

Alabama
Association of
College
Teachers of
Mathematics

61st Annual AACTM Conference

Huntingdon College
Montgomery, AL

February 19, 2011

Welcome!

Welcome to the 61st annual conference of the Alabama Association of College Teachers of Mathematics. The aim of this conference each year is to bring together Alabama college mathematics teachers from all areas of the state and all types of institutions and provide a forum for discussion and presentation of research. The AACTM conference is also the location of the annual Lewis-Parker lecture which honors a prominent Alabama researcher. This year's Lewis-Parker lecture will be delivered by Dr. Zhijian Wu of the University of Alabama.

For all those who have attended an AACTM conference before, we welcome you back. For those that are attending for the first time, we're particularly glad that you decided to attend. If you have any questions about or suggestions for AACTM, please feel free to let one of us know.

Note that at the end of the day today, the annual AACTM business meeting will take place. This meeting is open to all attendees of the conference.

Thank you again for being here today. We look forward to talking with you!

Sincerely,

The AACTM Officers

President	Jeffrey Powell, Samford University
Vice-President	Jim Gleason, University of Alabama
Secretary/Treasurer	Janie Kennedy, Samford University
Executive Council	Chris Rodger, Auburn University Barry Spieler, Birmingham-Southern College

Alabama Journal of Mathematics

The Alabama Journal of Mathematics, which is published through cooperation between the AACTM and the Alabama Council of Teachers of Mathematics (ACTM), has a new online home at:

<http://ajmonline.org>

Today's program will include a brief status update on the journal and the recent changes.

Acknowledgements

The AACTM would particularly like to thank Huntingdon College for graciously hosting this year's conference, and Dr. Sally Clark for her hard work as the local organizer. Thank you so much for your efforts to make this conference a success.

Schedule

Registration		8:15-8:45
Welcome		8:45-9:00
Young H.Y. Kim	Tuskegee University	9:00-9:15
<i>"Bounded Variation Properties of the Hysteresis Operator with Two Inputs"</i>		
John Boncek	Troy University-Montgomery	9:20-9:35
<i>"An Introduction to Sage"</i>		
Lauretta Garrett	Tuskegee University	9:40-10:00
<i>"Enabling Adult Students to Transfer Functional Thinking to Algebraic Representations through the use of Technology"</i>		
Break		10:00-10:15
Ed Smith	Jacksonville State University	10:15-10:30
<i>"Calculus and Trigonometry in a Classical Paper"</i>		
Chadia Affane Aji	Tuskegee University	10:35-10:50
<i>"On annuli containing all the zeros of a polynomial"</i>		
Update on the Alabama Journal of Mathematics		10:55-11:05
Break		11:05-11:20
2011 Lewis-Parker Lecture		11:20-12:20
Zhijian Wu	University of Alabama	
<i>"Möbius group, Bergman metric on the unit disk and reproducing formulas"</i>		
Lunch		12:20-1:45
Kenneth Roblee	Troy University	1:45-2:05
<i>"Easy Implementation of Video as a Supplementary Learning Resource"</i>		
Robert Vilardi	Troy University-Montgomery	2:10-2:30
<i>"Teaching Mathematics Using the Smartpen"</i>		
John Mayer	University of Alabama-Birmingham	2:35-3:00
Bernadette Mullins	Birmingham Southern College	
<i>"Greater Birmingham Mathematics Partnership and Student Success"</i>		
Break		3:05-3:15
AACTM Business Meeting		3:15

Abstracts

(Alphabetical by presenter's last name)

Chadia Affane Aji

Tuskegee University

“On annuli containing all the zeros of a polynomial”

In this paper, we obtain the annuli that contain all the zeros of the polynomial

$$p(z) = a_0 + a_1z + a_2z^2 + \dots + a_nz^n,$$

where the a_i 's are complex coefficients and z is a complex variable. Our results sharpen some of the recently obtained results in this direction. Also, we develop a MATLAB code to show that for some polynomials the bounds obtained by our results are considerably sharper than the bounds obtainable from the known results.

John Boncek

Troy University-Montgomery

“An Introduction to Sage”

Sage is a free, open-source computer algebra system implemented in the Python language. Originally written as a tool for mathematics researchers, Sage is becoming increasingly popular in classroom environments. In this presentation, I will demonstrate some of the basic features of Sage and show how it can be used to enhance classroom instruction.

Lauretta Garrett

Tuskegee University

“Enabling Adult Students to Transfer Functional Thinking to Algebraic Representations through the use of Technology”

Adult mathematics students may be limited in their mathematical progress by their inability to express genuine mathematical thinking using the language of mathematics, particularly algebraic representations (Dias, 2000). Participants will be taken on a journey of thinking about and expressing mathematics observed in one adult student, Marjorie¹ as she participated in a teaching experiment conducted by the presenter. They will see how Marjorie's genuine functional thinking was transferred to algebraic representations in the company of the algebraic features of the mathematics software Geometer's Sketchpad 4.07s.

References: Dias, A. L. B. (2000). *Overcoming Algebraic and Graphic Difficulties*.

Young H. Y. Kim

Tuskegee University

“Bounded Variation Properties of the Hysteresis Operator with Two Inputs”

We define and analyze two-dimensional hysteresis operator akin to the one-dimensional Preisach model of hysteresis. The Preisach model can be formulated and analyzed as a mathematical operator, independently from its interpretation in the context of electromagnetic theory; in this way, the essential mathematical properties can be formulated and proved. We present the bounded variation properties for the case of vector hysteresis of two-input signals .

John Mayer

University of Alabama-Birmingham

Bernadette Mullins

Birmingham Southern College

“Greater Birmingham Mathematics Partnership and Student Success”

The Greater Birmingham Mathematics Partnership (GBMP) is a partnership of nine Birmingham area school districts, UAB, BSC, and the Mathematics Education Collaborative of Washington State, founded in 2004, and focused on middle school education, but impacting grades K-20. Our definition of challenging courses and curriculum for all students motivates our operational definitions of student success at multiple levels: pre-service teachers, in-service teachers, and middle school students. In this talk we report on recent results regarding student success related to the work of GBMP with pre-service teachers, middle school teachers, and middle school students. GBMP pedagogy models, promotes, and advances inquiry-based instruction.

¹ Pseudonym

Kenneth Roblee

Troy University

“Easy Implementation of Video as a Supplementary Learning Resource”

If you teach upper-level mathematics courses and have looked for good supplements to the textbook and your notes, you may be frustrated as to the relative scarceness of additional learning resources for your course. Creating these yourself is one solution to this problem. The speaker shares his experiences creating such resources with a video recorder with relative ease and speed of uploading, and how he has made these available and easily accessible to students.

Ed Smith

Jacksonville State University

“Calculus and Trigonometry in a Classical Paper”

In the 1939 paper "An Extremum Property of the Ellipse" by E. Sas, there is some nice trigonometry and calculus which should be accessible to any good freshman calculus student. A close look shows that something quite a bit stronger is proven than the statement of the Theorem tells us. This could shed light on the answer to a well known and unsolved question in discrete geometry.

Robert Vilardi

Troy University-Montgomery

“Teaching Mathematics Using the Smartpen”

Many technologies have emerged recently that allow instructors to post their notes online, post their lectures online, or even create podcasts where students can replay entire class sessions as if they were sitting in the classroom. Although these technologies are very powerful and offer a great deal to students, they are extremely time consuming to produce. Additionally, the thought of being on camera or having a camera in the classroom is enough to steer many faculty members away from utilizing these technologies to the fullest extent available. There is, however, a technology that can marry the necessity of timeliness and the desire to provide students with the most complete study materials available. This technology is the Smartpen. Pairing a Smartpen and a document camera an instructor can record their lectures in real time without any additional need to edit or produce the recording. Additionally, the Smartpen has record and stop capabilities that allow the instructor to simply record the portions of the lecture that are desired for publication. Finally, the Smartpen records what is written as well as what is being spoken so that the notes and the lecture can be uploaded onto the computer. Once uploaded the instructor can decide whether they want to make the audio, the written, or both available to students, and even has the opportunity to create “pen-casts” where students can download the entire lecture as it was given. This technology allows instructors tremendous versatility without a significant time commitment and is definitely a technology to consider. Also, as with any technology, it is important that educators are aware of this pens presence as it can be used by students in their classrooms. Because of the inherent issue of intellectual property, there is a need for instructors to be aware of when their lectures are being recorded. Without knowledge of this new technology instructors may simply overlook the pen as a writing utensil. This new tool offers a great deal to mathematics educators who want to give their students extra study materials and is relatively simple to use, a great combination considering the immense amount of obligations already shouldered by educators.

Zhijian Wu

University of Alabama

2011 Lewis-Parker Lecture

“Möbius group, Bergman metric on the unit disk and reproducing formulas”

Möbius group and Bergman metric on the unit disk have been used effectively in the development of the modern analysis and operator theory. We revisit some basic ideas and results, and discuss the theory of atomic decomposition and some applications.