, which sustain high values for limited duration while maintaining low average values because of the low duty cycle. This presentation will discuss the circuits and configuration used for pulsed studies of superconductors.

Poster #9
The Hubble Exoplanet Classroom!
Laura Stevens, Joseph Carson, Kat Low, Kara Perrino, David Ruwadi$^1$, Starr Jordan$^2$, Glenn Schneider$^3$
$^1$College of Charleston, $^2$Children's Museum of the Lowcountry, Charleston, $^3$University of Arizona

We present a status report on the Hubble Exoplanet Classroom, an interactive website designed to engage 8-12th grade students in physical science concepts using the exciting field of exoplanet studies. Addressing national teaching standards, the webpage allows educators to enhance their physical science, physics, and astronomy curriculum with student-driven lessons. The webpage
records students' performance on lessons and quizzes and compiles the results, which can be accessed by the instructor using a secure website.

Poster # 10
Direct imaging of nanocolloid fluctuations
Lincoln Frayley and Dr. Ana Oprisan
College of Charleston

We used direct imaging methods to record non-equilibrium fluctuations of the interface between nanocolloids and water during free diffusion. Monochromatic light was passed through the sample that contains a dense nanocolloid at the bottom of a sample cell unit and pure water on top. We used silver nanocolloids with 100 nm diameter in concentrations of 4.375%, 8.75%, 17.5%, 25%, and 50%, and silver with 157 nm diameter in concentrations of 25% and 50%. After passing through the cell, the scattered light is captured by a CCD camera. From the images, we computed the power spectrum and the structure factor for each concentration. We observed giant concentration fluctuations due to the coupling of gravitational buoyancy and the gradient of concentration. The critical wave number at which the transition to giant fluctuations occurs changes over time within a specific concentration, as well as between concentrations. The critical wave number and the relaxation time of concentration fluctuations determine the diffusion coefficient.

Poster # 11
Numerical investigation of striatal beat frequency model of interval timing
Derek Novo¹, Garrett Arnhold², and Dr. Sorinel A. Oprisan¹
¹College of Charleston, Charleston, SC; ²Washington Central University, WA

Time is an essential dimension of the world around us, determining the decisions we make, the actions we choose to take, and the very precision of our slightest movements. Millisecond timing is important for speech recognition, auditory processing, playing music and dancing. Circadian timing (hours-to-days range) controls sleep and wakefulness, and is critical for metabolic and reproductive fitness. Interval timing, or timing in the seconds-to-minutes range, is crucial for rate estimation, decision-making and foraging. Interval timing has been demonstrated in many species, from invertebrates to many vertebrates. In most species, the error of time estimation varies quasi-linearly with the estimated duration (criterion time), a characteristic known as scalar property. In addition, dopaminergic (DA) agonists and antagonists speed up and slow down the internal clock, respectively. We will investigate the relationship between time-scale invariance and noise characteristics. It was previously shown that time-scale invariance only exists the SBF model in the presence of noise. However, it is not clear how the type of noise and its characteristics affect the scalar property.
Poster # 12
Investigating Dark Matter Composition Through Decays Into Flavor Conserving Lepton Pairs
William Hester and Gardner Marshal
College of Charleston, Charleston, SC

Using the physics simulation software Pythia, we simulate the decay of scalar, weakly-interacting, massive, dark matter particles into flavor conserving Tau/Anti-Tau lepton pairs. The energy spectrum resulting from these simulations is used to calculate the expected number of events that will be detected at the ICECUBE observatory in Antarctica during its five year operation period. Using this information, we place bounds on what the upper limit of the lifetime of these dark matter particles can be for this particular decay process, narrowing our scope for future investigations into dark matter composition.

Poster # 13
Novel UV photodegradation resistant TiO2 coating for melamine fabrics
Isaac Gould
College of Charleston, Charleston, SC

Firefighter turnout gear is most commonly comprised of three layers each with a unique function. The outer shell (OS), a melamine fiber blend, fabric provides flame protection, serving as the front-line defense from both mechanical and heat related injury. Recently, melamine fibers are finding applications in high performance clothing. Heat resistance and thermal properties of these fibers are comparable to inherently fire resistant fibers traditionally used in OS fabrics. While melamine has been shown to hold up well in high heat conditions, it has recently come to light that such blends show considerable delamination under ultraviolet (UV) light which can compromise the mechanical protection of the fabric. The goal of this study was to experiment with a mechanism to extend the overall lifetime of the OS. To do this a UV photodegradation protective coating containing TiO2 was applied to the exterior of the OS melamine fabric and then was subjected to advanced UV aging and then tested for its mechanical performance. The results show clear mass gain as well as improved photo-degradation. However due to the increased weight gain negative mechanical properties were also created. Further research needs to be preformed in order to truly understand, and engineer a viable coating.
Workshops
Saturday, October 25, 2014
Harbor Walk West building, College of Charleston
All workshops run in parallel between 2:00 pm - 4:00 pm

Waves
Kael Martin (Porter-Gaud School, Charleston)
Location: Harbor Walk West Building, rooms 104
Abstract: Waves abound in our lives and most of us are familiar with wave phenomena. We all have observed waves on the surface of water, heard sound waves and seen light (electromagnetic waves) to name few. We will investigate some of the common characteristic of waves; standing waves, reflection, refraction, interference and diffraction. We will present a series of hands-on activities related to waves that can be performed at high school level or even at middle school and elementary school level by reducing or eliminating some of the math and concentrating more on the concepts. At the end of this workshop we will give away experimental kits to our participants.

Albedo's Impact on Global Climate Change
Cynthia Hall, Director, Lowcountry Hall of Science and Math, College of Charleston, Charleston, SC
Location: Harbor Walk West building, room 110.
Abstract: Scientists agree that climate is changing and that humans are exacerbating that change. This is not a problem for geologists, chemists, physicists alone ... it requires an interdisciplinary understanding and approach. In this workshop, we are going to explore through an interdisciplinary approach, one contributor to a changing climate - Albedo. Earth's albedo has been steadily declining. Why? In this workshop, we will explore what exactly albedo is by gathering data on the reflectivity of light and absorption of radiant energy. Then we will investigate the characteristics of a variety of surfaces and their effect on the way that surface absorbs and releases heat from the sun. Finally, we will explore what activities on Earth are causing changes in albedo and the role that they play in a changing climate.

Openstax
Don Franklin
Harbor Walk West building, room 112.
Abstract: Openstaxcollege is based from Rice University. They have adapted textbooks with financial grants to help students cut the cost of textbooks. They can buy a printed copy for a greatly reduced price, or use the online textbooks. The advantage to teachers is designing a syllabus that is not lockstep with the textbook.