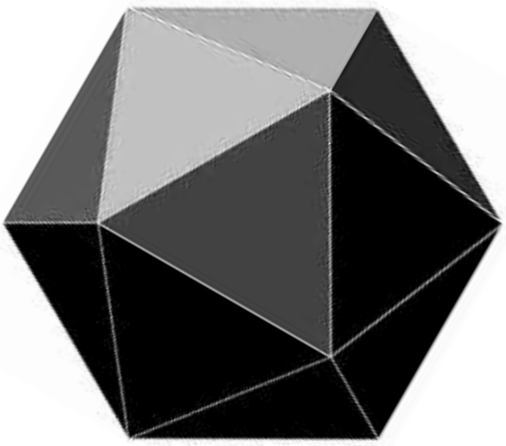
XLVII Joint Meetings of the Florida Section of the Mathematical Association of America and the Florida Two-Year College Mathematics Association



Edison State College

February 21-22, 2014

Florida Section of the Mathematical Association of America

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2015 Joint Meetings FL-MAA/FTYCMA, Eckerd College (dates TBA)

PROGRAM: Friday, February 21, 2014

Committee & Business Meetings

10:00 – 1:30	FTYCMA Officers' & Business Meetings	U-106
10:00 - 12:00	FL – MAA Executive Committee Meeting	U-202B

1:00 – 6:30 **Registration** **Atrium: U-2nd floor**

Please visit displays in the lobby of building U on the 1st floor.

1:45 – 2:00 **Welcoming Remarks** **U-102**

Dr Jeff Allbritten, President, Edison State College
Penny Morris, President, FTYCMA
Sidra Van de Car, President, FL-MAA

2:00 – 2:50 **Plenary Session** **U-102**

Karen Morgan Ivy, Associate Professor of Mathematics
New Jersey City University

An Intersection of Creative Literacy and Quantitative Literacy: Using Poetry to Improve Quantitative Reasoning

Room U-105 will be a hospitality room throughout the conference. Complimentary snacks and beverages will be provided by the Edison State College Mathematics Department.

3:00 – 3:50 **Contributed Papers Session I**

Please see table of concurrent sessions and student contests.

4:00 – 4:25 **Conference Break**

Please visit displays in the lobby of building U on the 1st floor.

4:30 – 5:20 **Contributed Papers Session II**

Please see table of concurrent sessions and student contests.

5:30 - 6:20 **Plenary Session** **U-102**

Bob Devaney, President, Mathematical Association of America
Boston University

The Fractal Geometry of the Mandelbrot Set

6:30 – 8:00 **Conference Banquet/Awards Ceremony** **Bldg. S**

Dinner will be served in the Garden Cafe of Taeni Hall.

Contributed Papers Session I

room	3:00 – 3:20	3:30 – 3:50
U-107	**Menaka Navaratna * & Channa Nishantha**** Florida Gulf Coast University* & Indiana University of Pennsylvania** *Synchronization of Coupled Networks with Long Distance Connections*	**Jaime H. Barrera** Saint Leo University *A Spectral Galerkin Method for the Porous Media Equation and a Class of Resulting Legendre Integrals*
U-109	**Thomas W. Hair** Florida Gulf Coast University *Benford's Law of First Digits and the Mass of Exoplanets*	**Anna Little** Jacksonville University *Teaching the Physics of Calculus*
room	**3:00 – 3:50**	
U-207	**Student Integration Contest**	
U-117	**Carol Warner**, Barry University *Retaining Highly Anxious Learners Opting-out of Remediation*	
U-118	**Joy D'Andrea**, University of South Florida, Sarasota – Manatee *An Extension of Euler's Polyhedron Formula*	
U-119	**Timothy W. Jones**, Edison State College *Proving the Powers of π are Irrational*	
U-120	**Michelle P. Carmel**, Broward College *Redesigning Math: Acceleration, Engagement, and Customized Remediation*	

Contributed Papers Session II

room	4:30 – 4:50	5:00 – 5:20
U-107	**Mile Krajcevski** University of South Florida *The Role of Visualization in Undergraduate Mathematics*	**C. Altay Özgener & Jim Condor** State College of Florida *A 20-minute History of the Twin Prime Conjecture, or Primes in Short Interval*
U-109	**Daniel Moseley** Jacksonville University *Incorporating Elements of Research in the Classroom*	**Jacci White** Saint Leo University *Governor's Session: Updates from the MAA*
U-207	**Student Math Puzzles**	**Jeopardy!**
room	**4:30 – 5:20**	
U-117	**Dennis Runde**, State College of Florida *Ten (or more) Engaging Topics from Math Class*	
U-118	**Latrica Williams**, St. Petersburg College *Increase Levels of Understanding in Elementary Statistics by Using a Flipped Class Model, Mobile Learning, and Social Media*	
U-119	**Carrie E. A. Grant**, Flagler College *Engaging Online Statistics Activities*	
U-120	**Brian Camp**, Saint Leo University *Computer Algebra Systems for Linear Algebra*	

PROGRAM: Saturday, February 22, 2014

9:00 – 10:50 **Workshop** **U-205**

Douglas Magomo, Edison State College
Alexander Basyrov, University of Wisconsin

WeBWork Training: An online homework delivery system

9:00 – 9:50 **Contributed Papers Session III**

Please see table of concurrent sessions, where student presentations are shaded.

10:00 – 10:50 **Contributed Papers Session IV**

Please see table of concurrent sessions, where student presentations are shaded.

11:00 - 11:50 **Plenary Session** **U-102**

Donal O'Shea, President, New College
Sarasota, FL

The Poincaré Conjecture (now Theorem), Singularities and the Shape of Space

Room U-105 will be a hospitality room throughout the conference. Complimentary snacks and beverages will be provided by the Edison State College Mathematics Department.

12:00 – 12:15 **Closing Remarks**

Dr. Theo Koupelis, Dean of the School of Pure and Applied Science, Edison State College
Penny Morris, President, FTYCMA
Sidra Van de Car, President, FL-MAA

12:15 – 2:00 **FL-MAA Business Meeting & Luncheon** **Bldg. S**

Lunch will be served in the Garden Cafe of Taeni Hall.

11:00 – 3:00 Yoko Ono: Imagine Peace Bldg. L

Consider visiting the Bob Rauschenberg Gallery, where viewers are given an opportunity to participate individually and collectively in the realization of the work. (Gallery hours on Friday are 10:00 – 4:00.)

Contributed Papers Session III

room	9:00 – 9:20	9:30 – 9:50
U-107	**Bibi Juman & Alfredo Janson** Nova Southeastern University, undergraduate students *Differentiation of Solutions of Second Order BVPs with Integral Boundary Conditions*	**Andrew Owen & Michael MacCallum** Edison State College, undergraduate students *Understanding and Computation of Some Riemann Integrable Functions and the Challenges of Online and IPhone Application*
U-109	**Alden Sharp & Shan Raja** H.L. Wilkes Honors College of FAU, undergraduate students *Classifying Nil-clean Rings*	**Thomas W. Hair** Florida Gulf Coast University *Provocative Radio Transients and Base Rate Bias: A Bayesian Argument for Conservatism*
room	**9:00 – 9:50**	
U-117	**Jim Kuzmanovich**, Wake Forest University *Mathematics on Postage Stamps*	
U-119	**Wendy Pogoda & Diego Grilli**, Hillsborough Community College *Teaching Probability through Projects and Games*	
U-120	**Junyi Tu**, University of South Florida, graduate student *Global Attractor of Boissonade System*	

Contributed Papers Session IV

room	10:00 – 10:20	10:30 – 10:50
U-107	**Raymond Fowler** H.L. Wilkes Honors College of FAU, undergraduate student *Dusty Plasmas*	**Patrick Bibby** University of Miami *DO THE MATH!! . . . MENTALLY!!*
U-109	**Neha Shrestha** H.L. Wilkes Honors College of FAU, undergraduate student *New Trends, Old People: Modelling the Effects of Population Aging on House Prices in the United States and Japan*	**Chuck Lindsey** Florida Gulf Coast University *The "Lost" Books of Euclid's Elements*
room	**10:00 – 10:50**	
U-117	**Jim Condor**, State College of Florida *Four Dimensions of the Fourth Dimension*	
U-119	**Kevin Bodden & Randy Gallaher**, Lewis & Clark Community College *"See You on the Flip Side" – What to expect when inverting your classroom*	
U-120	**Lubomir Markov**, Barry University *On Rolle's Theorem for Well-behaved Functions*	

ABSTRACTS: Plenary Sessions

Karen Morgan Ivy, Associate Professor of Mathematics, New Jersey City Univ.

An Intersection of Creative Literacy and Quantitative Literacy: Using Poetry to Improve Quantitative Reasoning

How do we as mathematics educators provide alternative ways in which students engage in mathematical discourse and explore mathematical ideas, thereby improving students' quantitative literacy? How do creative literacy and quantitative literacy conjointly enhance the cognitive and affective domains in the mathematics classroom? The use of mathematics in poetry extends beyond more obvious platforms such as counting syllables or lines and stresses in meter and structure. This talk will offer that teaching mathematics with poetry provides an opportunity to not only address quantitative reasoning, but to also improve students' quantitative literacy. Writing poetry inspired by mathematics offers students the opportunity to frame mathematical reasoning with arguments grounded in succinctness and clarity of thought processes. Additionally, writing poetry inspired by mathematics bolsters students' confidence in performing mathematics.

Bob Devaney, President, Mathematical Association of America, Boston University

The Fractal Geometry of the Mandelbrot Set

In this lecture we describe several folk theorems concerning the Mandelbrot set. While the set is extremely complicated from a geometric point of view, we will show that, as long as you know how to add and how to count, you can understand this geometry completely. We will encounter many famous mathematical objects in the Mandelbrot set, like the Farey tree and the Fibonacci sequence. And we will find many soon-to-be-famous objects as well, like the "Devaney" sequence. There might even be a joke or two in the talk. This talk only supposes a knowledge of complex numbers and is accessible to undergraduates.

Donal O'Shea, President, New College, Sarasota, FL

The Poincaré Conjecture (now Theorem), Singularities, and the Shape of Space

The notions of number and space date back to our earliest civilizations. Over millennia, we have modified, enriched, sharpened and further developed them. They are now thoroughly interwoven, and they undergird not just mathematics, but our civilization. The beginning of this century saw the surprising resolution of the so-called Poincaré Conjecture. We discuss what the conjecture says, why its resolution was surprising, and how that resolution triggered an enormous leap in our understanding of three-dimensional space.

ABSTRACTS: Contributed Papers Session I

Menaka Navaratna *& Channa Nishantha**,
Florida Gulf Coast University*& Indiana University of Pennsylvania**
Synchronization of Coupled Networks with Long Distance Connections

Here we study the dominant eigenvalue of a linearized coupled oscillatory network, and hence propose a network structure that has less transient times compared to networks only with nearest neighbor coupling.

Thomas W. Hair, Florida Gulf Coast University
Benford's Law of First Digits and the Mass of Exoplanets

Benford's Law refers to the frequency distribution of first digits in natural and human-constructed sources of data. In this distribution, the number 1 occurs as the leading digit approximately 30% of the time, while larger numbers occur in that position with decreasing frequency. This distribution of first digits is the same as the widths of gridlines on a logarithmic scale. Exoplanet mass data from the Exoplanet Orbit Database is analyzed for goodness-of-fit with the predicted distribution of first digits implied by Benford's Law. This surprisingly close match between the two suggests a limited predictive ability for the mass distribution of exoplanets.

Jaime H. Barrera, Saint Leo University
A Spectral Galerkin Method for the Porous Media Equation and a Class of Resulting Legendre Integrals

A spectral Galerkin method applied to the porous media equation and closed-form formulas for a class of resulting integrals, $\int_H P_i(t)P_j(t)\,dt$, $\int_H P_i(t)P_j(t)P_k''(t)\,dt$, and $\int_H P_i(t)P_j'(t)P_k'(t)\,dt$, where P_i is the degree i Legendre polynomial, $H = [x, 1]$, and $x \in [0,1]$, are discussed. The formulas arise from using the Adams-Nuemann formula for products of Legendre polynomials.

Anna Little, Jacksonville University
Teaching the Physics of Calculus

Illustrating the connections of calculus to other disciplines is a goal of many calculus instructors, yet the relevant applications are often lost in the technicalities of the mathematics. This talk will explore how to emphasize connections between calculus and physics, describing one professor's experience of teaching a linked calculus-physics class.

Carol Warner, Barry University
Retaining Highly Anxious Learners Opting-out of Remediation

With colleges and universities cutting costs and hoping to raise retention rates, many developmental courses are now being offered as optional. As a former highly anxious adult learner, Dr. Warner will discuss successful ways to retain adult students, and share what she has learned after 22 years in the classroom.

Joy D'Andrea, University of South Florida, Sarasota – Manatee
An Extension of Euler's Polyhedron Formula

Euler's Polyhedron Formula for convex polyhedra is denoted as V–E+F=2, where V(vertices), E(edges), & F(faces) are the elements of the polyhedron. The set of connected orbits of these elements is called a fundamental transversal. We present a new extension of Euler's Formula to investigate the number of orbits a fundamental transversal has on a polyhedron, which classifies polyhedra according to their Euler orbit characteristics.

Timothy W. Jones, Edison State College
Proving the Powers of π are Irrational

There are proofs that π and π^2 are irrational and that π is transcendental, but no general proofs that all natural number powers of π are irrational. We show this result using recent transcendence techniques of Niven and others. This result provides motivation for the techniques of transcendence in their simplest form. Once the irrationality of powers are established, transcendence of π is an easy generalization.

Michelle P. Carmel, Broward College
Redesigning Math: Acceleration, Engagement, and Customized Remediation

Acceleration, Engagement in the classroom and Customized Remediation are the key components to Broward College's Math Redesign 8-week Model. Participants will experience a redesigned math class during this interactive session. The facilitator will share an accelerated model, collaborative learning strategies and engagement techniques.

ABSTRACTS: Contributed Papers Session II

Mile Krajcevski, University of South Florida
The Role of Visualization in Undergraduate Mathematics

The benefits of visualizing mathematical concepts in guiding one's intuition towards a successful solution of a mathematical problem have been the subject of intensive research in the last few years. We will reflect briefly on the role of visualization in the past, and comment on the use of visualization arguments in undergraduate mathematics courses. At the end we'll indicate some prospects in this area of research.

Daniel Moseley, Jacksonville University
Incorporating Elements of Research in the Classroom

To encourage enthusiasm about the mathematical sciences, I try to incorporate elements of my own research in the classroom as well as research methods. In this talk, I will present a project that my Linear Algebra students developed.

C. Altay Özgener & Jim Condor, State College of Florida
A 20-minute History of the Twin Prime Conjecture, or Primes in Short Interval

We will outline the history of twin prime conjecture, and the recent progress related to the problem.

Jacci White, Saint Leo University
Governor's Session: Updates from the MAA

Topics of discussion include new membership options, the approaching 100th anniversary, and ways to get involved on a national level.

Dennis Runde, State College of Florida
Ten (or more) Engaging Topics from Math Class

This talk will highlight ten (or more) simple, engaging, and really cool topics from a range of classes taught in the first two years of college mathematics. Participants will collaborate to answer questions involving space travel, gambling, becoming a millionaire, and other topics! Bring a calculator and a sharp pencil!

Latrica Williams, St. Petersburg College
Increase Levels of Understanding in Elementary Statistics by Using a Flipped Class Model, Mobile Learning, and Social Media

The presentation will discuss online resources and their usefulness in a flipped class format for teaching Elementary Statistics. It will also focus on in-class and out-of-class activities and projects, mobile learning apps, and using social media for data collection, analysis, and discussions.

Carrie E. A. Grant, Flagler College
Engaging Online Statistics Activities

Engaging students in the learning process is essential to deep conceptual understanding of statistical topics. In this presentation, learn how to create applet activities in a using an online statistical package for students to explore statistical concepts. These activities involve a student worksheet, a video lesson, the applet, and an assignment.

Brian Camp, Saint Leo University
Computer Algebra Systems for Linear Algebra

This talk is intended to go over some of the methods and techniques in a Linear Algebra course and how they may be explored using computer algebra systems such as SAGE, Maxima and Octave.

ABSTRACT: Workshop

WeBWork is an MAA supported online homework delivery system that is being used against many commercial products. WeBWork is free and students easily learn how to input their solutions in various equivalent forms. Professors require about one hour of training before they can use it.

WeBWork enjoys inputs of many questions from various books by the professors who teach these courses. It is therefore our hope to provide this alternative delivery system to professors in the region through this workshop.

ABSTRACTS: Contributed Papers Session III

Bibi Juman & Alfredo Janson, Nova Southeastern University, undergraduates

Differentiation of Solutions of 2nd Order BVPs with Integral Boundary Conditions

In this talk, we make certain continuity and disconjugacy assumptions on second order BVPs with nonlocal integral boundary conditions. Given a solution of the BVP, we differentiate the solution with respect to various boundary parameters. We show the resulting function solves the associated variational equation.

Andrew Owen & Michael MacCallum, Edison State College, undergraduates

Understanding and Computation of Some Riemann Integrable Functions and the Challenges of Online and IPhone Application

We present code for programming Riemann sums for some functions and provide an alternative and comparative program to the Wolfram platform, as well as the challenges faced in minimizing errors. Our results are fairly comparable to the Wolfram online application platform. We also present code for the IPhone application for students to use for approximating area under a curve.

Alden Sharp & Shan Raja, H.L. Wilkes Honors College of FAU, undergraduates

Classifying Nil-clean Rings

We will discuss our work on classifying nil-clean commutative group rings. A ring is called *nil-clean* if every element can be written as the sum of a nilpotent ($a^n=0$ for some n) and an idempotent ($a^2=a$).

Thomas W. Hair, Florida Gulf Coast University

Provocative Radio Transients & Base Rate Bias: A Bayesian Argument for Conservatism

Most searches for alien radio transmissions have focused on finding omni-directional or purposefully earth-directed beams of enduring duration. However, most of the interesting signals so far detected have been transient and non-repeatable in nature. These signals could very well be the first data points in an ever-growing data base of such signals used to construct a probabilistic argument for the existence of extraterrestrial intelligence. This talk looks at the effect base rate bias could have on deciding which signals to include in such an archive based upon the unlikely assumption that our ability to discern natural from artificial signals will be less than perfect.

Jim Kuzmanovich, Wake Forest University

Mathematics on Postage Stamps

This is a light-hearted tour of postage stamps that depict a mathematical topic or a mathematician. Possible topics include the Pythagorean Theorem, interesting equations, mathematical symbols, Fermat's Last Theorem, complex numbers and quaternions. Possible mathematicians include Pythagorus, Gauss, Newton, Hamilton and Galois. The mathematical maturity rating of this talk is *G.*

Wendy Pogoda & Diego Grilli, Hillsborough Community College
Teaching Probability through Projects and Games

In a first year statistics course, probability is often viewed as the least interesting topic for students. However, through board games, student projects, and activities, probability can come alive for students. This session will present some ideas to increase student engagement and interest in probability.

Junyi Tu, University of South Florida, graduate student
Global Attractor of Boissonade System

We prove the existence of a global attractor for the solution semiflow of a reaction-diffusion system called Boissonade system in the L^2 phase space. Some properties of the global attractor are discussed.

ABSTRACTS: Contributed Papers Session IV

Raymond Fowler, H.L. Wilkes Honors College of FAU, undergraduate
Dusty Plasmas

Dust particles in a plasma can arrange themselves into a vertical configuration when placed inside a glass box. What really occurs in the glass box is still unknown, and no known method of direct measurement exists. In this talk we describe the related experiment and use simulation to find the parameters of particles in their equilibrium positions.

Patrick Bibby, University of Miami
DO THE MATH!! . . . MENTALLY!!

The best math students seem to have the ability to perform fairly complex mathematics in their heads, but all students can improve their mental math skills through regular practice. These skills are valuable tools in virtually all levels of mathematics, not just arithmetic. At this session, samples of mental math problems from various areas of mathematics will be presented via PowerPoint. If you attend, bring a pencil, but do not bring paper.

Neha Shrestha, H.L. Wilkes Honors College of FAU, undergraduate
New Trends, Old People: Modelling the Effects of Population Aging on House Prices in the United States and Japan

New demographic trends show that there is a larger share of elderly people in the population. Using established population projections for 2010-2050, I compare the effects of population aging on house prices for the US and Japan. The goal is to construct a simulation model that incorporates aspects of existing models, but also offers a novel approach to explaining the relationship between population aging and housing.

Chuck Lindsey, Florida Gulf Coast University
The "Lost" Books of Euclid's Elements

It is well-known that the standard edition of the *Elements* of Euclid consists of thirteen books. However, in the first English edition, published by Sir Henry Billingsley in 1570, the title begins "Euclid's Elements of Geometry in XV Books…". Where did Books XIV and XV come from? Where did they go? In this talk we will outline what is known of the contents, origin, history, and ultimate fate of "Books" XIV and XV.

Jim Condor, State College of Florida
Four Dimensions of the Fourth Dimension

Interest in higher dimensions has continued to grow in and around the mathematics community. The presenter will discuss how creative visualization can lead to a more thorough understanding of elusive mathematical concepts such as the fourth dimension.

Kevin Bodden & Randy Gallaher, Lewis & Clark Community College
"See You on the Flip Side" – What to expect when inverting your classroom

The presenters will discuss the current trend of "flipping" classrooms. Topics will include an overview of "flipping", example models, inexpensive ways to get started, as well as pros and cons of implementation. Common misconceptions will be discussed, as well as how "flipping" can be considered a "flashback" as well.

Lubomir Markov, Barry University
On Rolle's Theorem for Well-behaved Functions

We are going to prove an interesting version of Rolle's Theorem valid for a broad class of functions, and we will then discuss several advanced applications. The talk will be accessible to students.

FIRST FLOOR

EDISON STATE COLLEGE

DEPARTMENT OF FACILITIES PLANNING

CLASSROOM BUILDING

BUILDING U

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LEE COUNTY
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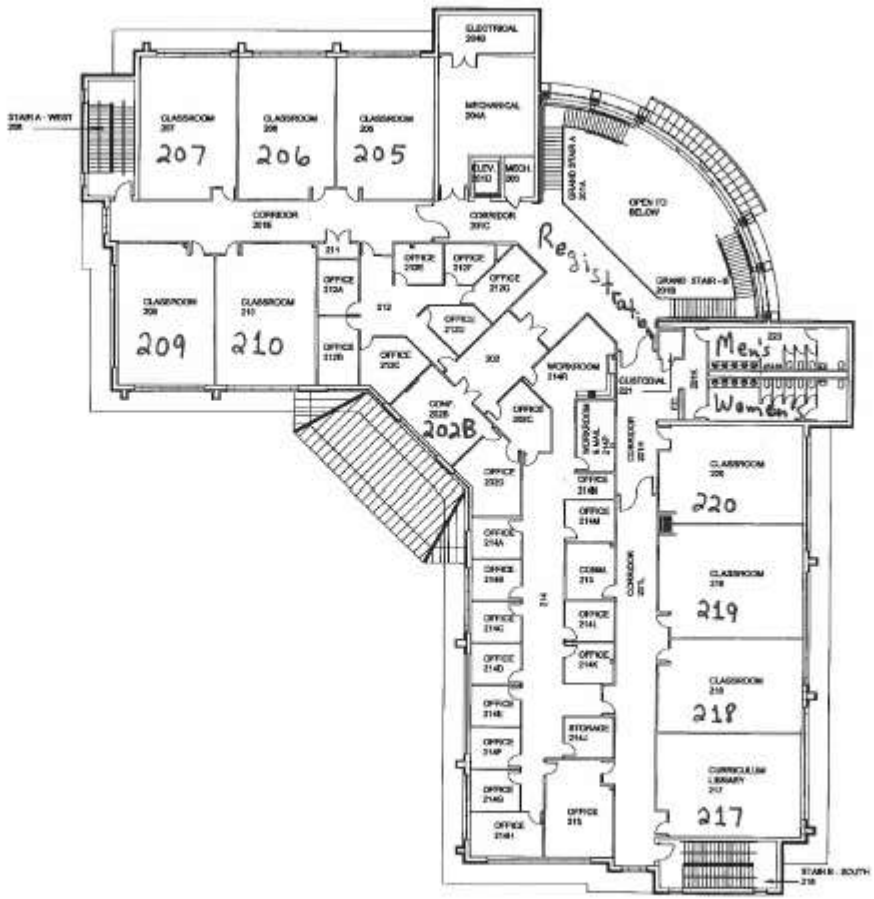

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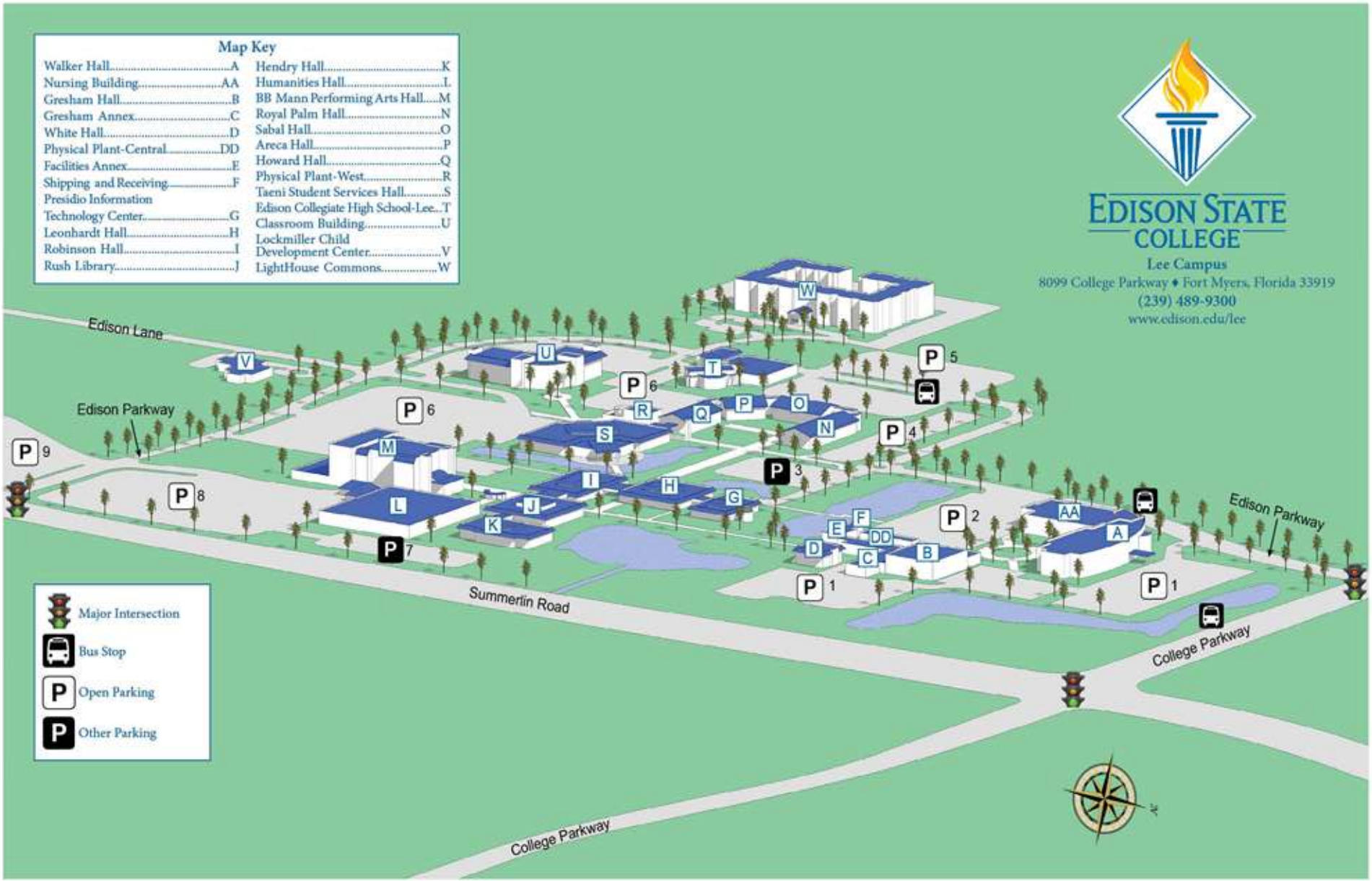
Map Key
Walker Hall....A
Nursing Building....AA
Gresham Hall....B
Gresham Annex....C
White Hall....D
Physical Plant-Central....DD
Facilities Annex....E
Shipping and Receiving....F
Presidio Information Technology Center....G
Leonhardt Hall....H
Robinson Hall....I
Rush Library....J
Hendry Hall....K
Humanities Hall....L
BB Mann Performing Arts Hall....M
Royal Palm Hall....N
Sabal Hall....O
Areca Hall....P
Howard Hall....Q
Physical Plant-West....R
Taeni Student Services Hall....S
Edison Collegiate High School-Lee....T
Classroom Building....U
Lockmiller Child Development Center....V
LightHouse Commons....W
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The Florida Section of the

Mathematical Association of America

and the

Florida Two-Year College Mathematics Association

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