

**American Association of Physics Teachers - South Atlantic Section**  
**Spring '99 Meeting , Friday Mar 12- Saturday Mar 13**  
**Gainesville College, Gainesville, GA 30504**

**FRIDAY, MARCH 12**

**REGISTRATION : 5:00 pm Continuing Education Lobby**

**GAINESVILLE COLLEGE PHYSICS FACILITIES INTERACTIVE TOUR:**

**5:45 pm -6:45 pm Science Building**

The Physics Electronic Classroom - J.B. Sharma

The Physics Microcomputer Based Laboratory - Jeff Turk and Wally Beck

GPS in Physics Instruction - Chris Semerjian

**BANQUET : 7:15 pm to 8:45 pm Continuing Education Building**

**"Revitalization - Is it Needed ? "**

Prof Tom O'Kuma

President , American Association of Physics Teachers 1998-99

Lee College, Baytown, TX

**SATURDAY, MARCH 13**

**CONTRIBUTED PRESENTATIONS : 8:00 am**

**Continuing Education Auditorium**

8:00am -8:15 am

**You Can Teach More Than Optics with an Aquarium**

Joe P. Meyer

Department of Physics

North Georgia College and State University

Dahlonega, GA 30597      jpmeyer@stc.net

The understanding and manipulation of vector quantities is probably the most important single physics concept that is taught to students beginning their careers in engineering. We teach the word vector as a noun, and then, for the rest of the year, use it as an adjective. Students think that magnitude implies "skip the units". Direction should be taught vector quantities in 3 dimensions from the start. 10 and 20 gallon aquariums will be used to illustrate vector direction, magnitude, addition and the direction cosine.

8:15 am - 8:30 am

**Two Body Tension Problems in the Lab**

Don Franklin

Battery Creek High School Burton, SC 29906

1800 7631785 x 271      dgfrank1.@aol.com

Additional Author - Alen Brown , Pasco Scientific

Two body tension problems can be done by hanging a mass over the end of an incline, but many problems in our books show two inclines and coefficients of friction. Using two Inclined planes with angle marking, we can adjust the inclines at different angles, different masses and coefficients of friction. The Science Workshop program is used with an Accelerometer. This will give instant values for the acceleration and help to show any

changes made in angle, mass or coefficient of friction.

8:30 am - 8:45 am

**Some New PASCO Microcomputer Based laboratory Products**

Alen Brown PASCO Scientific

A few new stand alone products for MBL physics laboratories from PASCO scientific will be presented. Special emphasis will be placed on our new computer interface, the 750 and the new software for this interface.

8:45 am - 9:00 am

**A Quick Tour of ActivPhysics2**

Dr. Christoher Wozny

Waycross College

2001 South Georgia Parkway

Waycross, GA 31503

(912) 285-6140 woz128@mail.way.peachnet.edu

ActivPhysics2 is the second half of a web browser-based software package of interactive physics simulations which teaches basic physics concepts and principles using a Socratic inquiry format. ActivPhysics1 was created by Alan van Huevelen and is composed of ten Units of study that cover the topics of mechanics, thermodynamics, and wave motion. ActivPhysics2 was written by Alan van Huevelen and Paul D'Alessandris and has ten Units covering electricity, DC circuits, magnetism, geometric and physical optics, and modern physics. This talk will present highlights of some of the best simulations on the ActivPhysics2 CD and suggest methods for incorporating the software in a physics course curriculum.

9:00 am - 9:15 am

**Web Interaction for Astronomy Students at USC**

John L. Safko

Dept of Physics and Astronomy, University of South Carolina, Columbia SC 29208

phone: 803/777-6466 fac: 803/777-3065 email safko@sc.edu

Thus semester the introductory self-paced courses in astronomy at USC were converted to computer evaluations on a LAN. Diagnostic information is provided to the student so he/she may obtain answers and help on the WEB. Students may also obtain progress information and schedule laboratories on the WEB. A demonstration is planned.

9:15 am- 9:30 am

**Detection at ng level of Strychnine Using a Raman Microscope--Application of Vibrational Spectroscopy in a Forensic Diagnostics**

V. Anantha Narayanan

Professor of Physics

POB 20473, Savannah State University, Savannah, GA 31404

Tel: 1-912-927-9330 Fax: 1-912-927-9330 E-mail ananthan@tigerpaw.ssu.peachnet.edu

Strychnine is an Indole alkaloid. Alkaloids are nitrogenous substances from the vegetable kingdom. Strychnine, quinine, atropine, cocaine, and morphine are well known alkaloids. Strychnine being useful as a rodent killer is not a controlled substance. Strychnine is a compound of medicinal values at proper dosage, but is a potent toxin

leading its abuse at lethal dose to commit murder by criminals and commit suicide by disturbed people. We report here the complete vibrational spectrum of strychnine by FTR, FTIR, and by a Raman microscope attached to a Raman spectrometer. The Raman microscope was used to record the spectrum of a 5ng (15 picomole) crystal of Strychnine giving a complete spectrum. The vibrational spectral analysis has been done to aid the potential application in any criminal and medical emergency situations involving abusive use of strychnine.

9:30 am - 9:45 am

**Teaching Paradigm Shifts in the Physics Laboratory**

Dr. Richard Summers

Reinhardt College

7300 Reinhardt College Circle, Waleska, GA 30183

(770) 720-5597 [rds@mail.reinhardt.edu](mailto:rds@mail.reinhardt.edu)

One of the more valuable things we can teach, which students can carry to their work experience and to their daily life, is to sometimes stand back and view a problem from a different perspective. In fact, this approach has led to many important discoveries in the past.

The presentation addresses this idea of paradigm shifting using a very old problem, that of putting a capacitor of maximum capacitance in a given volume. The laboratory exercise has been class tested and the results will be presented in the talk.

9:45 am - 10:00 am

**Ready, Set, Scramble! – A Test Scrambling Macro.**

Michael J. Pangia,

Assoc. Prof. of Physics,

Georgia College & State University,

Milledgeville, GA 31060.

(912) 445-4287. [mpangia@mail.gcsu.edu](mailto:mpangia@mail.gcsu.edu).

A test scrambling macro that works with Microsoft Word 97 will be illustrated. It was written using the abridged version of Visual Basic that is embedded in Microsoft Word. The purpose of the macro is to simplify the production of multiple versions of a test. Two test formats can be scrambled. One format is multiple choice, for which the macro randomly scrambles the order of the questions and the order of the choices. The second format is free-response, for which the question order would also be scrambled, but, in addition, two random numbers get generated for each question that can be automatically substituted into the test, thus allowing for different answers for the different versions.

**BREAK : 10: 00 am - 10:15 am**

***SPECIAL SECTION ON STUDENT PRESENTATIONS :***

10:15 am - 10:25 am

**Oscillations with nonlinear friction - theory**

Telford Wood

Georgia Southern University

P.O. Box 8031, Statesboro, GA 30460

(912)-681-5293 [mpayne@gsvms2.cc.gasou.edu](mailto:mpayne@gsvms2.cc.gasou.edu)

Additional Authors : Dr. Marvin Payne, Tommy Manning, and Marlow Lemons

Simple energy principles are used to derive the motion of a car attached to two springs on a horizontal air track. A sail is attached to the car, so that its motion is damped by air friction. The damping is consistent with the frictional force being quadratic in the speed of the car with a drag constant of  $c=4.2$ . The functional form of the motion is derived, and will be compared with experiment in another talk.

In a second study of the motion of a car on an incline, the far end of one of the springs is driven with simple harmonic motion. A theory is presented for the forced motion of such a simple harmonic oscillator with quadratic friction. In another talk this theory will be compared with experiment.

10:25 am - 10:35 am

**Two pendulums with different types of friction**

Tommy Manning

Georgia Southern University

P.O. Box 8031, Statesboro, GA 30460

(912)-681-5293 [mpayne@gsvms2.cc.gasou.edu](mailto:mpayne@gsvms2.cc.gasou.edu)

Additional Authors : Dr. Marvin Payne, Marlow Lemons, and Telford Wood

We study two types of pendulums. The first, is damped because of sliding friction in the suspension, while the second is damped by air friction. Theory predicts that in the first case the amplitude of the oscillations decreases linearly with time, while in the second case the amplitude damps rapidly at early times but very slowly at late times. For both types of pendulum the results of theory is compared with experiment.

10:35 am - 10:45 am

**Oscillations with nonlinear friction - Experiment**

Marlow Lemons

Georgia Southern University

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(912)-681-5293 [mpayne@gsvms2.cc.gasou.edu](mailto:mpayne@gsvms2.cc.gasou.edu)

Additional Authors : Dr. Marvin Payne, Tommy Manning, and Telford Wood

The motion of a car mounted between two springs on a horizontal air track is studied in a situation where the friction is dominated by air friction. Thus, the friction is expected to be quadratic in the speed. Damped oscillations are studied and compared with the theory presented earlier by Wood. Agreement is excellent.

In a second study of the motion of a car on an air track, the far end of the springs is driven with simple harmonic motion. The amplitude of the steady state oscillations are measured as a function of the driving frequency. The experimental resonance lineshape of the amplitude is compared with the theory presented earlier by Wood.

10:45 am - 10:55 am

**Using GPS to Analyze Real-Life Motion**

Eric Chapman

Dept of Physics

North GA. College and State U.

Dalhonega, GA 30597 [echa@stc.net](mailto:echa@stc.net)

Additional Authors : Bryan Ivie (NGC&SU), J.B. Sharma (Gainesville College)

This project was done as a part of a special topics physics course at Gainesville College. The project involved the Global Positioning System, or GPS, which allows the collection of three-dimensional position versus time (latitude, longitude, altitude, and time) of any moving object above the surface of the earth. The motion examined was of a person running up a flight of stairs. Differential GPS correction was applied to the collected data. This corrected data was uploaded into a software program, called PSI-Plot, in order to make calculations for the quantities of interest. The quantities were velocity in the x, y, and z directions, the magnitude of velocity, acceleration, force, momentum, and power expended.

***END OF SPECIAL SECTION ON STUDENT PRESENTATIONS***

11:00 am - 11:15 am

**Geographic Center of a State from its Center of Gravity**

Bob Powell

State University of West Georgia

Carrollton, Georgia 30118

770 836-4316    bpowell@westga.edu

The geographic center of the State of Georgia is located close to I-20 in Twiggs County, Georgia. A nearby marker indicates this point was determined by inscribing the outline of the state onto a metal plate and suspending the plate from two different axes to determine the Center of Gravity. In appropriate Introductory Physics classes copies of the map have been given to the students to cut away the surrounding states to determine the Center of Gravity and to compare to the known result.

11:15 am - 11:30 am

**A Low Cost Projectile Demonstrator**

Stephen Merwin

Augusta State University

Department of Chemistry and Physics

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Augusta, GA 30904

(706) 667-4516    jhauger@aug.edu

Additional Author : Dr. Andy Hauger

Projectile motion is a difficult concept for the typical introductory physics student. One of the difficulties is realizing the difference between the position vector components and the velocity vector components. A simple, low cost demonstration device will be shown that can be used to overcome some of the difficulties students encounter when learning projectile motion. In addition, the device can be used to demonstrate the relationship between projectile launch angle and the range.

11:30 am - 11:45 am

**Simulations in Introductory Physics Laboratory Courses**

J.B. Sharma

Gainesville College

Gainesville, GA 30504

770-718-3812    [jsharma@hermes.gc.peachnet.edu](mailto:jsharma@hermes.gc.peachnet.edu)

Simulation of physical phenomena has a pedagogical advantage when it is not viable to set up the actual physical situation. It is an important tool for visualizing physical situations and for an additional check for match between theory and experiment. In the real world, simulations are increasingly used for prototype building and testing. The laboratory component at GC has an increasing simulation component in the Mechanics and E&M labs. This is done using the Programs 'Interactive Physics' (Knowledge Revolution), 'EM fields' and 'Graphs and Tracks' (Physics Academic Software).

**11:45 am - 12:15 pm**

**SPECIAL INVITED PRESENTATION**

***CONCEPTUAL SURVEYS IN INTRODUCTORY PHYSICS COURSES***

**Tom O'Kuma**

**Lee College**

**Baytown, TX**

**SACS-AAPT BUSINESS MEETING 12:15 pm - 12:40 pm**

**LUNCH BREAK 12:40 pm - 1:40 pm SIDNEY'S GRILL (Opposite the GC Campus)**

**AFTERNOON WORKSHOPS :**

**1:45 pm - 3:00 pm**

**GPS IN INTRODUCTORY PHYSICS COURSES - Rm 126 Science Bldg**

**Chris Semerjian - Gainesville College, GA**

This workshop allows for a 'hands on' experience with Global Positioning Systems which can measure your position (Latitude, Longitude, Altitude) every one second. This opens up the possibility for analysis of 'real-world' motion and connecting classroom learning with experiential reality. You will collect data of your own motion about the GC campus and then analyze it using 'Graphical Analysis' and 'Sci-Plot' for your speed, acceleration, horsepower etc.

**1:45 pm - 2:45 pm**

**THE PHYSICS MICROCOMPUTER BASED LABORATORY (MBL) - Measurement, Simulation and Analysis - Rm 118 Science Bldg**

**J.B. Sharma - Gainesville College, GA**

**Tom O'Kuma - Lee College, TX**

The physics MBL opens up a range of possibilities of relating physical principles with experiential reality. This workshop will survey the following capabilities i) Real- time sensors ii) Simulations using 'Interactive Physics' iii) Video Capture and Analysis.

**1:45 pm - 2:45 pm**

**THE 'ACTIVE PHYSICS' CURRICULUM FOR HIGH SCHOOL PHYSICS**

**Rm 124 Science Bldg**

**Don Franklin - Battery Creek High School, Burton, SC**

Active Physics is a curriculum and textbook sponsored by AAPT and NSF. South Carolina has adopted this program for its Math and Science Hubs to develop for schools in their areas. This program has a training program to help teachers who are under-prepared in physics understand how much physics they all ready knew, but were not aware. The approach is different, but the physics is still real. See if you think high schools in your area would benefit from this program.

Feb 24, 1999

Dear SACS-AAPT Member,

Enclosed is a copy of the Program Schedule for the upcoming Spring '99 SACS-AAPT meeting to be held at Gainesville College, GA on March 12 and 13. This program is subject to minor changes. Also enclosed is a map with directions to Gainesville College and a map of the college campus.

I am also sending you a pre-registration form for the meeting. Please fill in the requisite information and mail it back to me as soon as you can. A copy of the election ballot for 1999 elections is also enclosed. Please fill this out and mail this to me as well.

Once more, following is a list of hotel accommodations convenient to the college :  
**Jameson Inn - 770-533-9400 (~0.25 miles) Country Inn and Suites - 770-535-8080 (~0.5 miles)**  
**Holiday Inn - 770-536-4451 (~6.0 miles) Ramada Inn - 770-287-3205 (~6.0 miles)**  
Please be sure to reserve a room ASAP as there is a big race at the nearby Atlanta Motor Speedway that weekend. Gainesville, GA is located about 50 miles NE of Atlanta on the foothills of the Appalachian Mountains and on the shores of lake Lanier. We look forward to having you on our campus.

Regards,

J.B. Sharma  
Associate Professor of Physics

TEAR HERE

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**SACS-AAPT SPRING '99 MEETING PRE-REGISTRATION FORM**

**NAME :** \_\_\_\_\_

**INSTITUTION :** \_\_\_\_\_

**PLEASE ENCLOSE A CHECK (made out to SACS-AAPT) FOR THE \$15.00  
REGISTRATION FEE  
(Registration fee includes the banquet on Fri Mar 12)**

**I would like to attend the following workshop on Sat Feb 13 afternoon :**

- \_\_\_\_\_ **The Physics MBL - Measurement, Simulation and Analysis (1:45 -3:00 pm)**
- \_\_\_\_\_ **GPS in Introductory Physics Courses (1:45 - 3:00 pm)**
- \_\_\_\_\_ **'ACTIVE PHYSICS' Curricula For High School Physics (1:45 - 2:45 pm)**

**Return to : J.B. Sharma, Division of Science, Gainesville College, Gainesville, GA-30503**

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