

Presentation Schedule with Abstracts:

8:30 AM Welcome and Announcements

8:45 AM *Physics Labs with Flavor: Recurrent approach*
Mikhail M. Agrest
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Presented work is dedicated to improvement of effectiveness of the teaching-learning process. Objectives of the hands-on experience are discussed. The Recurrent approach was developed to enhance learning and help students comprehend the material by using learned material to predict and test the results within the same lab. The method is promoting general approach developed in [1 - 4]. In the direct study of the phenomenon students perform experiments; analyze the data and the results; assess theoretical model; find quantitative features of the phenomenon. The essence of the recurrent approach is contained in the use of the direct study results to predict new results in an experiment on the same phenomenon in reverse order. The approach allows to consider the same phenomenon from a different perspective; provides the opportunity for students to use the knowledge that they have just learned. Psychologically, students' excitement is encouraging them to work more effectively in the lab. The assessment, based on the student's prediction of the results could be justified. This method was tested in Introductory and General Physics labs at the College of Charleston for both non-science majors and science, including Physics, majors. The teaching-learning effectiveness has been increased and positive feedback was received from students and faculty at the College and some other Universities. Learn how to bring flavor into any lab by making it "shot for your grade" type of a lab.

1-4 M. Agrest. Lectures on Physics. Volumes I-IV. Tavenner Publishing Company, 2002.

9:00 AM *Lectures on Physics: Multi-dimensional interaction.*
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Lecturing in the Physics class with a large number of students is the objective reality. Interaction with all the students in class becomes a challenge, which requires the lecturer to possess artistic features of a speaker as well as a leader and a manager. Teaching Physics demands the professor to expose to students philosophy of the discipline as well as its language and also teach actual skills, required to understand what Physics is all about. Presented work is dedicated to improvement of teaching-learning process and classroom time utilization. Transparencies and/or PowerPoint Presentation incorporated with the identical hard copy of the Lectures on Physics [1 - 4] were developed. This book is actually a workbook, which requires students' participation continuously during the lecture, at the same time helping to deliver the professor's words to each student individually. Students participate in the teaching-learning process through listening, discussing and making notes in the space provided in their hard copy completing ideal supplementary issue for their study out of the classroom. Presented method provides the opportunity to cover more material in class with the important for Physics classes derivations and correlation of concepts. It also saves time for discussion qualitative

issues, demonstrations, problem solving, etc. The teaching-learning effectiveness has been increased at the College of Charleston and positive feedback was received from students and faculty at the College and some other Universities.

1-4 M. Agrest. Lectures on Physics, Volumes I-IV, Tavenner Publishing Company, 2002.

9:15 AM *Physics (and Chemistry) Outreach at AASU*

Donna Mullenax

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The Pre-college Outreach Program in the Department of Chemistry and Physics at AASU has been active for many years. There are several phases of outreach that are performed, both in-house and off-campus. Local schools and organizations come to campus for science demonstrations and/or laboratory experiments. Faculty and students also travel to the schools for the demonstrations and assist teachers in experiments. Through this talk, what we have done and have learned over the past year will be shared.

9:30 AM Break

9:45 AM *BQ: Free Software to Poll Everyone*

Bill Junkin

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Polling students to get feedback (either in real-time or prior to class) allows the instructor to know what concepts students in class understand and what is still unclear. This session will demonstrate polling software, "BQ," that can be used effectively for pre-class polling (JiTT) and in-class polling (Peer Instruction) with a variety of platforms. With this software, the instructor's computer receives responses from students using a variety of systems: networked computers, Internet-ready cell-phones and/or commercial keypad systems. This software requires no programming (just the ability to complete web-forms) and is freely available for educational purposes.

10:00 AM *Making Learning More Active in Introductory Physics II Course*

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Physics education research has shown that making learning more active enhances students' understanding of principles of physics. Activity-Based Learning in laboratory and classroom has been successfully used at a number of institutions such as Dickinson College, University of Oregon, and Tufts University. The author attended a "Promoting Active Learning in Introductory Physics Course II" workshop at Dickinson College in summer 2002. A few interactive learning strategies that are found useful and are used by an author in his classroom are discussed.

10:15 AM *Physical Oceanography: an Oxymoron?*

Louis Keiner

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Marine Science is the largest major at Coastal Carolina University, with over 500 undergraduates in the program. As a part of the program, all majors are required to take Physical Oceanography (MSCI 301), a survey of the mechanics and thermodynamics of the marine environment. Calculus Physics is a pre-requisite for this class: marine science majors account for about 80% of the students in that course. This talk will focus on applying Physics to a field outside the traditional area of undergraduate physics instruction - and the joys and frustrations of teaching physics to students who just want to swim with the dolphins.

10:30 AM *PTRA Summer Workshop for High School Physics Teachers*

Teresa Burns

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For the past two summers, the physics department at Coastal Carolina University has hosted a summer workshop for high school physics teachers. This talk describes the meeting, and discusses some of the challenges, and positive outcomes. Opportunities for upcoming workshops will be discussed.

10:45 AM Break

11:00 AM *A Visit to a Nearby Impact Crater*

Amy Richards and Bob Powell

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Asteroids, comets, and meteoroids have collided with the Earth throughout its history. Over 150 astroblemes have been discovered on the Earth. Typically, impact sites are identified by circular terrain features, displaced rock formations, and shock effects, such as shatter cones. The best preserved impact crater is found near Winslow, Arizona. In the southeast, impact craters are located at Wells Creek, Tennessee, Flynn Creek Tennessee, Middleboro, Kentucky, and Chesapeake Bay, Virginia. Recently, an unusual feature in Alabama has been identified as an astrobleme. It is located at Wetumpka, Alabama, about 30 kilometers north of Montgomery, Alabama. This horseshoe-shaped feature is about 6.5 kilometers across and was possibly formed about 83 million years ago by an impactor about 350 meters in diameter. Its elongated shape suggests a low angle impact. The authors recently visited the Wetumpka Crater to acquire more knowledge of this astrobleme and to make photographs to share at this meeting.

11:15 AM *Design and Evolution of an Instrument to Detect Volatile Organic Compounds in Soil and Water*

Prem Mathai, Roger Sakhel and John Reddic*

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Volatile organic compounds (VOCs) are found as contaminants in the environment due to poor disposal techniques or accidental spills from industrial and individual sources.¹ Once these chemicals are in the environment, they partition into the water and soil where they can have a negative impact on flora and fauna. With this in mind, the development of techniques for rapidly detecting the presence of organic contaminants becomes important. In this talk we present the basic concepts for resonant multiphoton ionization (REMPI) as a technique for detecting various VOCs in environmental samples.² Focus is

placed on the design of a sampling system that allows for accurate and rapid analysis of samples. This includes how the system has evolved over time to incorporate ease-of-use sampling techniques and to overcome experimental limitations in the current configuration.

1. E. M. McGrath, K. S. Booksh and J. J. Breen, *Process Analytical Chemistry*, F. McLennon and B. R. Kowalski, Eds. (Chapman-Hall, New York, 1995), p. 132.
2. B. M. Cullum, S. K. Shealy and S. M. Angel, *Applied Spectroscopy*. 53, 1646 (1999).

11:30 AM

Ultraviolet Imaging of EI Eri

Tabetha Boyajian and James Neff

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The IUE satellite was used to observe HD 26337, obtaining a series of 23 high-resolution ultraviolet spectra taken throughout an orbital cycle of this rapidly-rotating star. Using ICUR, an IDL software package available at the College of Charleston, I have fitted multiple Gaussian curves to the observed ultraviolet emission line profiles. These multi-component fits are then decomposed into symmetric versus asymmetric and into constant versus time-dependent components. This allows us to spatially resolve (i.e. image) the outer atmosphere of this star and to study the dynamics of magnetically active regions. Once a realistic spatial map is produced, it will be used to measure the effects of the magnetic activity on HD 26337's chromosphere.

11:45 AM

A Stratosphere-Troposphere Coupling Mechanism

Kumar Jeev and Varavut Limpasuvan

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Recent studies in Atmospheric Physics point out the importance of the "Arctic Oscillation" in the Northern Hemisphere wintertime climate. Characterized by the irregular, anomalous shifting of atmospheric mass across the Arctic Circle, the Arctic Oscillation (AO) causes the Jet Stream to shift North-South and influences global storm patterns and total ozone concentration. Studies of wave structures and their interactions with the atmospheric flows have shown that the downward moving wind anomalies from the stratosphere can influence the Jet Stream and subsequently the AO phase during episodic stratospheric vortex break-down.

However, such coupling between the AO and anomalous stratospheric winds may also be possible during episodic stratospheric vortex intensification. To this end, a careful study of the anomalous stratospheric vortex intensification life cycle is performed. We examine the wind and temperature anomalies, eddy fluxes, and the AO index in relation to the vortex intensification episodes using a lead-lag composite technique and the 45-year NCEP reanalysis data. In addition to obtaining the atmospheric structures during vortex intensification, our results show a remarkable change in the AO phase as the vortex becomes anomalously strong. This suggests that the stratosphere may influence the troposphere climate.

12:00 Noon

Lunch (in the "Commons")

1:00 PM

SACS Business Meeting

1:30 PM **Workshops** (in the Smith Science Building):

Room 120 *WebAssign 4.0: Created by teachers for teachers.*

Aaron Titus

High Point University, High Point, NC

There are lots of commercial web-based programs available that grade homework. Perhaps your school uses BlackBoard or WebCT; perhaps your textbook publisher offers a web-based assessment system. So why use WebAssign? WebAssign is the best and most versatile assessment system available. Some of its most powerful features, that you probably won't completely find in other systems, are randomized content within questions, grading of equations, grading of lab reports (i.e. data and calculations based on data), use of Java applets and JavaScript for grading vectors, motion diagrams, and other sketches (using Physlets, PADs, or other Java applets), dynamic display of mathematical and chemical equations, and capability to upload students' files in response to questions.

In this workshop, we will use WebAssign 4.0, the redesigned, beta version of WebAssign. You will learn more common tasks such as creating classes and assignments. You will also experience some of its more exciting features like those described above. Participants will receive a free trial.

Room 114 *Building a Soda Bottle Speaker*

Matt Marone

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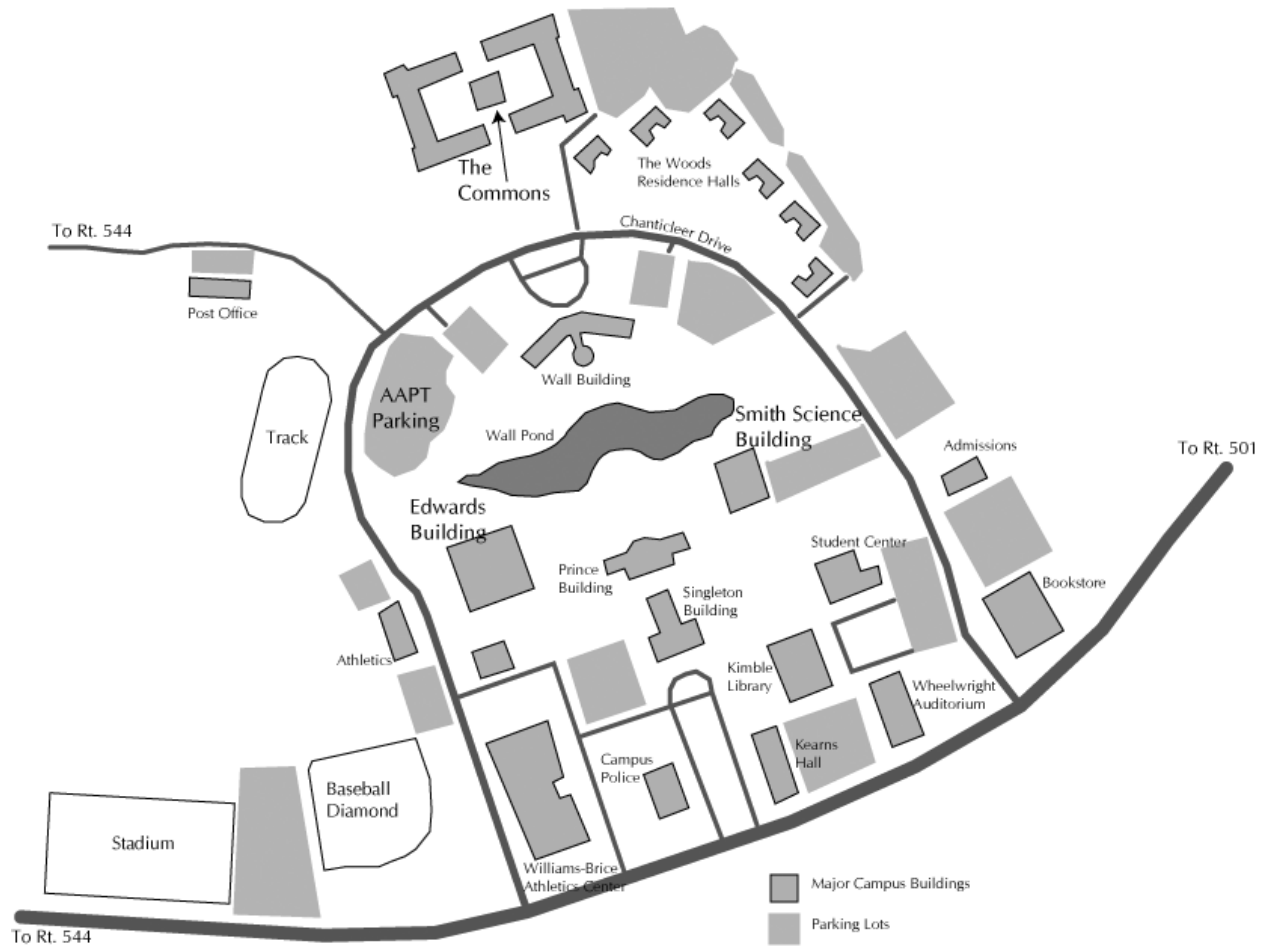
Participants in this workshop will build a simple "soda bottle" speaker. This is a real working speaker that participants will be able to take home with them. We have used this experiment in our "Acoustical Foundations of Music" course at Mercer. Students enjoy making and using their speakers. The "soda bottle speaker" is simple to make and can be built for less than \$1.00. Experimentation and analysis of the speaker can be conducted at many levels. Students can explore frequency response, resonance, inductance, impedance, or just have fun.

We are particularly interested in introducing high school students and teachers to this experiment. The speaker consists of a soda bottle frame, paper diaphragm, soda straw coil form, wire, and a magnet. Tape and hot-glue are used to hold it together. Coil winding is the most difficult part, and can be accomplished with a variable speed drill.

Participants who have their own variable speed drill or glue gun are asked to bring them. We will also provide a limited number. The workshop organizers will provide all other items.

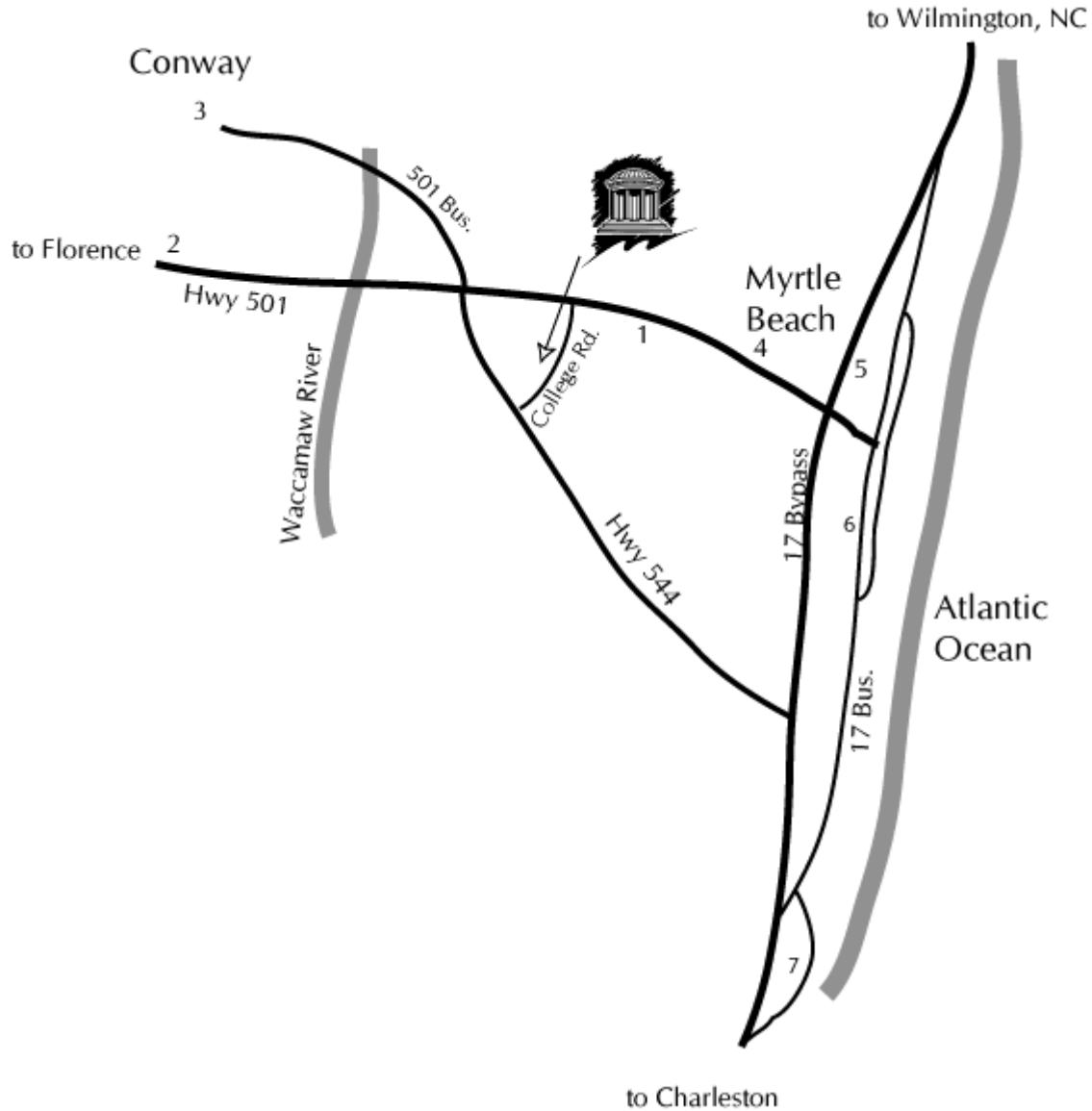
Campus Map

Coastal Carolina University
Conway, SC



Map Drawn by Louis Keiner

Area Restaurants:



- 1 Hwy 501 towards Myrtle Beach - Burger King, Wendy's, Subway, KFC, Pizza, plus Mexican, Chinese, Japanese and Pizza...
- 2 Hwy 501 Bypass to Conway - All fast foods, plus Zaxby's and Applebees
- 3 Downtown Conway - Delis, Bistros, etc.
- 4 Kroger Shopping center - Pizza Hut, McDonalds, Delis, Pizza, Mexican, etc.
- 5 Broadway at the Beach - tourist shopping mecca. Liberty Brew-Pub, upscale and downscale restaurants.
- 6 Kings Hwy (Business 17) through Myrtle Beach - Everything.
- 7 Murrells Inlet - Seafood. Troughs to upscale restaurants.