



Meeting Program

SACS-AAAPT Fall 2008 Meeting

Kennesaw State University, Kennesaw GA

October 24-25 2008

Friday October 24 (Location: KSU Center – Check first Map below- Use the South Entrance)

5:00 pm – 6:00 pm	Registration
6:00 pm – 7:00 pm	Buffet Supper
7:00 pm – 7:05 pm	Welcome Note: Dr. Larry Peterson, Dean, College of Science and Mathematics, Kennesaw State University
7:05 pm – 8:00 pm	Keynote Speech: "Exploring the Mind with Antimatter" Dr John Votaw of Emory University.
8:15 pm – 9:00 pm	"Physics Circus" show Dr. Clyde Smith of the South Carolina Governor's School of Science and Mathematics.

Saturday October 25 (Location: Clendenin Atrium & Room 1010- Check second Map below)

8:00 am – 8:45 am	Registration (Atrium)
8:00 am – 8:30 am	Coffee and Refreshments (Atrium)
8:30 am – 12:15 pm	Posters (Atrium)
8:30 am – 10:00 am	Contributed talks (I) (Clendenin 1010)
10:00 am – 10:30 am	Coffee Break (Atrium)
10:30 am – 12:15 pm	Contributed talks (II) (Clendenin 1010)
12:15 pm – 1:00 pm	Lunch (Atrium)
1:00 – 1:30 pm	SACS-AAAPT Business meeting (Clendenin 1010)
1:30 – 3:30 pm	Workshops (Science SC213 & SC214)

Saturday October 25, 2008

SACS-AAPT Fall 08 Contributed Talks Program

Clendenin Building

8:00 am to 12:15 pm

8:30 am – 8:45 am

Conceptual Change In Pre-Service Science Teachers' Views On Nature Of Science When Learning A Unit On The Physics Of Waves

Ehsan Kattoula

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Recent reform efforts in science education have culminated in National Science Education Standards (NSES), which include the nature of science and science inquiry themes across all grade levels. Consideration must be given to pre-service science teachers' nature of science conception, and their perceived roles in implementing properly the nature of science in the science classroom. Due to changes in science pedagogy required by the standards, this study looks at how pre-service science teachers' views about the nature of science develop and change when learning a college physics unit on waves.

This qualitative study uses the case study methodology with four pre-service science teachers as individual units of analysis. Data regarding the participants' views about the nature of science were collected before and after the instruction on the physics of waves. After completing the VNOS/VOSI-PHYS questionnaire the pre-service science teachers' views of the nature of science were coded as naïve, transitional, or informed. Based on the responses to the questions before the instruction, the participants' views regarding the nature of science were mainly naïve or transitional. The findings of this study provide evidence that using explicit instruction with specific activities, such as experiments and concept mapping, shifted the pre-service science teachers' views away from naïve and toward informed.

8:45 am - 9:00 am

Transforming common-sense beliefs into Newtonian thinking through Just-in-Time Teaching

Sarah P. Formica

Georgia College & State University, Dept. of Physics, 82 College Circle, Dahlonega, GA 30597, (706) 867-2701

sformica@ngcsu.edu

We analyze whether teaching an introductory physics course with a traditional lecture style or with Just-in-Time Teaching (a student-centered, interactive engagement style) will help students to better understand Newtonian concepts, such as Newton's Third Law. We examined 222 students in introductory physics courses taught by traditional lecture styles and Just-in-Time Teaching at North Georgia College & State University over the span of five semesters using the Force Concept Inventory as a pre-test and a post-test. Overall, the gains favor the Just-in-Time Teaching method with a $37.8\% \pm 2.0\%$ gain compared to the $19.9\% \pm 2.4\%$ seen in traditional lecture classes. When analyzing only those gains pertaining to the Newton's Third Law questions, the results again favor the Just-in-Time Teaching method with a gain of $52\% \pm 3.7\%$ while the traditional lecture classes only saw a gain of $13\% \pm 4.0\%$. Another method of analysis used was a BIT Coding we created to quickly identify students' understanding of Newton's Third Law questions. Our study shows that students in courses using the Just-in-Time Teaching strategy better understand Newton's Third Law after instruction than do students in traditional lecture courses.

9:00 am – 9:15 am

Implementing Studio Physics for Algebra-based Introductory Courses at Georgia State University

Cherilynn Morrow, John Evans, Brian Thoms

Georgia State University, cmorrow@gsu.edu

Georgia State University (GSU) has begun a concerted effort to improve introductory physics teaching & learning with emphasis on the algebra-based courses that serve other STEM majors such as biology. More than 800 students take these courses each year. Accordingly, the current semester (Fall 2008) finds us in the process of teaching our first section of Phys 1111 in a new, 54-seat Studio classroom—a cutting edge, technology enhanced, collaborative learning environment for integrated lecture/laboratory courses. GSU's Studio classroom has six, 7-foot diameter round tables with three teams of three students at each table. There is one laptop computer for each student team. The environment lends itself to greater interaction among students and between the students and instructor. The greater achievement of women and African American students using this Studio-styled approach has been documented by Robert Beichner and colleagues at NC State. This is of significance for GSU owing to the large populations of students in these categories who take the introductory physics sequence (Phys 1111 and Phys 1112). The early focus of our emerging education research program is to document the teaching & learning performance of the Studio classroom compared to a more traditional approach.

9:15 am – 9:30 am

PTRA Workshop on Energy, Momentum, and Impulse

Bob Powell

University of West Georgia 678 839-4095 , bpowell@westga.edu

Sharon Kirby, Cherokee County Schools, & Ann Robinson, Paulding County Schools (Retired)

The University of West Georgia received a grant from the Math Science Partnership Program (MSP) in the State of Georgia in March, 2007. The workshop on Kinematics and Dynamics was offered in June, 2007. The grant was renewed in May, 2008 for Year II. The funded project was Training Institutes for Physics and Physical Science (TIPPS) and used the curriculum developed by the Physics Teacher Resource Agents (PTRA) of the American Association of Physics Teachers (AAPT). Two PTRAs taught 19 participants the AAPT/PTRA units on "Energy, Momentum, and Impulse" in a five day summer workshop with a follow-up session in September, 2008; a second follow-up session is planned for early 2009. A tour of the nearby Plant Wansley, operated by the Georgia Power Company, was arranged for part of the September follow-up session.



9:30 am – 9:45 am

Some Inexpensive Physical Models for Visualizing Concepts in Electromagnetism.

Ntungwa Maasha

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While mathematical models provide powerful representation in electromagnetic theory, some students in introductory physics courses find mathematical formations abstract. Thus, appropriate physical models can be of benefit in supplementing mathematical descriptions in visualizing some concepts in electromagnetic theory. I present several inexpensive physical models to help students visualize the electric field associated with charged bodies of simple geometric shapes.

9:45 am – 10:00 am

Discovering Wanderers

Matt Marone

Mercer University, Department of Physics, 1400 Coleman Ave., Macon GA 31207, marone_mj@mercer.edu

By combining the power of image processing and planetarium software students can “discover” planets, comets and asteroids. A star field image containing such objects can be generated using any of the numerous planetarium programs. Students are presented with several images and then challenged to find the objects that have moved. Most image processing software programs have a means for subtracting images. Students overlay the images and try to find the difference between them. Here is a good opportunity to show the utility of sidereal time. In some cases, we superimpose right ascension and declination grids so that the students can try to determine what the actual object is. We have used this technique to create fascinating laboratory exercises that our students enjoy.

COFFEE BREAK 10:00 am – 10: 30 am

10:30 am – 10:45 am

Exam Reflection Surveys in Introductory Mechanics

Craig C. Wiegert

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Many students in introductory physics lack effective learning strategies for such a course. This is true even of students who have taken many previous math and science courses. Encouraging and modeling effective strategies is often not enough to convince students who have succeeded in the past with other study methods requiring less effort. For these students, evidence of their peers' "secrets of success" may be more convincing. To that end, I have been surveying introductory mechanics classes after their first exam, on the topic of their exam study strategies. I then present the survey data in class, organized by exam letter grade, and asked the students to interpret the results. This simple and practical example provides an opportunity to discuss several aspects of scientific reasoning, including the distinction between induction and deduction, and correlation versus causation.

10:45 am – 11:00 am

Conceptual Physics. Studying and teaching Introductory Mechanics

Mikhail M. Agrest

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Teaching Mechanics in the introductory Physics courses provides the teacher with a great opportunity to expose students to the powerful ideas of modeling in Physics. The common sense assumptions sometimes stay not emphasized to students and don't leave significant trace in their minds.

Students worship learning by their own hands on experience and love to create their own rules of thumb. It is very easy to take for granted what one can see with his/her own eyes and to create a misconception based on the apparent clarity of behavior of objects on the scale of our everyday experience. Things are often not what they seem to be. Students might not necessary understand some ideas that are obvious for the teacher.

This paper is about the importance of exposing the concepts hidden behind the routine procedures and so correcting misconceptions and clarification of the assumptions in the modeling processes in Mechanics.



11:00 am – 11:15 am

Energy and Power Investigations Using Student-Centered Motion Data

J.B. Sharma

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jsharma@gsc.edu

The Global Positioning System (GPS) captures the 3-D position vector of a moving object at a sampling rate of up to 1Hz. This allows students to capture motion within which they are embedded. Knowing the mass of the moving object, the net force, net work done and net power delivered to the motion can be calculated. This can allow students a wide range of projects in which they analyze principles of mechanics in the context of their motion. Students have performed a range of projects related to energy and power of internal combustion engines of cars, motorcycles and powerboats. Furthermore the American College of Sports Medicine (ACSM) equations allow students to calculate their metabolic rate and energy consumption while running, walking or biking. This opens up a whole range of 'human physics' investigations and are particularly appropriate for life science majors.



11:15 am – 11:30 am

Impulse Momentum Diagrams (IMDs)

David Rosengrant

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Representations are a vital part to help students solve problems and learn concepts in physics. However, certain concepts do not have many representations to help students. One of those concepts is momentum. I present a new representation to help students understand momentum, impulse and conservation of momentum. I call this representation an Impulse-Momentum Diagram (IMD). In this talk, I present a description of this diagram as well as examples on how instructors can use them in the classroom. Next, I present preliminary quantitative and qualitative data from a study where students learned how to use these representations. Students reacted very favorably to this representation and the students who learned how to use these representations were just as if not more successful than students who learned via a traditional mathematical representation.

11:30 am – 11:45 am

Tee Zero: A game of symbolic manipulation

Tatiana A. Krivosheev

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TatianaKrivosheev@mail.clayton.edu

We present Tee Zero – a physics based game currently being developed by Big Fun Development company. The purpose of the game is to improve a student's fundamental ability to work with symbols while interacting directly with scientific phenomena. Tee Zero will offer a unique opportunity for many students who are learning poorly from books, lectures and even computer-based training: they can explore mathematics and exercise their skills on their favorite learning device: the videogame console. Tee Zero offers parents and teachers a cost effective alternative to tutors, remedial classes and out-of-school test prep programs. The game is expected also to be attractive to the advanced middle school students, particularly in rural and urban schools, there may be no advanced math track.



11:45 – 12:00 pm

Collaboration between Physicists, Science Teachers and Students to Study Cosmic Ray Particles

Xiaochun He and John Wilson

Department of Physics and Astronomy, Georgia State University, xhe@gsu.edu

The faculty and staff members in the Department of Physics and Astronomy at Georgia State University have been working on creative ways to improve student achievement in science and mathematics. This project allows middle and high students and their science teachers to work on a real scientific research project in collaboration with physicists to study cosmic ray particles and the associated applications. In this talk, we will present the past activities and the future plans of our outreach program.

12:00 – 12:15 pm

Study of Online vs. Traditional Physics Homework

Joshua M. Dyer

Clayton State University, 2000 Clayton State Blvd, Morrow, GA 30240, 678-466-4783, JoshuaDyer@mail.clayton.edu

This talk is a preliminary look at my current investigation as to which mode of homework is most beneficial to students as a learning tool, online homework or written homework. I will discuss the overall design of the experiment and what current issues I am having with the study and some early findings.

Saturday October 25, 2008

SACS-AAPT Fall 08 Posters & Workshops

Clendenin Building

8:15 – 12:15 pm – Posters

Clendenin Atrium

I) Study of the performance of several beam geometries (RT-plans) in intensity modulated radiation treatment of prostate cancer.

Moyosore O. Olagoke, Tatiana A. Krivosheev

Clayton State University, 2000 Clayton State Blvd, Morrow, GA 30240, 678-466-4783, TatianaKrivosheev@mail.clayton.edu

We present a study of the performance of three different beam geometries (3-, 5-, and 7-beams) in intensity modulated radiation treatment (IMRT) planning. The plans were created with the Hyperion treatment planning system based on CT information for prostate cancer case. The performance was evaluated based on several parameters, such as mean doses delivered to primary target volume (PTV) and organs at risk (OAR), and normal tissue complication probabilities (NTCP's) which were calculated for each organ at risk to predict radiation-induced complications. A global scoring method was then used to evaluate the plans according to their degree of success in meeting the objectives.

1:30 – 3:30 pm – Workshops

I) Using Starry Night in Introductory Astronomy classes (Science SC213)

Matt Marone

Mercer University, Department of Physics, 1400 Coleman Ave., Macon GA 31207, marone_mj@mercer.edu

For several years I have used Starry Night software to supplement material in our introductory astronomy class. Using Starry Night, many of the illustrations found in typical text books can be brought to life as animations. I would like to introduce teachers to this software and share some of the “tricks” that I have developed. This will be hands on activity. Several laptops will be provided so that you can try things out. Think about some of the difficulties your students have and bring those ideas to the meeting. We can then work together to find ways of using the software to simulate things that are difficult for our students to visualize.

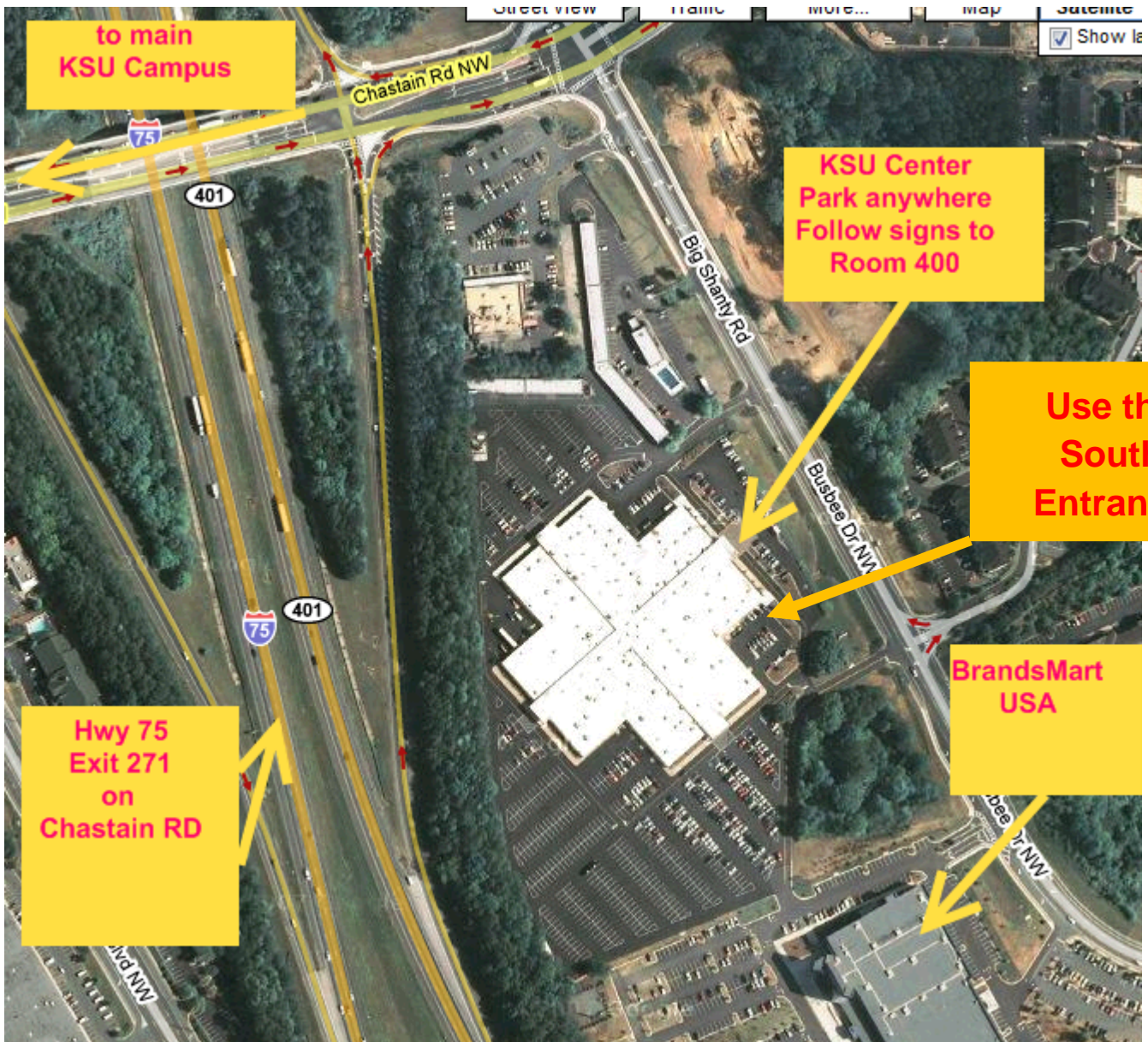
II) Analysis of Student-Centered 3D Real World Motion in Introductory Mechanics Courses (Science SC214)

J.B. Sharma

Department of Physics, Gainesville State College, Gainesville, GA 30504 , 678-717-3812, jsharma@gsc.edu

The GPS technology captures a real time 3D position vector of a moving object at a sampling frequency up to 1 Hz. This allows for an examination of a wide range of 3D real world motion. If the mass of the moving object is known, the kinematics, dynamics and energetics of the moving object can be calculated. This workshop will give the participants a hands-on experience with capturing real-world motion with a GPS unit and downloading the data onto a computer for analysis with the Graphical Analysis software. Ideas for curricular integration into an introductory mechanics course will be discussed and the use of geo-spatial software like Google Earth and GPSTrackmaker will be demonstrated.

Map for Friday Night Activities:



For a full campus Map, refer to:

http://www.kennesaw.edu/admissions/pdfs/ksu_2d_map.pdf

Map for Saturday Activities:



For a full campus Map, refer to:

http://www.kennesaw.edu/admissions/pdfs/ksu_2d_map.pdf



**Registration Form
SACS-AAPT
Fall 2008 Meeting
October 24-25, 2008
Kennesaw State University**

Name : _____

Address: _____

Email: _____

Registration Fee :

- Friday + Saturday: \$25
- Friday Only: \$12
- Saturday Only: \$15

Membership Dues:

- University Faculty: \$5/year _____ years
- High School Faculty/Student: \$0

Total enclosed: _____

Address check to: SACS-AAPT

Lodging Information:

The following hotels/motels are within a couple of miles from the KSU campus. They all offer a Kennesaw State University rate, however, when checking online, I found that you can often beat that rate. Check this site for example:

<http://hotel-guides.us/colleges/georgia/kennesaw-state-university.html>

SpringHill Suites (approximately \$96 plus tax)

3399 Town Point Drive
Kennesaw, GA 30144
(770) 218-5550

Fairfield Inn (approximately \$99 plus tax)

3425 Busbee Drive
Kennesaw, GA 30144
(770) 427-9700

Residence Inn (approximately \$104 plus tax)

3443 Busbee Drive
Kennesaw, GA 30144
(770) 218-1018

Holiday Inn Express (approximately \$92 plus tax)

2485 George Busbee Parkway NW
Kennesaw, GA 30144
(770) 427-5210

Comfort Inn (approximately \$75 plus tax)

2489 George Busbee Pkwy
Kennesaw, GA 30144
(770) 499-9200

Suburban Lodge (approximately \$49.99 plus tax)

2900 George Busbee Pkwy
Kennesaw, GA 30144
(678) 581-1778

Best Western Motel (approximately \$69.95 plus tax.)

3375 Busbee Drive
Kennesaw, GA 30144
(770) 424-7666