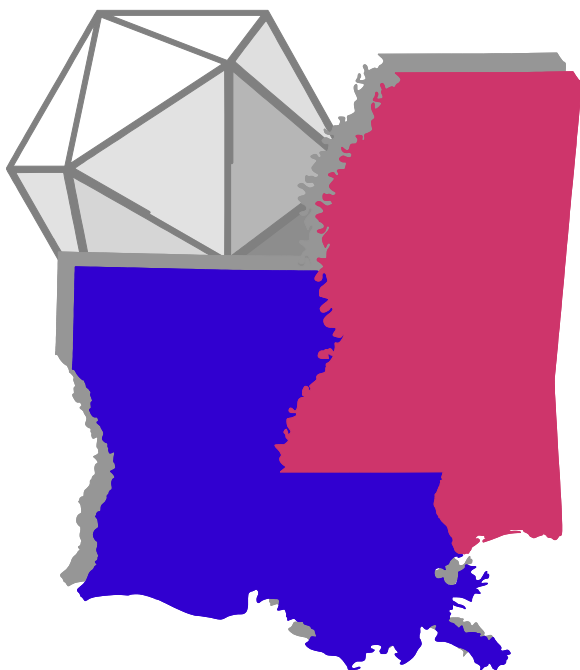
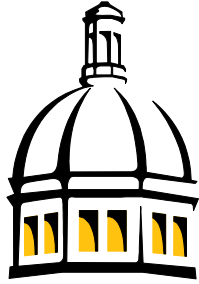


The Mathematical Association
of America

Louisiana/Mississippi Section



92nd annual meeting
Long Beach, Mississippi
February 26th – 28th, 2015



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FRIENDSHIP OAK
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Plenary Address
Why do Left-handed People Survive?
Rick Gillman, Valparaiso University
Friday, February 27th, 1 – 2:15p
Fleming Education Center Auditorium

This talk explores the question of why people are predominately right-handed, a trait shared by no other species. It answers the title question by considering the cultural, biological, and genetic explanations for our left-handedness. Two evolutionary game theoretic models are offered to explain why it may have been advantageous (from an evolutionary perspective) to have a fraction of the population be left-handed.

6th Annual R.D. Anderson Lecture
Mathematics to DIE for: The Battle Between Counting and Matching
Jennifer Quinn, University of Washington, Tacoma
Friday, February 27th, 5:15 – 6:15p
Fleming Education Center Auditorium

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.

Outstanding Teacher Address
Why being just a teacher is not "just" being a teacher
Bernd Schroeder, University of Southern Mississippi
Saturday, February 28th, 10:45 – 11:45a
Fleming Education Center Auditorium

We will take a good-natured look at the variety of challenges that our profession presents, the way in which these challenges have changed, the way in which they have stayed the same and what we can possibly do to meet them.

Section NExT Workshop

Friday, February 27th, 8:30 – 11:30a

Hardy Hall, Room 346

8:30a **Welcome**

Introductions

Michael Pearson, MAA Executive Director

James Reid, Section Governor

Jenna Carpenter, MAA First Vice President

9:30a **What a Provost Likes to See in Junior Faculty**

Rick Gillman

10:20a Break

10:30a **The Flipped Classroom**

Lenny Ornas

Student Luncheon

A Woman in Science 1977-2015

Louise Perkins, University of Southern Mississippi

Friday, February 27th, 11:15a – 12:30p

Hardy Hall Ballroom

Institutional Partners

Louisiana State University

McNeese State University

Mississippi College

Mississippi State University

Northwestern State University of Louisiana

Southeastern Louisiana University

University of Louisiana – Lafayette

University of Southern Mississippi

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Student Presentations

Friday, February 27th, 2:30 – 4p
Fleming Education Center, Room 103

2:30p

A matrix population model for Cuvier's beaked whales

Tyler Montgomery, Undergraduate,
UL Lafayette

Using the limited amount of data available from the literature, we develop a discrete four stage population matrix model for the *Ziphius cavirostris*, or Cuvier's beaked whales. From this model, we are able to estimate vital rates such as survival and transition probabilities, as well as deterministic values such as lifetime reproduction number, life expectancy, asymptotic growth rate, and inherent net reproduction number. These values tell us that the population is very fragile and can be driven to extinction by any major stochastic event.

2:50p

A with-in host Dengue infection model with immune response and non-constant susceptible cell production rate

Michael Hennessey,
Undergraduate, Loyola University
of New Orleans

Herein is a viral infection model of a monocyte population by Dengue virus. The model encapsulates the approximate 7 day clearance of infection after the onset of symptoms. By taking the host's immune system and the hormone Macrophage Colony Stimulating Factor into account, the model is able to capture a variable production rate of the monocyte population.

3:10p

Approximation of the scattering amplitude using nonsymmetric saddle point matrices

Amber S. Robertson, Graduate,
University of Southern Mississippi

In this paper we look at iterative methods that are more robust and efficient than existing methods for solving the primal $Ax=b$ and dual $A^T y=g$ systems of linear equations where the coefficient matrix is large, sparse, and nonsymmetric. We can use these methods to approximate the scattering amplitude defined by $g^T x$. We use a conjugate gradient-like iteration for a nonsymmetric saddle point matrix that is constructed so as to have a real positive spectrum, and a full set of eigenvectors that are orthogonal in some sense. The preservation of these properties allows us to generalize the conjugate gradient method to one for nonsymmetric matrices. We find that this method is more consistent than known methods for computing the scattering amplitude such as GLSQR or QMR. Then, we use techniques from "matrices, moments, and quadrature" to approximate expressions of the form $u^T f(A)v$, such as the scattering amplitude, without solving the system directly.

3:30p

A brief study of American families' food expenditure

Peixia Cheng, Graduate, McNeese
State University

More and more Americans are eating out. In this brief study, we examined the spending on food prepared at home and outside of home for American families. Trends identified in this study include that older families spend more money on food than young and middle aged families. However the middle aged families have the highest rate of spending on food not prepared at home.

Faculty Presentations: Session A

Friday, February 27th, 2:30 – 5p

Fleming Education Center, Room 201

2:30p

Fixing a Really Bad Statistical Graph

David Gurney, Southeastern Louisiana University

In Michael Sullivan's *Fundamentals of Statistics*, 2005 and 2008, there is a really bad statistical graph entitled "Total Rain Events Since 1871 in Chicago". This talk explains all the work involved to find the data used to create the original graph and convert that data into a good statistical graph.

3:00p

Homotopy Analysis for Solving Nonlinear Partial Differential Equations

Daniel Watson, Mississippi College

Nonlinear PDEs are of importance in science and engineering because most physical systems are nonlinear in nature. Nonlinear PDEs are difficult to solve and closed form solutions are rarely known. A homotopy approach can be combined with the method of particular solutions for efficiently solving nonlinear PDEs.

3:30p

An Integral Equation, a Differential Equation, and a Quadratic Equation

Randall Wills, Southeastern Louisiana University

In this talk, we will discuss solving the integral equation $f^{-1}(x) = \int_0^x f(t)dt$ and the differential equation $f'(x) = \frac{1}{(f \circ f)(x)}$. We will show that the two problems are equivalent, and the solution to the differential equation depends solely on the positive solution to the quadratic equation $x^2 + x - 1 = 0$.

4:00p

Image Restoration through Forward-backward-forward Diffusion

James V. Lambers, University of Southern Mississippi

In this talk, we present a new forward-backward-forward nonlinear diffusion equation for noise reduction and deblurring in images. The new model preserves and enhances the most desirable aspects of the closely-related Perona-Malik equation, while avoiding its defects. Joint work with Patrick Guidotti and Yunho Kim.

4:30p

Higher Dynamic Range through Precalculus

John Perry, University of Southern Mississippi

While image sensors have improved greatly, the sensors in compact cameras and smartphones remain especially famous for losing details in white clouds and dark shadows. One compact camera adopted a technique to expand dynamic range that rivaled some professional models: it took two simultaneous images, one with a shorter exposure than the other, and used a secret sauce to combine them. The scientific literature on such recipes is vast, involving a lot of frightening jargon, but we can adapt this camera's mechanical technique to simple recipes that require nothing deeper than precalculus. Some resulting images are more pleasing than the camera's; others illustrate why these techniques help only in special cases, not as a general rule.

Faculty Presentations: Session B

Friday, February 27th, 2:30 – 5p

Fleming Education Center, Room 203

2:30p

North Louisiana Math Teachers' Circle

Judith Covington, LSU Shreveport

In this session, I will talk about my rewarding work with the North Louisiana Math Teachers Circle. I will describe the process of starting our Math Teacher Circle as well as the steps that have been taken to keep the program sustained. I will also share a few of our circles favorite problems.

3:00p

Engaging Students in Mathematical Dialogue with Mobile Devices

Jana Talley, Jackson State University

The accessibility of mobile devices to students and instructors at the post-secondary level creates a multitude of avenues for which classroom instruction can be enhanced. As components of a student response system, these devices may be used to engage students in meaningful classroom discussions through participation in poll questioning activities. This study is designed to investigate how mobile devices can be used in undergraduate mathematics courses to engage students in mathematical dialogue, which has been shown to facilitate conceptual understanding. The investigation will be conducted at Jackson State University, an urban minority-serving university, and the participants will be enrolled in a freshman level mathematics course.

3:30p

Helping Students Develop and Appreciate Precision in Mathematical Writing: Activities for a Transitions Course

Connie Campbell, Millsaps College

After numerous incidents of students

complaining that I was nit-picking their work and simply looking for places to deduct points on their proofs, I started addressing the importance of precision in mathematical writing early and directly. In this talk I will present several activities I have incorporated into my introduction to proof course to help students better appreciate the importance of precision in mathematics. In addition to reducing the number of grading complaints I receive, these activities seem to help students develop their own proof writing skills.

4:00p

Mentoring for New Faculty – a Formula for Success

Jenna Carpenter, Louisiana Tech University

Six years ago we began a faculty mentoring program. Mentees are paired with mentors outside their department. Participants receive one hour of training. Pairs meet for one hour a month. A monthly e-newsletter and quarterly coffee provide information and networking opportunities. Assessment suggests the program has made a significant impact.

4:30p

Promoting Students' Conceptual Understanding of Elementary Statistic Concepts Using Java Applets

Ali Ahmad, University of Southern Mississippi

The presenter will share an innovative way of integrating statistics concepts through java applets. Java applets can be used as a teaching model to improve the conceptual understanding of statistic. Each applet is integrated with a specific content area and allows the user to dynamically change the concept involved.

Faculty Presentations:

Session C

Saturday, February 28th,

9:00 – 10:30a

Fleming Education Center,
Room 201

9:00a

Approximation of solutions to 1-D and 2-D differential equations

Haiyan Tian, The University of
Southern Mississippi

We solve elliptic partial differential equations using orthogonal trigonometric functions. To help students understand mathematical concepts and relevance of problems, we go from one-dimensional to two-dimensional cases.

9:30a

Benefits and Obstacles in Teaching Online Math/Stat Undergraduate Course

Julie Roy and Christy Sue Langley,
University of Louisiana at Lafayette

This talk summarizes the benefits and obstacles in teaching online courses. We will discuss the different audiences, types of communication, types of delivery and types of assessment. We will also address the shift in expectations and responsibilities of both the instructor and student.

10:00a

A group with constant negative sectional curvature

Edgar Reyes, Southeastern
Louisiana University

The cartesian product $G = \mathbb{R}^n \times_s \mathbb{R}$ is a semi-direct product group. The group multiplication is given by $(v_1, x_1) * (v_2, x_2) = (v_1 + e^x v_2, x_1 + x_2)$ where $v_i \in \mathbb{R}^n$ and $x_i \in \mathbb{R}$. We show the sectional

curvature of G is always -1 , which is well-known. The curvature of Lie groups has been investigated by John Milnor in a 1977 paper. In this talk, we solve a differential equation to determine the 1-parameter subgroups of G . The adjoint representation is applied to describe the Lie algebra and sectional curvature of G .

Faculty Presentations:

Session D

Saturday, February 28th,

9:00 – 10:30a

9:00a – FEC 203

A Freshman Quantitative Reasoning Course at UL Lafayette

Kathleen Lopez, UL Lafayette
Melissa Myers, UL Lafayette

Quantitative Reasoning for Life is a new course for freshman majoring in non-technical fields at UL Lafayette. Course philosophy, content, sample activities, and assessment will be discussed.

9:30 - 10:20a – FEC 304

Introduction to GeoGebra

Liza Cope, Delta State University
Dominic Veiga, Delta State
University

In this talk, participants will be introduced to GeoGebra, a free interactive mathematics software. The presentation will begin with guided demonstrations through simple investigations that teach the basic functionality of the software. Next we will explore applet resources that participants can implement in their mathematics courses. This workshop is intended for beginner or novice GeoGebra users. Participants are encouraged (but not required) to bring their own device (laptop, tablet, or smart phone).

Biographies

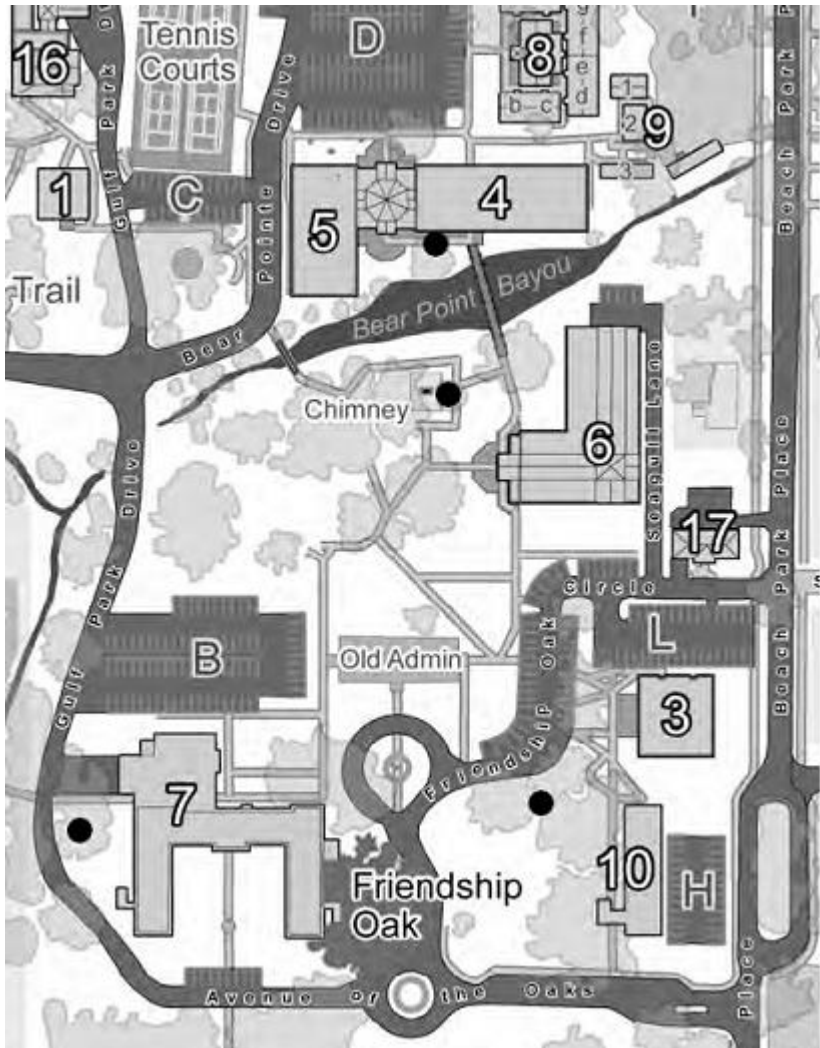
Rick Gillman completed his undergraduate work at Ball State University and earned his Doctorate of Arts at Idaho State University in 1986. He has worked at Valparaiso University since then, rising to the rank of Professor and is currently serving as Associate Provost for Faculty Affairs. Along the way he served as Assistant Dean for Sponsored Research and Faculty Development, was the founding director of VU's Celebration of Undergraduate Scholarship, and was chair of his department. Rick has edited two volumes published by the Mathematical Association of America (MAA), *A Friendly Competition* and *Current Practices in Quantitative Literacy*, currently serves as chair of the MAA's Problem Series Editorial Board, and is Chair of the MAA Committee on Sections. Rick co-authored *Models of Conflict and Cooperation*, published by the American Mathematical Society.

Jennifer Quinn is a professor of mathematics in the School of Interdisciplinary Arts & Sciences at the University of Washington Tacoma and Interim Director for the campus's Teaching & Learning Center. She earned her BA, MS, and PhD from Williams College, the University of Illinois at Chicago, and the University of Wisconsin, respectively. She has taught in and chaired the mathematics department at Occidental College before moving to UW Tacoma where she help create a non-existent mathematics curriculum in the newly expanded four-year institution. She has held many positions of national leadership in mathematics including as Executive Director for the Association for Women in Mathematics, co-editor of *Math Horizons*, Second Vice President of the MAA, and currently, chair of the MAA Council on Publications and Communications. She received one of MAA's 2007 Haimo Awards for Distinguished College or University Teaching and the MAA's 2006 Beckenbach Book award for *Proofs That Really Count: The Art of Combinatorial Proof*, co-authored with Arthur Benjamin. As a combinatorial scholar, Jenny thinks that beautiful proofs are as much art as science. Simplicity, elegance, and transparency should be the driving principles.

Bernd Schroeder serves as Professor and Chair in the Department of Mathematics at the University of Southern Mississippi. He received a Vordiplom (roughly equivalent to a bachelor's degree) from the Technische Universitaet Berlin in 1988 and his Ph.D. in Mathematics from Kansas State University in 1992. Before joining USM, he taught at Hampton University from 1992 to 1997, and at Louisiana Tech University from 1997 to 2014.

A. Louise Perkins is a Professor in the Department of Computer Science at the University of Southern Mississippi. She completed her BS in Mathematics at California State University East Bay, an MS and PhD at the University of California at Davis, and a post-doc in a physical oceanographic numerical modeling research group at MIT. After leaving MIT, she moved to Stennis Space Center where she continued her work with ocean models. She then moved to LSU and worked on a collaborative project with the Medical Center to detect eye disease, resulting in a series of papers and methods that improved eye diagnosis world-wide. After returning to USM, she worked on a simple model of parallel finite automata with a graduate student, introducing a finite-state automaton that is now part of the transformations from the standard FSA to more complex theoretical machines. More recently, she has been working on a theory for natural language processing, and most recently, she has been working on an extension of logic that is based on computation. She has formulated a weak solution to the satisfiability problem, and is currently developing programmatic support for the work.

Map



Event Locations:

- 4. Fleming Education Center (FEC)
- 5. FEC Auditorium
- 7. Hardy Hall

WIFI access info (Fri. - Sat.)

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USM College of Science & Technology - Gulf Park

University Communications - Gulf Park

Schedule of Events

Thursday, February 26th

Registration	5 – 7p	FEC Rotunda
Integration Bee	6:30 – 9p	FEC, Room 103
Video and Pizza	7:30 – 8p	FEC, Room 103

Friday, February 27th

Registration	8a – 4p	FEC Rotunda
Team Competition	8:30 – 11a	Hardy Hall Ballroom
Section NEXt	8:30 – 11:30a	Hardy Hall, Room 346
Exhibits	10a – 4p	FEC Reception Area
Student Luncheon	11:15a – 12:30p	Hardy Hall Ballroom
100 th Anniversary Cake	12:30 – 1p	FEC Reception Area
Plenary Address	1 – 2:15p	FEC Auditorium
Student Papers	2:30 – 4p	FEC, Room 103
Contributed Papers A	2:30 – 5p	FEC, Room 201
Contributed Papers B	2:30 – 5p	FEC, Room 203
R.D. Anderson Lecture and Reception	5:15 – 6:15p 6:30 – 8p	FEC Auditorium Hardy Hall Ballroom

Saturday, February 28th

Registration	8 – 10a	FEC Rotunda
MAA Liaison Breakfast	8 – 9a	Hardy Hall, Room 346
Exhibits	9 – 11a	FEC Rotunda
Contributed Papers C	9 – 10:30a	FEC, Room 201
Contributed Papers D	9 – 10:30a	FEC, Rooms 203 & 304
Outstanding Teacher Address	10:45 – 11:45a	FEC Auditorium
Business Meeting	12 – 1p	FEC Auditorium
Executive Committee	1 – 2p	FEC, Room 101

