



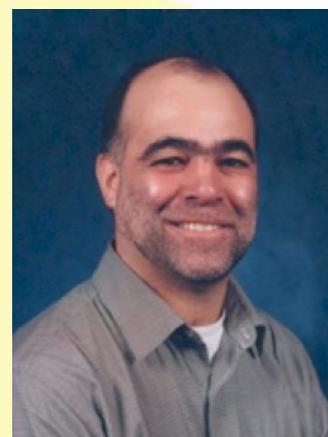
Michigan Section of the American
Association of Physics Teachers

Spring 2013 Meeting Announcement and Program Schedule

Henry Ford Community College, Dearborn, MI
April 20, 2013

Program Highlights

We are very pleased to welcome Dr. Nilton O. Renno as our featured speaker. Dr. Renno is a multidisciplinary scientist with interests in atmospheric thermodynamics, dust electrification, brine thermodynamics, and the implications of liquid brines to the habitability of Mars. Dr. Renno was the leader of the Phoenix Mars Mission Atmospheric Science Theme Group. He led the team that found the *first* direct evidence for liquid water on Mars. Dr. Renno is Co-Investigator of the Mars Science Laboratory and the ExoMars Missions. He has been developing instruments and missions for measurements on Earth, the Moon, Mars and beyond. Dr. Renno and his students made important contribution to the understanding of the interaction of rocket plumes with soils, dust electrification, and the motion of wind-blown sand or ‘saltation’. Saltation is an important physical process because it is the main natural source of dust aerosols and wind erosion, but it is still poorly understood. Indeed, climate forcing by dust aerosols is the most uncertain processes in our current understanding of global climate change.



Door Prizes!!!

We have some great door prizes donated by various vendors and distributed during the afternoon session, see the schedule below.

Program Overview

Location: Referring to the map attached to the end of this schedule, the meeting will be in the Rosenau Room of the Andrew A. Mazzara Administrative Services and Conference Center, marked AS at the bottom right. The break out sessions will be held in the Science Building, indicated with an S on the map. To find directions to the college or to download another copy of the map, please go to <http://www.hfcc.edu/contact/locations.asp>.

Registration: Registration cost is \$10 per meeting. Students and first-time attendees, though, may attend *free* of charge.

Parking: Again referring to the provided map, parking will be available either in the lot right next to the Andrew A. Mazzara Administrative Services and Conference Center, marked AS, or in staff lot J located at the mid bottom of the map.

Lunch: Boxed lunches will be available from Park Place Catering for \$10.00 per person, separate from the registration fee. Members will be able to pay and make their selections during morning meeting registration. The choices for a sandwich are vegetarian wrap or a kaiser sandwich of either turkey, ham, or roast beef. Also, customers will have the choice of potato salad, pasta salad, or cole slaw. The drink option will be between pop and water. The lunch also includes fruit salad and a cookie. The boxes will contain plastic ware, napkins, cups, and condiments. All prices are subject to the state sales tax of 6%.

Also, Continental breakfast will be available throughout the meeting courtesy of HFCC Science Division. This breakfast includes the following items: Danish, bagels, muffins, fresh fruit, bottled juice, bottled water, coffee (regular and decaf), and hot tea.

Hotels: For those who wish to stay overnight for the meeting try [Google site](#)

Program Schedule – Saturday April 20th

- 7:30 – 8:00 am Registration/Morning refreshments**
Meeting fee: \$10.00 (FREE for students and first-time attendees)
Location: Andrew A. Mazzara Administrative Services and Conference Center
- 8:00 – 8:10 am Call to order and welcome**
James Gell, Plymouth High School – MIAAPT President
Michael C. LoPresto, Henry Ford Community College – Chair of Physics and Astronomy
Location: Rosenau Room
- 8:10 – 10:25 am Contributed Presentations**
Location: Rosenau Room
- 8:10 – 8:25 **The Physics Behind Refrigerator Magnets**
David A. Van Baak, Calvin College (dvanbaak@calvin.edu)
- 8:25 – 8:40 **Geomagnetism and Induced Voltage**
Wathiq Abdul-Razzaq, West Virginia University (wabdulra@wvu.edu)
- 8:40 – 8:55 **Queues of Q : A (Super) Market-Based Approach to Current**
Dr. Laurence Tarini, Grand Valley State University (tarinil@gvsu.edu)

- 8:55 – 9:10 **Verifying the Effects of a Mouthpiece and Bell on the Resonant Frequencies of a Trombone Using PVC-Pipe and the New P-Bone**
Michael C. LoPresto, Henry Ford Community College (*Lopresto@hfcc.edu*)
- 9:10 – 9:25 **Examining Student Understanding: Dynamics within Rotating Reference Frames**
D. P. Cassidy, Western Michigan University (*david.p.cassidy@wmich.edu*)
- 9:25 – 9:40 **Lawrence Tech’s Quest Program to Foster Undergraduate Research**
Dr. Changgong Zhou et. Al., Lawrence Technological University (*czhou@ltu.edu*)
- 9:40 – 9:55 **Click-on House: Physics in Society**
Jeff Whittaker, The Dearborn Center for Math, Science & Technology (*jbwhittaker@hfcc.edu*)
- 9:55 – 10:10 **Textbooks’ Presentation of the Ambiguous Concept of “Weight”**
Rex Taibu, Mallinson Institute for Science Education: Western Michigan University (*rex.taibu@wmich.edu*)
- 10:10 – 10:25 **Effects of Formative or Summative Assessment on Learning Force & Motion**
Chaiphath Plybour, Western Michigan University (*Chaiphath.plybour@wmich.edu*)

10:25 – 10:45 am Break

10:45 – 11:45 am Round Tables

The CAE Great Lakes Regional Teaching Exchange: Current Practices in Introductory Astronomy: In Class, Online, and with Labs

Michael C. LoPresto, Henry Ford Community College (*Lopresto@hfcc.edu*)

Participants will be invited to share anything new, innovative, and interesting that they are currently doing in Introductory Astronomy as well as discuss solutions to problems that may be arising as a result. If time permits, the moderator will share tutorials he has developed as part of his recently finished Ph.D. These and other materials will be available for participants to take home with them sponsored by the NASA/CAE Great Lakes Regional Teaching Exchange.

Location: S-041 or S-042 of the Science Building.

The round table sessions are informal settings for peer support, networking, and discussion of academic issues specific to each group. Topics for discussion can include creating laboratory exercises/experiments on a shoestring budget, utilizing the latest in off-the-shelf equipment and software and programs, how to implement the new Flipped Classroom and Student Centered learning pedagogy, translating physics and physics related courses to the Online delivery system, how to reduce students’ preconceived fears of physics, and any other items of interest.

11:45 – 1:00 pm Lunch

1:00 – 2:00 pm **Keynote Address:**

Exploring Mars with the Curiosity Rover

Dr. Nilton O. Renno, Atmospheric, Oceanic, and Space Sciences,
University of Michigan-Ann Arbor (*nrenno@umich.edu*)

Location: Rosenau Room

The Mars Science Laboratory Curiosity Rover was developed to assess if Mars could sustain microbial life. Since liquid water is a basic ingredient for life as we know it, in order to understand the potential for life to exist in other planets, we must first understand the behavior of water on them. In this presentation, the Curiosity Rover, its instruments, and its landing site on Mars will be described briefly. Then, the current evidence for liquid water on Mars will be discussed. The presentation will conclude with a discussion of Curiosity's initial results.

2:00 – 2:30 pm **Puzzlers! And Door Prizes!**

Location: Rosenau Room

2:30 – 3:00 pm **MIAAPT Business Meeting**

James Gell, Plymouth High School – MIAAPT President

Location: Rosenau Room

3:00 – 5:00 pm **Workshops**

Workshop #1

“Standard orbit!” Guided Inquiry Activities for Teaching Celestial Mechanics

Brad Ambrose, Grand Valley State University (*ambroseb@gvsu.gov*)

Location: S-041 of The Science Building

If you are a college/university faculty member or an AP physics high school teacher, you are invited to learn about and acquire research-tested guided inquiry activities on celestial mechanics. Workshop participants will learn about recent results from the research in student learning of Kepler's laws, central forces, and orbital mechanics. They will also obtain firsthand experience with guided inquiry tutorials on these topics, which have been developed as part of the *Intermediate Mechanics Tutorials* project.* We will also discuss how these materials can be adapted to meet student and instructor needs. (2 hours)

(*B. Ambrose and M. Wittmann, NSF grants DUE-0441426 and DUE-0442388)

Workshop #2

A Show at HFCC's Hammond Planetarium

Steve Murrell, HFCC Planetarium Director (*srmurrell@hfcc.edu*)

Location: Hammond Planetarium on the upper floor of the Science Building

Workshop #3

Tour of HFCC's renovated Science Building and New South Wing

Dr. James Smith, Henry Ford Community College (*jsmith1@hfcc.edu*)

Location: Meet in the lower lobby of the Science Building, near the Magic-Planet globe.

Physics instructor, Dr. James Smith, will guide a tour for anyone interested in viewing HFCC's new and renovated science facilities.

Abstracts for Contributed Presentations

The Physics Behind Refrigerator Magnets

David A. Van Baak, Calvin College (dvanbaak@calvin.edu)

The humble refrigerator magnet stores some secrets. The surprises of its single-sided magnetic field, and its ratcheting action against another refrigerator magnet, can both be explained in terms of a spatially-periodic distribution of magnetization in its material. This talk will show how that magnetization can be revealed visually, and will also show that the result is a single-sided magnetic field, and what can be displayed with such a source.

Geomagnetism and Induced Voltage

Wathiq Abdul-Razzaq, West Virginia University (wabdulra@wvu.edu)

Introductory physics laboratories have seen an influx of *Conceptual Integrated Science* over time in their classrooms with elements of other sciences such as chemistry, biology, earth science, and astronomy. In this laboratory, we will introduce this development as it attracts attention to the induced voltage in the human brain as it is initiated by the change in the magnetic flux due to the Earth's magnetic field and movement. This simple and enjoyable experiment will demonstrate how basic concepts in physics and geology can help us think about possible health effects due to the induced voltage.

Queues of Q : A (Super) Market-Based Approach to Current

Dr. Laurence Tarini, Grand Valley State University (tarinil@gvsu.edu)

Many students have difficulty understanding why adding a resistor in parallel to a circuit *increases* current flow. More resistors should mean less current, no? By modeling current flow as a supermarket checkout process, with branches as servers and resistance as a waiting time, the flow of charges (customers) may be easily visualized and calculated.

Verifying the Effects of a Mouthpiece and Bell on the Resonant Frequencies of a Trombone Using PVC-Pipe and the New P-Bone

Michael C. LoPresto, Henry Ford Community College (Lopresto@hfcc.edu)

The resonant frequencies of a cylinder of PVC pipe the same length as a trombone will be compared to the resonances of the pipe with part replaced first by a mouthpiece, then by a flaring bell section, and then with both. The observed differences in the resonances will show the effects that the mouthpiece and the bell have on the instrument's vibrating air-column.

Examining Student Understanding: Dynamics within Rotating Reference Frames

D. P. Cassidy, Western Michigan University (david.p.cassidy@wmich.edu)

Students of all levels have a difficult time understanding dynamics, especially when treated from a rotating frame. To elucidate why this may be, think-aloud, problem-solving sessions were conducted with eight physics graduates. Each of whom was tasked with describing several situations from both the fixed and rotating frames. From these descriptions and subsequent open-ended interviews several obstacles to student understanding were identified. Possible pedagogical solutions to these obstacles are being developed, informed by the limitation and successes of traditional instruction. This pathway for future instruction and research will be discussed, with an emphasis on feedback and collaboration.

Lawrence Tech's Quest Program to Foster Undergraduate Research

Dr. Changgong Zhou et. Al., Lawrence Technological University (czhou@ltu.edu)

In 2009, the Arts & Sciences College of the Lawrence Technological University introduced an extracurricular program, called the Quest program, with the goals of providing experimental learning and helping students identify their career passion. Students who participate in the program can apply for funding to work on projects of three different categories: arts, leadership, and research. In this presentation, an ongoing interdisciplinary research project conducted by a team of three undergraduate physics students will be described. In this project, we make use of high-speed light sensors to analyze performance of camera flashes in terms of color shift and output stability, among other things. The project, along with students' learning experiences, will be presented. Co-presenters are Ryan Daniel, Xiangmin Wang, and Jamie MacLennan.

Click-on House: Physics in Society

Jeff Whittaker, The Dearborn Center for Math, Science & Technology (jbwhittaker@hfcc.edu)

Neodymium Iron Boron sphere magnets are being used to develop a new form of children's play house known as the "Click-on House". Chad Richert, from HFCC's Architectural Construction program, and Jeff Whittaker speak to the genesis and interdisciplinary research and development of this new technology.

Textbooks' Presentation of the Ambiguous Concept of "Weight"

Rex Taibu, Mallinson Institute for Science Education: Western Michigan University (rex.taibu@wmich.edu)

Two distinct physical constructs are involved in the discussion of 'weight': the gravitational and the scale force. Different experts name these constructs differently. The problem is also that the two constructs are given the same name, and the distinction is not made clear to students, which causes problems in accelerating reference frames (e.g., elevators and orbiting spaceships). Analysis of 13 introductory physics textbooks indicates that the debate regarding 'weight' is not explicitly stated in textbooks, the two physical constructs are not clearly presented, and semantic issues are prevalent. A new approach to teaching 'weight' is proposed.

Effects of Formative or Summative Assessment on Learning Force & Motion

Chaiphath Plybour, Western Michigan University (Chaiphath.plybour@wmich.edu)

We compared the effects of a strongly formative assessment system with a conventional mostly summative assessment system on student performance and attitude in a conceptual unit on force and motion. Two sections of an introductory physics course for prospective elementary teachers provided treatment and control groups, and both groups experienced both systems earlier in the course. Components of the formative and summative systems will be described. Student learning gains were higher for the formative group, and while reasons varied, most students preferred that formative system. Unexpectedly, student evaluations of the same instructor were very different for the two groups. Co-author: David Schuster

Henry Ford Community College

www.hfcc.edu

800-585-HFCC or 313-845-9600

- A Learning Technology Center**
Campus Safety
- AS Andrew A. Mazzara Administrative Services and Conference Center**
Eugene A. Forfa Auditorium
Michael Berry Amphitheater
Rosenau Board Room (A, B, C)
- B Facilities Management Building**
Purchasing
Shipping and Receiving
- C Student and Culinary Arts Center**
Fifty-One O One Restaurant
Skylight Café
Student Activities
- CAC Child Development Center**
- CS Colloge Store**
- D Dearborn Heights Center**
Center for Lifelong Learning (CL2)
Early College
- F MacKenzie Fine Arts Center**
Adray Auditorium
Sisson Art Gallery
- H Health Careers Education Center**
Hackett Conference Room H-150
- L Routhier Liberal Arts Building**
English Language Institute
Welcome Center - First Floor
- LIB Esheleman Library**
Media Center
- LRC Learning Resources Center Hallissey Hall**
Assisted Learning Services
Career Resource Center
Counseling
Learning Lab
Student Outreach Services
- M Michigan Technical Education Center M-TEC**
- N School of Nursing**
- PE Athletic Memorial Building**
Fitness Center
- S Science Building**
Planetarium
Community Room
- T Technology Building**
Distance Learning Center T-217
Ghafari Conference Room T-123
Job Placement T-112
- WC Welcome Center**
Admissions
Assessment Center
Cashier's Office
Community Room
Financial Aid
Records & Registration

