Alabama Association of College Teachers of Mathematics

62nd Annual AACTM Conference
Athens State University
Athens, AL
March 3, 2012

Welcome!

Welcome to the 62nd 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 that honors a prominent Alabama researcher. Dr. Jia Li of the University of Alabama at Huntsville will deliver this year's Lewis-Parker lecture.

For all those who have attended an AACTM conference before, we welcome you back. For those that are attending for the first time, we are 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: *Jim Gleason, The University of Alabama*
Vice-President: *John Mayer, University of Alabama at Birmingham*
Secretary/Treasurer: *Janie Kennedy, Samford University*
Executive Council:

                Anne Yust, Birmingham-Southern College
                Ray Price, Judson College

Alabama Journal of Mathematics

The Alabama Journal of Mathematics is published through cooperation between the AACTM and the Alabama Council of Teachers of Mathematics (ACTM), has published the 2011 volume and can be found at:

http://ajmonline.org

Acknowledgements

The AACTM would particularly like to thank Athens State University for graciously hosting this year's conference and Ronnie Merritt for his 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

Bernadette Mullins   Birmingham Southern College   9:00-9:25
"Helping Students Develop the Common Core State Standards for Mathematical Practice"

Tan-Yu Lee   The University of Alabama   9:30-9:55
"Technology, Technology, Technology"

Mark VanHooser   Troy University   10:00-10:25
"Enhancing Learning and Lectures using Geometers' Sketchpad"

Break   10:25-10:45

Zhijian Wu   The University of Alabama   10:45-11:10
"Non-tangential average and Carleson measures"

2011 Lewis-Parker Lecture   11:15-12:15
Jia Li   University of Alabama in Huntsville
"Fighting Malaria Transmission with Transgenic Mosquitoes or Genetically-modified Bacteria"

Lunch   12:15-1:45

Jing Chen   The University of Alabama   1:45-2:10
"Most likely path in long-term hedging"

Cynthia Stenger   University of North Alabama   2:15-2:40
James Jerkins   University of North Alabama
Janet Jenkins   University of North Alabama
"Using Programming to Build Abstraction, Generalization, and Proof"

John Mayer   University of Alabama at Birmingham   2:45-3:10
David Cosper   University of Alabama at Birmingham
"Euclidean Geometry Rediscovered"

Break   3:10-3:20
AACTM Business Meeting   3:20-4:00

Abstracts

Bernadette Mullins   Birmingham Southern College   9:00-9:25

"Helping Students Develop the Common Core State Standards for Mathematical Practice"

> The Greater Birmingham Mathematics Partnership is helping to prepare future and practicing teachers to implement the new Common Core State Standards (CCSS) which include standards for mathematical practice as well as standards for content. While the mathematical practices are second nature to mathematicians, some of the language (such as "look for and make use of structure," "contextualize and decontextualize," and "model with mathematics") is unfamiliar to many teachers. We describe how we engaged teachers in a series of tasks which bring the mathematical practices to life.

Tan-Yu Lee   The University of Alabama   9:30-9:55

"Technology, Technology, Technology"

> The University of Alabama has been increasing the focus on freshmen retention rates and the overall six-year graduation rates, while at the same time our enrollment has grown almost two folds in about ten years. Inevitability more and more students are arriving on campus under-prepared for college-level work. Lowering expectations is definitely not the way to handle this challenge, and we can't and shouldn't sacrifice quality just to raise retention rates and graduation numbers. This presentation is to share my experience of how the ever advancing technology has changed the way I am teaching Calculus-using internet, course software, Smartnote, Tegrity and beyond to be able to morph teaching into educating.

Mark VanHooser   Troy University   10:00-10:25

"Enhancing Learning and Lectures using Geometers' Sketchpad"

> Geometers' Sketchpad (GSP) is a dynamic program that is perfect tool to use to present interactive graphs. The presentation is a demonstration of how GSP can be used in the classroom and how it can enhance learning and make lectures more interesting.

Zhijian Wu   The University of Alabama   10:45-11:10

"Non-tangential average and Carleson measures"

> Non-tangential properties are useful in complex and harmonic analyses. In this talk, we present a way of characterizing Carleson measures by their non-tangential average. Applications to area operators are discussed also.

2011 Lewis-Parker Lecture   11:15-12:15

Jia Li   University of Alabama in Huntsville

"Fighting Malaria Transmission with Transgenic Mosquitoes or Genetically-modified Bacteria"

> To prevent malaria transmission, genetically-altered (transgenic) mosquitoes, or mosquitoes carrying genetically-modified bacteria, that are resistant to malaria infection, become an effective weapon. To study the impact of releasing these mosquitoes into the field of wild mosquitoes, we formulate simple mathematical models of interactive wild and transgenic mosquitoes, based on systems of difference equations. We consider both dominant and recessive transgenes, and include horizontal and vertical transmissions of genetically-modified bacteria. With fundamental analysis of the model equations, we investigate the interactive dynamics of the different types of mosquitoes, which will affect the malaria transmission.

Jing Chen   The University of Alabama   1:45-2:10

"Most likely path in long-term hedging"

> Based on a simple model initially discussed in Culp and Miller, Mello and Parsons, Glasserman and a simple discussion about comparing risks of a cash shortfall and the most likely path to a shortfall by Glasserman, we did analysis on the most likely path for four basic cases: mean reverting or not, hedged or not. In addition, based on Larcher and Leobacher's optimal strategy and Wu, Yu and Zheng's optimal strategy under the constraint of terminal risk, we did analysis on the most likely path corresponding to each optimal strategy. These "optimal" paths give information about how risky events occur and not just their probability of occurrence.

Cynthia Stenger   University of North Alabama   2:15-2:40
James Jerkins   University of North Alabama
Janet Jenkins   University of North Alabama

"Using Programming to Build Abstraction, Generalization, and Proof"

> Our instructional treatment uses the Python programming language as a vehicle to induce students to build the mental structures needed for abstraction, generalization, and proof.

John Mayer   University of Alabama at Birmingham   2:45-3:10
David Cosper   University of Alabama at Birmingham

"Euclidean Geometry Rediscovered"

> For many students of the first author's generation, particularly the visual thinkers, Euclidean geometry was the first course in which the beauty of mathematics became apparent. The idea that this wealth of knowledge could be deduced from a small set of truths (the axioms) was exhilarating. In his Introduction to the Instructor Edition of his book, Euclidean Geometry – a Guided Inquiry Approach, David M. Clark explains the reasons for, and laments, the loss of this beauty to generations of students; his book is the remedy. My assistants and I rediscovered geometry through teaching an undergraduate Euclidean geometry course the Fall 2011 semester based upon David Clark's book. The book supports an inquiry-based learning approach to axiomatic geometry, which Clark and I would both trace back to R.L. Moore. In this talk I will describe the implementation of the course at UAB, a significant variation on Moore's approach. In this endeavor, I have been ably assisted by William Bond, a former mathematics MS student of mine, and David Cosper, a current BS/MS Fast-Track mathematics student at UAB.