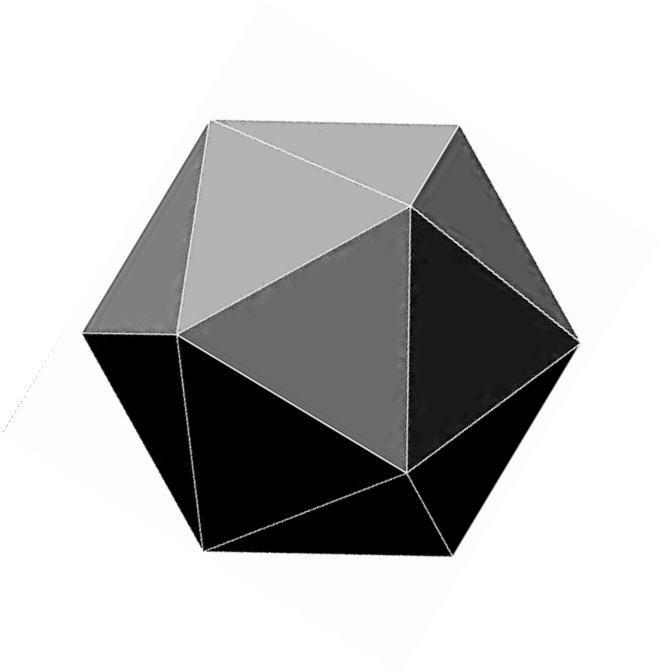
XLVI Joint Meetings of the Florida Section of the Mathematical Association of America And the Florida Two-Year College Mathematics Association



University of Tampa

February 22-23, 2013

Florida Section of the Mathematical Association of America

Executive Committee 2013

Governor	Mike Mears, State College of Florida
President	Daniela Genova, University of North Florida
Past President	Monika Kiss, Saint Leo University
Vice-President for Programs	Jacci White, Saint Leo University
Vice-President for Site Selection	Scott H. Hochwald, Univ. of North Florida
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Vice-President-Elect, Programs	Joni Pirnot, State College of Florida
Vice-President-Elect, Site Selection	Penny Morris, Polk State College

Florida Two-Year College Mathematics Association

Executive Committee 2013

President	Penny Morris, Polk State College
Past President	Deepankar Rick Pal, Valencia College
Vice-President for Programs	Bill Hemme, St. Petersburg College
Secretary	Nancy Johnson, State College of FL
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Webmaster	Altay Özgener, State College of FL
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President-Elect	Ryan Kasha, Valencia College

2014 Joint Mathematics Meetings FL-MAA/FTYCMA

February, 21-22, 2014 at Edison State College

PROGRAM

Friday, February 22, 2013

Committee & Business Meetings

10:00 – 10:50	FTYCMA Officers' Meeting	Vaughn Board Room
11:00 – 1:30	FTYCMA Annual Business Meeting and Luncheon	Vaughn Board Room
10:00 - 12:00	FL – MAA Executive Committee Meeting	PH 327

1:00 – 6:30 **Registration** Lobby of Plant Hall

Sign in and browse the displays from several publishing companies.

1:45 – 2:00 **Welcoming Remarks** Reeves Theater

Dr Joe Sclafani, Dean of the College of Social Sciences, Mathematics, and Education, UT
Penny Morris, President, FTYCMA
Daniela Genova, President, FL-MAA

2:00 – 2:50 **Plenary Session** Reeves Theater

Larry Hall, Distinguished University Professor and Chair
Department of Computer Science and Engineering
University of South Florida

Exploring Big Data with Scalable Soft Clustering

3:00 – 5:00 **Student Events** Room JS 150

3:00 - 4:00 Student Integration Contest
Come test your integration abilities!

4:00 – 5:00 Student Math Puzzle Contest

Attempt to solve our Sudoku and Ken-Ken puzzles.

3:00 – 3:25 **Contributed Papers Session I**

Jianqiang Zhao, Eckerd College Room 236

Generating Functions and New Identities of Multiple Zeta Values

Zhaoxia Wang, Graduate Student, UWF Room 237

A Cubic Convergent Method for Real Symmetric Eigenvalue Problems

I.A. Sakmar, USF retired Room 274

A Remarkable Identity of the Legendre Polynomials

Zeynep Teymuroglu, Rollins College Room 333

Service-Learning Project Outcomes: Social Network Analysis

Henrik Singendonk, Undergraduate BCC Room 334

Useful Cryptography for College Purposes

3:30 – 3:55 **Contributed Papers Session II**

Li Zhou, Polk State College Room 236

Fun with Sign

Debbie Garrison, Valencia College Room 237

Bringing Active Learning to the classroom - A potpourri of Ready-to-Use Activities

Jaime Barrera, Saint Leo University Room 274

Reflections on A Low-Cost

Research Experience for Undergraduates (REU)

Scott Hochwald, Univ. of North Florida Room 333

Theoretic Tales From the Harmonic Series

Alec Mishkin, Undergraduate, FAU Room 334

Modeling Cancer Growth

4:00 – 4:25 **Conference Break**

Please visit the textbook publishers and browse their displays.

4:30-5:50 **Invited Speakers** Reeves Theater
Special Topics session on Combinatorics

4:30-4:55 **Brian Curtin**, University of South Florida

Permutations from Latin squares

5:00-5:50 **Miklos Bona,** University of Florida

Permutation Pattern Problems

4:00-5:50 **Workshop TENTATIVE**

Jim Condor & C. Altay Özgener, SCF Room JS 161

Constructing Visual Interpretations of Vertical and Horizontal Components Using a Graphic Design Approach

4:30 – 4:55 **Governor's Session** J.S. 169

Mike Mears, State College of Florida

Governor's Session: Top 10 (or so) Updates from MAA – The Final Chapter

5:00-5:50 **Panel Presentation:** J.S. 169
"A Nation at Risk" 30 years later

Jill Nielsen, President of FCTM and
Supervisor of Mathematics, K-12

Jacci White, Saint Leo University

Fred Zerla, Professor Emeritus, USF

Jennifer Quinn, Second Vice President of MAA

Matt Campese, In-service teacher training

Len Lipkin, University of North Florida

6:15-7:00 **Organ Recital** Sykes Chapel

Dr Haigh Mardirosian, University of Tampa
Dean of the College of Arts and Letters

J S Bach, Louise Vierne, and Alexandre Guilmant

7:00 – 8:30 **Conference Banquet and Awards Ceremony** Vaughn Crescent Student Union

Saturday, February 23, 2013

9:00 – 10:50 **Workshops**

Ben Fusario, FSU Room 169

Environmental Mathematics and Community Engagement

9:00 – 9:25 **Contributed Papers Session III**

Jamie Sprecher, USF Room 236

Hamiltonian Polygonal Paths in Assembly Graphs

Rhonda L. Williams, Graduate Student UF Room 274

Blended High School Courses

Patrick Bibby, University of Miami Room 319

Sabermetrics and Fantasy Baseball as a Math Activity

Carrie E. A. Grant, Flagler College Room 332

Using StatCrunch Applets to Simulate Conceptual Understanding of Statistical Ideas.

Jacci White, Saint Leo University Room 334

Classroom Supplement to compliment MyLab and Mastering in Statistics

9:30 – 9:55 **Contributed Papers Session IV**

Kelsey Garrett, Graduate Student, UWF Room 236

Using Markov Chains in Maximum Likelihood Estimates of Disease Progression

Karl Haller, Aida Galeb, PHCC Room 274

Sage in the Classroom

Svetlana Mokhnach, Graduate student, UWF Room 319

Symbolic Dynamics and
Substitutions: from a to b

Dafne Jacobs and Samantha Kern, Room 332
Undergraduate students, Saint Leo University

"*Hey! Math is not just for nerds.*"

Monika Kiss, Saint Leo University Room 334

What is spherical trigonometry?

10:00 – 10:25 **Contributed Papers Session V**

Laurice Garrett, JoAnn Lewin, Room 236
Edison State College

Oh, The Things We can Learn!
(from each other)

Lucas Ortiz, Undergraduate Student, FAU Room 274

Modeling Embryonic Tubulogenesis
with Polarized Particles

Holly Renaud, Graduate Student, UWF Room 319

Cauchy's Residue Theorem and the
Inverse Laplace and Fourier Transforms

Sydney Schroth, Graduate Student, UWF Room 332

Bulgarian Solitaire

Monika Kiss, Saint Leo University Room 334

Jeopardy game time

10:30 – 10:50 **Contributed Papers Session VI**

Brian Camp, Saint Leo University Room 236

Sudoku, Graph Theory and the Puzzle of the Freshman Honors Mathematics Course

Nicole A. Bobbit, Undergraduate, USF Room 274

Parallel Performance Analysis between Free Response Environments and the Force Concept Inventory in Introductory Mechanics Courses

Bariaa Shatila, Flagler College Room 319

Formative and Summative Assessments in Mathematics

William Olsen, UNF Room 332

Elliptic Curves and the Kronecker-Weber Theorem

Monika Kiss, Saint Leo University Room 334

Jeopardy game time

10:30-10:50 **AMC Awards Recognition** Reeves Theater

11:00 - 12:00 **Plenary Session** Reeves Theater

Jennifer Quinn, Second Vice President of MAA
Associate Director of IAS, University of Washington

Mathematics to DIE for: The Battle Between Counting and Matching

Closing Remarks

Penny Morris, President, FTYCMA
Daniela Genova, President, FL-MAA

12:15 – 2:00 **FL-MAA Business Meeting and Luncheon** Vaughn Crescent

ABSTRACTS

Contributed Papers Session I

Jianqiang Zhao, Eckerd College

Generating Functions and New Identities of Multiple Zeta Values

Multiple zeta values are iterated generalizations of Riemann zeta values. In this talk we will show a few new family of identities of these values using their universal generating function.

Zhaoxia Wang, Graduate Student, University of West Florida

A Cubic Convergent Method for Real Symmetric Eigenvalue Problems

In this talk, how to use the Laguerre's method to compute some or all eigenvalues of real symmetric eigenvalue problems is discussed. The sequence generated by Lagurre's method converges to an eigenvalue cubically and monotonically. The numerical results showed that this approach is better than the Bisection and Newton methods if the eigenvalues are well separated.

I.A. Sakmar, USF retired
A Remarkable Identity of the Legendre Polynomials

We derive from physical considerations a non-recursive identity of the Legendre Polynomials and discuss its properties.

Zeynep Teymuroglu, Rollins College

Service-Learning Project Outcomes: Social Network Analysis

Rollins College is a liberal-arts institution located at Winter Park, FL. The first-year students in the "Statistics for Biology and the Health Sciences" conducted a service-learning project called "Nutrition at the CDC." We investigate the effects of such service-learning experience in building academic and friendship ties among first-year students by utilizing social network analysis methods.

Henrik Singendonk, Undergraduate Brevard Community College

Useful Cryptography for College Purposes

Various techniques of cryptography for along the way. I specifically want to talk about matrix encryption with spreadsheet programs for the encryption of texts and even whole essays.

Contributed Papers Session II

Li Zhou, Polk State College

Fun with Sign

Every child knows that -1, 1, -1, 1, ... can be written as (-1)^n.
What about other periodic changes of sign, such as the period-8 pattern -, -, +, +, +, -, +, +, ...?
We address this question (which arose from my calculus class) and make connections to many areas of elementary mathematics.
This talk is accessible to precalculus students.

Debbie Garrison, Valencia College

Bringing Active Learning to the classroom - A potpourri of Ready-to-Use Activities

According to the AMATYC "Beyond the Crossroads" document, effective mathematics instruction should require students to be active participants. This session will provide instructors with a variety of activities that can be used to introduce or re-enforce basic concepts in Algebra, Calculus, Liberal Arts Math and Statistics.

Jaime Barrera, Saint Leo University

Reflections on A Low-Cost Research Experience for Undergraduates (REU)

For two and a half weeks in June 2011 a friend and I, intensively studied mathematics and worked towards producing some original mathematics. My friend is also an undergraduate student of mathematics. So, part of the mission was to teach my friend the requisite mathematics. There are a couple of reasons why this REU is different from most others: the experience was in no way affiliated with any academic institution and my friend received no monetary incentive to participate. This talk discusses the structure of the REU, as well as its strengths and weaknesses using both my viewpoint and my student's viewpoint.

Scott Hochwald, University of North Florida

Theoretic Tales From the Harmonic Series

Partial sums of the Harmonic Series will be examined through a Number Theory lens.

Alec Mishkin, Undergraduate Student, FAU Room

Modeling Cancer Growth

One of the most powerful tools in curing cancer is mathematical modeling. Using accumulated data we will take a look at different models for the growth of cancer cells, incorporating the positive effect of the immune system. Using these models we will try to find points of stability between cancer cells and effector cells.

Contributed Papers Session III

Jamie Sprecher, University of South Florida

Hamiltonian Polygonal Paths in Assembly Graphs

Assembly graphs are graphs with rigid 4-valent vertices, which are used to model DNA recombination. The assembly number of a graph is the minimum number of polygonal paths needed to create a Hamiltonian set for that graph. The assembly number gives the minimal number of encoded genes.

Rhonda L. Williams, Graduate Student University of Florida

Blended High School Courses

Blended learning systems combine face-to-face instruction with computer-mediated instruction. Students will have the benefit of the flexibility and use of both modes of delivery. The blended course provides the variability for learning styles and motivational levels of students, which are not accounted for with the use of one method.

Patrick Bibby, University of Miami

Sabermetrics and Fantasy Baseball as a Math Activity

Bill James defined sabermetrics as "… the mathematical and statistical analysis of baseball records." The study of sabermetrics involves applications of fractions, decimals, percentages, means, standard deviations, and even the Pythagorean Theorem! Familiar metrics include batting average (BA), slugging average (SLG) and on-base average (OBA) for batters; and earned run average (ERA) for pitchers. Not-so-familiar metrics include OPS, BRC, ISO, RPA, VORP, SLOB, WHIP, BABIP, and many, many more. All metrics are computed from raw data.

Sabermetrics can be instrumental in organizing a fantasy baseball league, a wonderful activity for students (and faculty).

Carrie E. A. Grant, Flagler College

Using StatCrunch Applets to Simulate Conceptual Understanding of Statistical Ideas.

Simulations are an integral part of an introductory statistics course and are used to promote deeper understanding of statistical concepts. In this session, learn how to use various StatCrunch applets to actively engage students in the learning process and to promote classroom discussion.

Jacci White, Saint Leo University

Classroom Supplement to compliment MyLab and Mastering in Statistics

MyLab is an outstanding tool for students to practice mathematical techniques. However, the text is rarely read, and there are few resources for campus initiatives such as Writing or Social Justice across the curriculum, Values integration, or Critical Thinking for Effective Problem solving. A small student supplement addresses this need.

Contributed Papers Session IV

Kelsey Garrett, Graduate Student, University of West Florida

Using Markov Chains in Maximum Likelihood Estimates of Disease Progression

Markov Chains are useful when evaluating the disease history of patients. The transition probability matrix is used to describe the progression of diseases. Three different approaches will be presented to find this transition probability matrix under the following conditions: observation intervals coincide, observation intervals don't coincide, and observation intervals aren't consistent.

Karl Haller, Aida Galeb, Pasco Hernando Community College

Sage in the Classroom

This presentation is for those who do not have subscription to either Mathematica or Maple. SAGE is open source mathematics software. It is a very powerful tool that can be used by anyone needing to perform complex mathematical operations. We will give the instructions how to install the software. We will then

demonstrate its versatility by giving examples from Calculus, Linear Algebra, and Differential Equations. Sage has plotting and animation features which can be used in the classroom to illustrate topics discussed. Students can use the software at home for further explorations.

Svetlana Mokhnach, University of West Florida

Symbolic Dynamics and Substitutions: from a to b

The area of symbolic dynamics is an active and fast-growing part of dynamical systems. We focus on the subarea of substitutive dynamical systems. We generate infinite binary strings over the alphabet {a,b} using a variety of substitution mappings and explore patterns that arise. We will also discuss several famous substitutions.

Dafne Jacobs and Samantha Kern, undergraduate students, Saint Leo University

"*Hey! Math is not just for nerds."*

The most memorable and appealing activities a Math Club could host from the perspective of a Freshman and Junior at a private liberal arts University.

Monika Kiss, Saint Leo University

What is spherical trigonometry?

I had the opportunity to take a workshop in San Diego California during the Joint Meetings in 2013 on spherical trigonometry. During this talk, we will look at some beautiful examples of trigonometric laws on a sphere I learned about during this workshop. I would also like to share with you a free software that you can use in your classes to look at the motion of the stars and the planets.

Contributed Papers Session V

Laurice Garrett, JoAnn Lewin, Edison State College

Oh, The Things We can Learn! (from each other)

Looking for a low-cost, fun way to involve your department in effective professional development? Have only an hour or so to spare? Visit another instructor's class! The presenters will share information on the development, implementation, and results of a peer classroom observation initiative at Edison State College.

Lucas Ortiz, Undergraduate Student, Florida Atlantic University

Modeling Embryonic Tubulogenesis with Polarized Particles

Embryonic morphogenesis is driven by the polarity of cells his study attempts to create a qualitative mathematical model for the formation of tubes in embryonic tissue by representing cells as polarized particles connected by a spring which interact through field forces.

Holly Renaud, Graduate Student, University of West Florida

Cauchy's Residue Theorem and the Inverse Laplace and Fourier Transforms

An important concept within the field of complex analysis is that of residues. The presentation is going to introduce the main theorem on residues, namely, Cauchy's Residue Theorem, and some of its applications, more precisely, how complex residues can be used to derive the inverse Laplace and Fourier transforms.

Sydney Schroth, Graduate Student, University of West Florida

Bulgarian Solitaire

In this talk, we will describe and enumerate the cycles of partitions for both triangular and non-triangular positive integers based on the game Bulgarian Solitaire.

Monika Kiss, Saint Leo University

Jeopardy game time

Contributed Papers Session VI

Brian Camp, Saint Leo University

Sudoku, Graph Theory and the Puzzle of the Freshman Honors Mathematics Course

This talk will provide perspective from a Freshman Honors Mathematics course for non-majors taught over the past few years. How such a course is created and the need for this course will be addressed. Topics included in the course will be discussed along with descriptions of some of the successes, pitfalls and other details involved in such a course.

Nicole A. Bobbit, Undergraduate Student, University of West Florida

Parallel Performance Analysis between Free Response Environments and the Force Concept Inventory in Introductory Mechanics Courses

This paper reports our attempts to find a way to model and predict common thought processes that cause typical misconceptions identified by the Force Concept Inventory .The data was analyzed using factor analysis to group performance across two question type environments.

Bariaa Shatila, Flagler College

Formative and Summative Assessments in Mathematics

Effective classroom assessment is essential to gather information about students' learning. When instructors are aware of their students' gaps in learning, they can then reduce the gaps between teaching and assessment. This presentation will include practices of Formative and Summative assessments that will enhance faculty assessments in their mathematics classrooms.

William Olsen, UNF

Elliptic Curves and the Kronecker-Weber Theorem

The study of elliptic curves has been beneficial and interesting to mathematicians of all shapes and sizes. In this presentation, a connection between elliptic curves and the Kronecker-Weber Theorem is exposed and explained. Along the way, we will see how complex analysis, Galois theory, and cyclotomic extensions of the rational numbers play a significant role in this connection.

Monika Kiss, Saint Leo University

Jeopardy game time

Governor's Session:

Mike Mears, State College of Florida

Top 10 (or so) Updates from MAA – The Final Chapter

This informational sharing session is a chance for you to receive updates about recent policies and direction of the MAA, and to provide input into how the organization can better serve its members (including you). This is my last year as Governor, and so you do not want to miss the "nuggets of wisdom" that will permeate this session.

Invited Speakers: Special Topics session on Combinatorics

Brian Curtin, University of South Florida

Permutations from Latin squares

To each entry of a Latin square we associate a permutation. We show that the multiset of all cycle structures arising from such a permutation provides an invariant of the main class of the Latin square. We briefly discuss the role the permutations play in an associated algebra.

Miklos Bona, University of Florida

Permutation Pattern Problems

The area of pattern avoiding permutations, which hardly existed 20 years ago, is now a very popular and rapidly developing field. We will describe the original problems of the area that spurred most the initial research efforts, but we will also sample a few recent developments. No previous knowledge of permutations is necessary, and the talk is meant to be accessible for students.

Plenary Sessions

Lawrence O. Hall, Distinguished University Professor and Chair
Department of Computer Science and Engineering
University of South Florida

Exploring Big Data with Scalable Soft Clustering

Abstract: Sky surveys for Astronomy are expected to generate 2.5 petabytes a year. Electronic medical records hold the promise of treatment comparisons, grouping patients by outcomes but will be contained in petabyte data storage. We can store lots of data and much of it won't have labels. How can we analyze or explore the data? Unsupervised clustering, fuzzy, possibilistic or probabilistic will allow us to group data. However, the algorithms scale poorly in terms of computation time as the data gets large and are impractical without modification when the data exceeds the size of memory. We will explore distributed clustering and subsampling approaches to enable scalable clustering. Examples will show that one can scale to build good models of the data without necessarily seeing all the data and, if needed, modified algorithms can be applied to terabyptes and more of data treated as a stream.

Jennifer Quinn, Second Vice President of MAA
Associate Director of IAS
University of Washington, Tacoma, WA

Mathematics to DIE for: The Battle Between Counting and Matching

Positive sums count. Alternating sums match. So which is "easier" to consider mathematically? From the analysis of infinite series, we know that if a positive sum converges, then its alternating sum must also converge but the converse is not true. From linear algebra, we know that the permanent of an $n \times n$ matrix is usually hard to calculate, whereas its alternating sum, the determinant, can be computed efficiently and it has many nice theoretical properties. This talk is one part performance art and three parts combinatorics. The audience will judge a combinatorial competition between the competing techniques. Be prepared to explore a variety of positive and alternating sums involving binomial coefficients, Fibonacci numbers, and other beautiful combinatorial quantities. How are the terms in each sum concretely interpreted? What is being counted? What is being matched? Do alternating sums always give simpler results? You decide.

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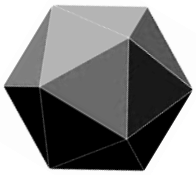

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Emilio Toro

The UT faculty and student volunteers who helped execute this event

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