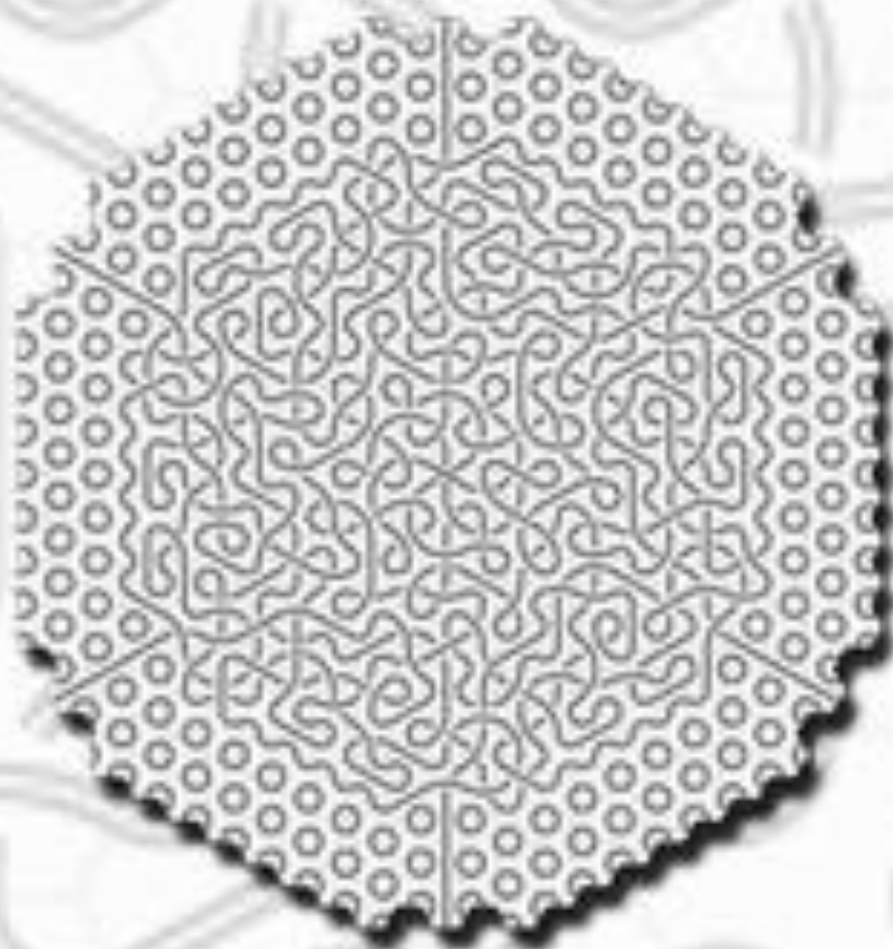


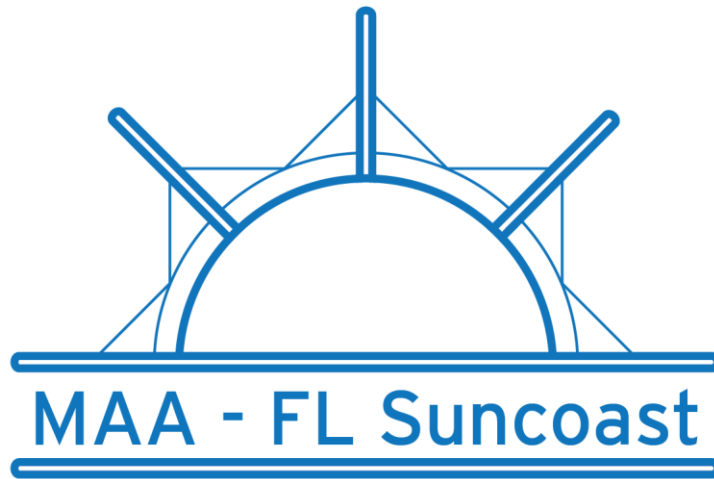
The 2016 Annual Meeting  
of the  
Suncoast Region  
of the  
Florida Section  
of the  
Mathematical Association  
of America



St. Petersburg College - Seminole Campus  
December 2, 2016

Merge a Trios - David Reinhardt

This artwork depicts three interlocking paths, each having  $C_2$  symmetry, with the triangular paths having  $C_3$  symmetry. The overall pattern has nearly, but not exactly,  $C_2$  and  $C_3$  symmetry due to the lack of symmetry in the over-under path crossings, providing additional movement in the paths. The paths are constructed in a piecewise fashion using Isoperiod tiles decorated with arcs placed on a hexagonal grid.



***A special thanks to our local partners in bringing together the 2016 MAA- FL Suncoast Region Conference:***

Jonathan Sullivan  
Bill Hemme  
Lisa Leighton  
Marguerite's Café & Catering  
Pam Levering  
Bill Rush  
Mark Strickland  
St. Petersburg College – Seminole Campus

*Please send thoughts and well-wishes to Sandy Cohen, Mathematics faculty member at St. Petersburg College – Tarpon Springs Campus, as she recovers from a lengthy illness. Get well soon Sandy!*

## PROGRAM

Time	Title	Room
12:45 – 1:45	<b>Registration</b>	UP Lobby
1:45 – 2:00	<b>Welcoming Remarks</b> Mark Strickland, Provost, SPC – Seminole Campus	UP 160
2:00 – 2:20	<b>Concurrent Sessions IA</b> <i>The Correct Definition of an Infinite Series</i> Jared Bunn, Florida Polytechnic University	UP 235
2:25 – 2:45	<b>Concurrent Sessions IB</b> <i>Prevalence of Typical Images in High School Geometry Textbooks</i> Megan Cannon and Milé Krajcevski, University of South Florida, Tampa	UP 156
	<i>Simple Mathematics to the Rescue of Physics AGAIN in UNIQUELY Resolving the CLOCK PARADOX</i> Carlton Lane, Hillsborough Community College, Retired	UP 193
2:45 – 3:00	<b>Break</b>	
3:00 – 3:45	<b>Concurrent Session II</b> <i>Improving Performance and Enhancing Introductory Statistics using Projects</i> Joy D’Andrea, Ph.D, University of South Florida Sarasota, Manatee Rebecca D. Wooten, Ph.D, New College of Florida	UP 235
3:00 – 3:20	<b>Concurrent Sessions IIA</b> <i>Special Values of L-functions Derived from Symmetry of the Gamma Function</i> Matthew Cuffaro, University of South Florida	UP 154
	<i>City as Text – St. Petersburg, FL</i> Jacci White, Ed. D., St. Leo University	UP 175
3:25 – 3:45	<b>Concurrent Sessions IIB</b> <i>Mathematical Methods of Electromagnetic Wave Propagation in Various Media</i> Carlton Drew, University of South Florida	UP 156
	<i>MAT1033 LAB: How it Works (or Doesn’t!)</i> Cora Wilkerson, St. Petersburg College	UP 193
3:45 – 4:00	<b>Break</b>	

<b>4:00 – 4:20</b>	<b>Concurrent Sessions IIIA</b>	
	<i>Source Identification Using Particle Filter Technique</i> Menaka Navaratna, Florida Gulf Coast University	UP 154
	<i>Celebrate 50 Years with the Florida Section of the MAA</i> Joni Pirnot, State College of Florida, Past President of MAA–Florida Section	UP 175
<b>4:25 – 4:45</b>	<b>Concurrent Sessions IIIB</b>	
	<i>Searching for the Maximum Number of Roots of Harmonic Polynomials Corresponding to Images of a Single Light Source Produced by a Cardioid-Shaped Gravitational Lens of Smooth Mass Distribution</i> Nicole Hudson and Catherine Bénéteau, University of South Florida	UP 156
	<i>The Geometry of the Human Form</i> Gregory McColm, Ph. D., University of South Florida	UP 193
<b>4:45 – 5:00</b>	<b>Break</b>	
<b>5:00 – 5:45</b>	<b>Plenary Session</b>	UP 160
	<i>The Parallel Paradigms of Mathematics and Art</i> Elizabeth Indianos, M.F.A., Artist and Writer, St. Petersburg College, Tarpon Springs	
<b>6:00 – 7:15</b>	<b>Dinner: <i>By Reservation Only</i></b>	UP Lobby
<b>7:15 – 7:30</b>	<b>Closing Remarks</b>	UP Lobby

## ABSTRACTS

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2:00 – 2:20

Sessions IA

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**Jared Bunn, Ph.D**, Florida Polytechnic University

UP 154

*The Correct Definition of an Infinite Series*

Abstract: Modern calculus textbooks generally have the same definition of a series: an infinite sum of (real) numbers realized using partial sums. This talk will present a definition that ties together the sequence that forms the summands with the sequence of partial sums in united pair of sequences. Under this definition, a number of examples will be presented to demonstrate the clarity produced from this organization. Moreover, the definition will be used to reduce classic paradoxes regarding series to obvious false statements.

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2:25 – 2:45

Sessions IB

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**Megan Cannon and Milé Krajcevski**, University of South Florida, Tampa

UP156

*Prevalence of Typical Images in High School Geometry Textbooks*

Abstract: Visualization can be a powerful tool in mathematics for intuitive understanding, providing and/or supporting proof and reasoning, and assisting in comprehension however, there are instances when a visual representation may be an obstacle to the cognitive process. Despite the extensive research on the benefits and challenges of visualization there is little research into what types of figures students are exposed to through their textbooks. We take a look at the 'typical' images in 14 high school geometry textbooks in four sections: parallel lines and transversals, classifying triangles, parallelograms, and trapezoids and hypothesize on possible misconceptions resulting from the overuse of these images.

**Carlton Lane**, Hillsborough Community College, Retired

UP 193

*Simple Mathematics to the Rescue of Physics AGAIN in UNIQUELY Resolving the CLOCK PARADOX*

Abstract: It will be shown that high school algebra simplifies

$$\left\{ \frac{D(1-v^2/c^2)^{1/2}}{[c+v]} \right\} (1-v^2/c^2)^{1/2}$$

so that the difference in synchronizations between inertial systems in uniform motion can be readily seen and the corresponding error of the Clock Paradox makers exposed. Without the simplification help of mathematics, it is impossible to see that the messy expression differs from  $D/c$  by  $Dv/c^2$ . This  $Dv/c^2$  difference allows one to see the correct synchronizations, rather than the false ones of the paradox makers. Also, the difference between

$$(D/v)(1-v^2/c^2)^{1/2} \text{ and } [D(1-v^2/c^2)^{1/2}]/v$$

while mathematically the same, is another source of error made by the paradox makers.

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3:00 – 3:45

Session II

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**Joy D’Andrea, Ph.D**, University of South Florida Sarasota, Manatee

UP 235

**Rebecca D. Wooten, Ph.D**, New College of Florida

*Improving Performance and Enhancing Introductory Statistics using Projects*

Abstract: Introductory Statistics is a course taught in various community colleges, state colleges, and universities. The implementation of projects in this course has been shown to enhance student learning; in addition to increasing the ability of educators to assess student learning outcomes and objectives in detail. These projects are often inquiry-based and require a balance between flexibility and efficiency. Maintaining balance has provided the students’ opportunities through exploration and learner autonomy. In exploration, a student seeks new methods and options through experimenting. In this talk, we will discuss the benefits of exploration required by projects given in an introductory statistics course. This discussion also includes viewpoints that students shared regarding their projects and how their opinion was also a performance indicator of their scholastic enhancement.

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3:00 – 3:20

Sessions IIA

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**Matthew Cuffaro**, University of South Florida

UP 154

*Special Values of L-functions Derived from Symmetry of the Gamma Function*

Abstract: This talk is an exposition the special values of zeta functions from the domain of integers, and special values may be derived from other number fields.

By the convexity of the gamma function there exists pairs of values in the domain which are equal in the codomain, but determining these pairs of values can be problematic if their difference is not an integer. For those that differ by an integers  $n < 5$  and  $2n \geq 6$  they can be expressed in terms of radicals and therefore correspond to certain number fields.

This relationship becomes important in the theory of L-functions, whose functional equations are expressed in the following form:

$$L(h - s) = A^s g(s) L(s)$$

where  $h$  is some constant,  $A^s$  is an exponential form, and  $g(s)$  is a product of gamma functions called the “gamma factor.” The gamma factor plays an important role in the highly-conjectural study of L-functions, and for negative  $s$  the gamma factor determines the zeros of the zeta function. While mathematics has been able to generalize zeta and L-functions, since Euler their special values have not been extended from the domain of even positive integers and negative integers. For the presentation, I will use this “gamma equivalence” relation to combine functional equations of zeta functions to support the claim that L-functions have special values defined for certain number fields.

**Jacquelyn White, Ed. D.**, St. Leo University

UP 175

*City as Text – St. Petersburg, FL*

Abstract: In this session we will talk about a mathematical field trip to downtown St. Petersburg on “Arts Alive” where students integrate a core value of community with mathematics as their lens for observing the city, and how the lens effects the perspective. Examples will be given of how to explore the city from a problem solving perspective, geometry, measurements, probability, and a statistical view.

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3:25 – 3:45

Session IIB

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**Carlton Drew**, University of South Florida

UP 156

*Mathematical Methods of Electromagnetic Wave Propagation in Various Media*

Abstract: We will discuss some of the various mathematical techniques for the study and analysis of electromagnetic wave propagation, including the angular spectrum method and transfer matrix formalism. We will touch briefly on the extension of these methods to more elegant forms when applicable (e.g. group theory). Covered will be wave propagation in free space as well as in periodic media, such as crystals. We will close on the application of these analyses to the future of scientific research and technological development, especially as it applies to the field of optics. Contributing authors: Carlton Drew, Brian Kantor, Darrick Hay, and Zhimin Shi

**Cora Wilkerson**, St. Petersburg College

UP 193

*MAT1033 LAB: How it Works (or Doesn't!)*

Abstract: A brief presentation on how the LAB is conducted, and a comparison of success rates between sections taking the LAB and sections not taking the LAB.

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4:00 – 4:20

Session IIIA

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**Menaka Navaratna, Ph.D**, Florida Gulf Coast University

UP 154

*Source Identification Using Particle Filter Technique*

Abstract: Accurately locating the source of contaminants from noisy measurements acquired from a series of sensors is analyzed here. The physical system considered here consists of contaminant particles originating from an unknown location in a confined space which are being carried away by the airflow inside a room. The path of the particles is influenced by both inherent random movement of the particles as well as air flow inside the room. Concentration of the particles at each sensor is measured at discrete time instances. These measurements are inaccurate due to additive random noise and will be processed under a particle filter algorithm to estimate the origin of contaminant particles. Extensive simulation experiments are carried out to show the effectiveness of particle filters in calculating the origin of contaminant.

**Joni B. Pirnot, Ph. D.**, State College of Florida

UP 175

*Celebrate 50 Years with the Florida Section of the MAA*

Abstract: The annual joint meetings of the MAA-Florida Section and FTYCMA will be held on February 17-18, 2017, on the campus of State College of Florida. This is the 50th anniversary of the Florida Section, and there are some exciting things planned for the conference! Attend this session to get a sneak preview of the program and to provide input on ways to make this the best conference ever.

**Nicole Hudson and Catherine Bénéteau**, University of South Florida

UP 156

*Searching for the Maximum Number of Roots of Harmonic Polynomials Corresponding to Images of a Single Light Source Produced by a Cardioid-Shaped Gravitational Lens of Smooth Mass Distribution*

Abstract: Unlike ordinary polynomials of a complex variable  $z$ , the fundamental theorem of algebra does not yield information about the number of roots of harmonic polynomials containing both  $z$  and  $\bar{z}$ . Today, complex analysts and astrophysicists alike are interested in determining an upper bound for the number of roots of these polynomials, and the connection of the two fields comes from the complex formulation of gravitational lensing theory. This presentation will begin with a bit of history about gravitational lensing, and an explanation of what is now called 'the lens equation'. Various techniques which are utilized in the process of finding the roots of the lensing equation will be discussed. At the end of the presentation, future avenues for research of this open problem will be mentioned.

**Gregory McColm, Ph. D.**, University of South Florida

UP 193

*The Geometry of the Human Form*

Abstract: The most commonly depicted image in art is the human form, either the face or the body. While our interest in our own image appears older than our species (!), the historical and archeological evidence of mathematics - especially geometry - in studying, depicting, and philosophizing about the human form is only a few thousand years old. Since then, the geometry of the human form has attracted the attention of artists and anatomists, statisticians and physicists, geometers and numerologists. In this tale of mathematics in popular culture, we find that mathematics has been used as a tool to create art, a mechanism to control art, and a medium to find out what we really think about ourselves.

**Elizabeth Indianos, M.F.A.**, Artist and Writer, St. Petersburg College, Tarpon Springs

UP160

*The Parallel Paradigms of Mathematics and Art*

Abstract: Plenary Speaker, award winning writer and artist, Elizabeth Indianos, explores how mathematics and art inspire and reflect each other, fueling our conceptions of the Universe. In this fascinating talk, Indianos discusses the work of scientists and artists, from Isaac Newton, to artist Edouard Manet and the creative thinkers of our time.





**MAA100**

MATHEMATICAL ASSOCIATION OF AMERICA

CELEBRATING A CENTURY OF  
ADVANCING MATHEMATICS



Elizabeth Indianos

**FRIDAY, DECEMBER 2ND, 2016  
5:00PM**



Sir Isaac Newton



Eduard Manet's Olympia

*Elizabeth Indianos: Utopian Dreams*  
**The Parallel Paradigms of Mathematics and Art**

Plenary Speaker, award winning writer and artist, Elizabeth Indianos, explores how mathematics and art inspire and reflect each other, fueling our conceptions of the Universe. In this fascinating talk, Indianos discusses the work of scientists and artists, from Isaac Newton, to artist Edouard Manet and the creative thinkers of our time.

**ST. PETERSBURG COLLEGE SEMINOLE CAMPUS**