



## Michigan Section of the American Association of Physics Teachers

**2008 Fall Meeting  
Saturday, October 11, 2008**

**Clara E McKenzie Building  
St. Clair County Community College  
Port Huron, MI**

**8:00 - 8:30 Registration/Breakfast (CEM Lobby)**  
**8:45 - 9:00 Meeting call to order and opening comments (CEM 201)**  
Welcome by SC4 Physics Dept.  
Charles Henderson, MIAAPT President  
Poster Announcements

### **Morning Session I**

**9:00 - 10:30 Oral Presentations** (submitted abstracts attached) **(CEM 201)**

9:00-9:15 A Historical Approach to Atomic Physics  
Donya Dobbin, Battle Creek Lakeview High School

9:15-9:30 A Friction Experiment with Inclined Planes  
Michael Faleski, Delta College

9:30-9:45 Facilitating Change in Undergraduate STEM: Preliminary Results from an Interdisciplinary Literature Review  
Charles Henderson, Western Michigan University

9:45-10:00 Inspiring Eventual Teachers of our Future Scientists and Engineers  
Wathiq Abdul-Razzaq, West Virginia University

10:00-10:15 Using Mini-Investigations to Encourage Students to Think and to Reason Based on Evidence  
Alex Azima, Lansing Community College

10:15-10:30 Science Literacy: We Still Need the Dreamers and the Visionaries  
Philip Kaldon, Western Michigan University

**Break**

**10:30 - 11:00 Break**

## Morning Session II: Invited Talk

### 11:00 – 12:00 Beyond Fossil Fuels: Options and Challenges (CEM 201)

Levi T. Thompson

Richard E. Balzhiser Professor of Chemical Engineering, University of Michigan <http://www.engin.umich.edu/dept/che/research/thompson/>

Abstract: Securing our nation's energy supply is arguably the most important challenge we face. The source and amount of energy that is available impacts nearly every aspect of our lives including our mobility, health and welfare. Presently, the U.S. depends heavily on foreign energy resources. For example, in 2007, nearly 60% of the crude oil consumed in the U.S. was imported; approximately one-quarter of this oil comes from the Persian Gulf. With growing demands from emerging economies, declining environmental quality and potential for global conflict, there is a pressing need to develop a more sustainable energy strategy. This presentation will review options for a sustainable energy economy including the use of hydrogen and fuel cells, and describe some of the key scientific and engineering challenges.

### Lunch

### 12:00 – 1:00 Lunch

Boxed lunches (sandwich, chips, cookie, drink) will be available for \$6.00.  
Sandwich selections available at registration

### Afternoon Session I

### 1:00 – 1:20 MIAAPT Business Meeting (CEM 201)

Charles Henderson, MIAAPT President

### 1:20 – 1:50 Demonstrations / Questions / Give-aways (CEM 201)

Amazing and Entertaining Discrepant Event Demos  
Don Pata, Grosse Pointe North HS

### Afternoon Session II – Concurrent Workshops

### 2:00 – 3:00 Workshop 1 (CEM 201)

Energy in the 21<sup>st</sup> Century  
Ernie Behringer, Eastern Michigan University

Abstract: Although many students understand intuitively that their futures are affected by the availability of affordable energy, many have not thought quantitatively about the specific energy challenges that exist. During this workshop, participants will work through a quantitative exercise to develop possible energy plans for the 21st century. Materials for classroom use and a list of resources will be distributed.

**2:00 – 3:00**

**Workshop 2 (CEM 318)**

Physics for Graduation Credit: A Newly Designed Course to Meet Michigan's  
New High School Graduation Requirements

Drew Isola, Allegan High School

Bob Poel, Western Michigan University

Abstract: Michigan's new High School Science Content Expectations (HSSCE's) and recently enacted statewide graduation requirements, have caused many high schools and physics teachers to rethink and redesign the physics courses they offer. This year's sophomores (Class of 2011) are the first class of students that has to meet these new requirements. These students must earn one full credit of physics or chemistry, as described by the HSSCE's, to graduate (along with many other new requirements). This means that these courses will have to be accessible to all students if schools are to continue to make high school graduation a viable goal for all of their students. This state of affairs requires the creation of courses in these areas that look very different from the traditional high school physics and chemistry courses of the past. This workshop will take a detailed look at a unit-by-unit description of a newly designed course to meet these new requirements that would also be accessible to all students. Special attention will be focused on which topics and skills need to be emphasized in such a course and which topics no longer need to be included.

**Afternoon Session III**

**3:00 – 4:30**

**Presentations & Tours of SC4 Alternative Energy Tech. Program (CEM 201)**

- Converting gasoline cars to electric and/or natural gas technologies
- Tours of the wind generator and solar panel installations and the labs that are being used to support them and the program.
- Tours of the new green roof and the site of the proposed demonstration roof.

**Meeting Abstracts**

Contributed Poster (on display outside CEM 201):

**The PhysicsBowl – A Contest for High Schools**

Michael C. Faleski, Delta College

Abstract: The PhysicsBowl is an annual contest for high school students. This past year there were almost 4000 students participating from approximately 175 schools across the United States and Canada as well as from schools in Japan and Taiwan. Prizes are awarded to both the students and schools for high performers. Michigan students took three of the four student awards in the region and Michigan schools won two of the four team awards in the region. This informational poster will include copies of last year's exam, the equation sheet, the solutions, and the list of winners in an attempt to increase the participation of both students and schools.

## Morning Session I: Oral Presentations

### **A Historical Approach to Atomic Physics**

Donya Dobbin, Battle Creek Lakeview High School

Abstract: It can be confusing and boring for students to try to learn current theories about light and the atom. To help put the information in context I have taught the unit using a historical approach. I have found that by presenting this information in sequential order have allowed the students to see the connections between the theories of wave-particle light duality, the atomic model, Planck's hypothesis and equation, and the photoelectric effect to name a few. The historical information that is presented during these lessons allows the students to see these theories in context, how they were developed, and what evidence supports them. Many of the students seemed to come away with a better understanding of the theories and the tentative nature of physics.

### **A Friction Experiment with Inclined Planes**

Michael Faleski, Delta College

Abstract: A common experiment and student activity is to determine the coefficient of static friction of an object on an incline. This is done by placing the object on the surface in question. The angle of the surface is then increased until such time that the object starts sliding down the incline. Based on the angle at which the object starts sliding, a simple relationship for the coefficient of static friction is determined. Now, what happens if the object in question placed on the surface is round? Regardless of the incline of the surface, the object will move down the incline. How can the coefficient of static friction be found? What of the kinetic friction coefficient? Simple analysis provides answers to these questions, but there are many experimental obstacles. Results will be shown with the hope that others will improve upon the simple experimental design employed.

### **Facilitating Change in Undergraduate STEM: Preliminary Results from an Interdisciplinary Literature Review**

Charles Henderson, Western Michigan University

Andrea Beach, Western Michigan University

Noah Finkelstein, University of Colorado - Boulder

R. Sam Larson, Kaiser Permanente and Regis University

Abstract: Although decades of research have identified effective instructional practices for improving Science, Technology, Engineering and Mathematics (STEM) education, these practices are not widely implemented. Scholars in three fields are interested in promoting these practices and have engaged in research on pedagogical change. *Disciplinary-based STEM Education Researchers* (SER) focus on changing curricula and pedagogical materials. *Faculty Development Researchers* (FDR) focus on changing faculty. *Higher Education Researchers* (HER) focus on policies and structures. There is little interaction between the fields and efforts in all areas have met with only modest success. We have systematically analyzed journal articles since 1995 related to instructional change to describe and critique the change efforts of these three fields. Results suggest that approaches to change differ by fields in important ways that have implications for their success. We hope this literature review and related efforts will result in improved interdisciplinary work towards the facilitation of lasting change.

## **Inspiring Eventual Teachers of our Future Scientists and Engineers**

Wathiq Abdul-Razzaq, West Virginia University

As physics teachers at the collegiate level, we are faced with the difficulty of lack of interest in science among non-science majors. An example of this occurred in a conceptual physics course at West Virginia University, where we taught mostly students attending the education college. A poll taken of the class found 62% of the students wrote they did not want to teach science. A difficulty presented by this is that the students, who are mostly aspiring elementary level teachers, will go into the teaching field with a lack of enthusiasm toward teaching science. This will certainly have a negative impact on inspiring our kids to go into science and engineering majors. It is our goal then to excite these students towards science and therefore exhibit eagerness when applying their knowledge in the classroom and elsewhere. One proposed method for accomplishing this is to give these students hands-on, relevant, stimulating, and interesting research practices that relate physics to health. Such a project will be discussed.

## **Using Mini-Investigations to Encourage Students to Think and to Reason Based on Evidence**

Alex Azima, Lansing Community College

Students often memorize and regurgitate ideas without thinking or questioning their own reasoning. I believe a major goal of introductory physics should be to encourage students to make scientific arguments based on evidence. One way to do this is to use, in addition to formal labs, several mini-investigations throughout the course that demand thinking, reasoning, and making evidence-based arguments. Mini-investigations are used in a calculus-based introductory physics course at Lansing Community College in order to get students to think and to reason scientifically and to report their results in short class presentations. Some of the activities and results will be shared.

## **Science Literacy: We Still Need the Dreamers and the Visionaries**

Philip Kaldon, Western Michigan University

Abstract: In past MIAAPT sessions I've talked about using Science Fiction in Physics and Science Literacy activities -- exams, lectures, papers. Generations of people in technical fields were inspired to go into those technical studies by reading Science Fiction -- or perhaps it is the other way around. One could say that we need the dreams and visions of the future to fuel the future. In August 2008 I was among a number of authors honored at the 24th Writers of the Future, including an actual red carpet event in Hollywood CA, for my short story "A Man in the Moon", and I just wanted to share what I did on my summer vacation with you.

## **Useful Links**

A link to SCCC College maps and driving directions is (free parking available in Student Parking)  
<http://www.sc4.edu/show.php?title=Maps%20and%20Directions&category=About%20SC4>

A link to local hotels and motels is <http://www.bluewater.org/Main/Locations.aspx?locationtypeid=1> .

And one for local restaurants is <http://www.bluewater.org/Main/Locations.aspx?locationtypeid=5> .