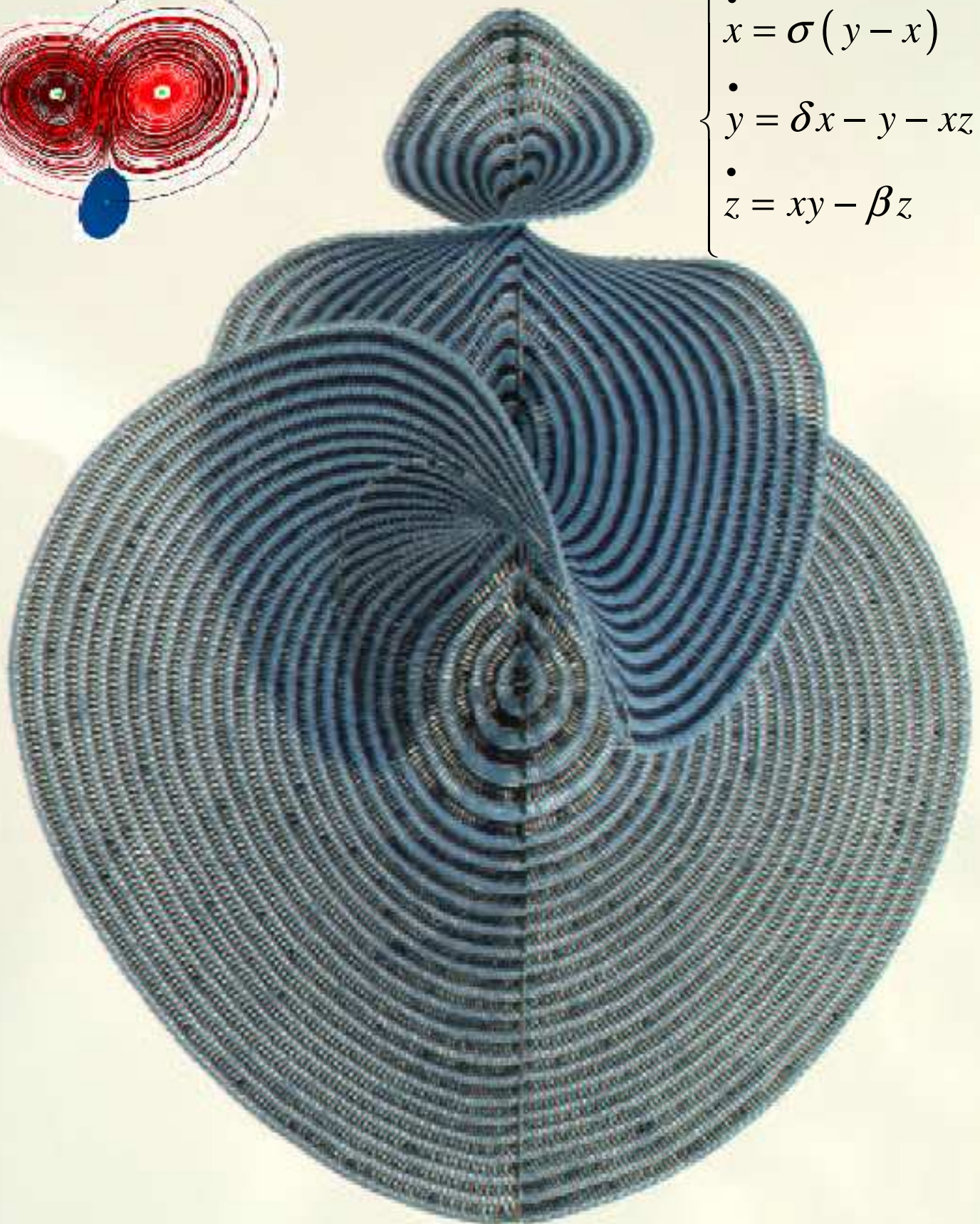




$$\begin{cases} \dot{x} = \sigma(y - x) \\ \dot{y} = \delta x - y - xz \\ \dot{z} = xy - \beta z \end{cases}$$



Joint Meetings 2007

The Lorenz attractor illustrates the chaotic nature of the equations that were derived and studied by the meteorologist E.N. Lorenz in 1963 as a much simplified model for the dynamics of the weather. Now generally referred to as the Lorenz system, it is given as the three ordinary differential equations on the front page.

The 2007 Joint Meetings

While the Lorenz system has been widely accepted as a classic example of a chaotic system, it was proven by Tucker only in 1998 that the Lorenz attractor is actually a chaotic attractor.

of the

Presented is an image of the Lorenz attractor not obtained by simply integrating from an arbitrary starting condition, but by computing the one-dimensional unstable manifold $W_u(0)$. Since the origin is in the Lorenz attractor, plotting $W_u(0)$ gives a good picture of the attractor. The two branches of the unstable manifold, one red and one brown, accumulate on the Lorenz attractor. The little blue disc is in the stable eigenspace and separates the two branches.

Florida Section of the Mathematical Association of America

The Lorenz manifold, like any global two-dimensional invariant manifold of a vector field, cannot be found analytically but must be computed numerically. The key idea is to start with a uniform mesh on a small circle around the origin in the stable eigenspace and then use the dynamics to "grow" this circle further away. The main problem one needs to deal with is that the flow does not evolve the initial circle uniformly, so that the mesh quality generally deteriorates very quickly.

and the

Initially, up to a geodesic distance of about 36.75, the Lorenz manifold is nearly flat. It then starts picking up a lot of negative curvature near the positive z-axis, around which it spirals. The lower part of the manifold with $z < 0$ has almost zero curvature. It is impossible to flatten out the crocheted manifold on a table, as the region of strong negative curvature forms more and more folds.

Florida Two Year College Mathematics Association

Dr Hinke Osinga and Professor Bernd Krauskopf have turned the famous Lorenz equations that describe the nature of chaotic systems into a beautiful real-life object, by crocheting computer-generated instructions. Together all the stitches define a complicated surface, called the Lorenz manifold.

Tallahassee Community College

The final result consists of 25,511 crochet stitches and took Osinga about 85 hours to complete. However, this wasn't just done for fun. Their work gives insight into how chaos arises and is organized in systems as diverse as chemical reactions, biological networks and even your kitchen mixer.
Information quoted from <http://www.enm.bris.ac.uk/staff/hinke/crochet/>

February 16-17, 2007

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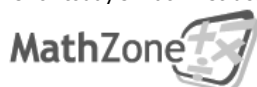
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Friday 9:30 am - 11:00 am

Registration: EWD Lobby
Friday 9:00 am - 4:30 pm
Saturday 9:00 am - 11:30 am

MAA Books and Merchandizes: EWD Lobby

Publishers' Exhibits: EWD Lobby

Email Access: EWD Room 217

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Jacci White, President, Saint Leo University
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Eduardo Fernandez, Vice-President for Site Selection, Eckerd College
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C. Altay Özgener, Web Master, Manatee Community College

Don Ransford, President-Elect, Edison Community College
Martha Goshaw, Past President, Seminole Community College

Friday, February 16th, 2007				
8:00-10:45	FTYCMA Workshop – EWD Room 123			
11:00-12:30	FTYCMA Business Meeting and Luncheon – EWD Room 123			
12:45-1:00	Presidential Welcomes – EWD Grand Banquet Hall Jacci White, President of MAA - Florida Section Byron Dyce, President of FTYCMA Bill Law, President of Tallahassee Community College			
Plenary Session 1:00-1:50 EWD Grand Banquet Hall	UNDERSTANDING HOW YOUR CALCULATOR CALCULATES Bruce Edwards, University of Florida			
Contributed Papers	EWD Room 114	EWD Room 123	EWD Room 207	EWD Room 264
2:00-2:45	R. Rao University of North Florida A group-theoretic proof for the Chinese Remainder Theorem.	Steve Grosteffon Santa Fe CC Implementing "Beyond Crossroads"	Dr. Jayathi Raghavan, Dr. Stacie Badran, Dr. Nirmal Devi, Ms. Sharmistha Chakrabarti, Ms. Carol Jacobs Embry-Riddle Annual Women in Math Day at Embry-Riddle Aeronautical University	Richard Tamburro Daytona Beach CC Innovative Teaching: Film Making and Mathematics
3:00-3:45	Yanzhao Cao Florida A&M University From integral to Young inequality	Chuck Lindsey Florida Gulf Coast University The Sunshine State Standards for Mathematics	Student Sudoku Contest Organized by Dan Jelsovsky	Li Zhou Polk CC A Sponge-worthy Activity for the Classroom
4:00-4:45	Please take this time to visit the publishers, whose sponsorship helps make this event possible.			
5:00-5:45	Alex Ambrosio Hillsborough CC Arrow's Impossibility Theorem	Jayathi Raghavan Embry-Riddle Aeronautical University Conceptual Change Model – An Enquiry Based Learning	Scott Hochwold University of North Florida Mathematics Lost, Found, and Misnamed	James Condor Manatee CC Creative Geometry
Plenary Session 6:00-6:50 EWD Grand Banquet Hall	Connections Between Mathematics and Biology Carl Cowen, Indiana University – Perdue University Indianapolis Past President, MAA			
7:00	Conference Banquet and Awards Ceremony – Student Union Ballroom			

Saturday, February 17th, 2007				
8:15-9:00	Continental Breakfast – Provided by Pearson-Prentice Hall			
Contributed Papers	EWD Room 123	EWD Room 128	EWD Room 207	EWD Room 264
9:00-9:45	Stephen Blumsack Florida State University Solving the N-hat Problem Using Venn Diagrams and Hamming Codes	Norma Agras Miami-Dade College College Algebra Guidelines	Student Integral Contest Organized by Dan Jelsovsky	John K. Lane Kennedy Space Center Mathematics in Music and Space
10:00-10:45	Ben Fusaro Florida State University The Seven Deadly Sins of Modeling	Cynthia Young University of Central Florida Improving Student Learning in the Pre-Calculus Environment	Student Presentations Linda Segovia Florida Atlantic University Epidemic Models ----- Megan Logue Jacksonville University Minimum Coverings with Fish	Julie Becker Valencia CC Using Quilts to teach PreAlgebra Concepts
11:00-11:45	James Lang Valencia CC Are there more happy numbers than there are happy people?	Eric Torres Santa Fe CC The Tablet PC and Online Instruction	Student Presentations Mathew Williamson University of South Florida Virtual Knots and the Kauffman-Harary Conjecture -----	Cynthia McGinnis Okaloosa-Walton College Playing With Paint, Mathematics and Two-Dimensional Design
Plenary Session 12:00-12:50 EWD Grand Banquet Hall	More than a Dozen Proofs that $1 = 2$: A Misguided Review of all of Mathematics James Tanton, St. Mark's School, MA MAA Beckenbach Book Prize Winner			
12:50-1:00 EWD Grand Banquet Hall	Presidential Farewells Jacci White, President of MAA - Florida Section Byron Dyce, President of FTYCMA			
1:00-2:30 EWD Grand Banquet Hall	Conference Luncheon Annual Business Meeting of MAA - Florida Section			

Abstracts

Friday, February 17

8:00 – 10:45 am

FTYCMA Workshop:

The workshop will provide members with the opportunity to formulate recommendations for distance learning as a follow-up to the 2006 Fall Retreat, will provide an overview of the *Beyond Crossroads* document, and will begin planning strategies for implementing the *Beyond Crossroads* standards in the state of Florida.

1:00 - 1:50 pm

Plenary Session

UNDERSTANDING HOW YOUR CALCULATOR CALCULATES

Bruce Edwards, University of Florida

Abstract: What happens when you press the sine key on your calculator? How does a calculator quickly produce the values of trigonometric functions? For instance, how does the TI-89 calculate $\sin 1.0$? You might be surprised to know that the calculator does not use series or polynomial approximation, but rather a simple algorithm called the CORDIC method. In fact, the CORDIC method is used for almost all function evaluations (trigonometric, logarithmic, exponential, hyperbolic, inverse functions, etc.), and even multiplication and division. In this paper we will present the main ideas of the CORDIC method along with some elementary examples.

2:00 – 2:45 pm

Room **A group-theoretic proof for the Chinese Remainder Theorem.**
114 R. Rao; University of North Florida

Room **Implementing "Beyond Crossroads"**
123 Steve Grosteffon; Santa Fe CC

Abstract: "Beyond Crossroads" presents a renewed vision for mathematics courses and instruction in the first two years of college. This presentation provides an overview of its purpose and content.

Room **Annual Women in Math Day at Embry-Riddle Aeronautical University**
207 Dr. Jayathi Raghavan, Dr. Stacie Badran, Dr. Nirmal Devi, Ms. Sharmistha Chakrabarti, Ms. Carol Jacobs; Embry-Riddle Aeronautical University

Abstract: Female student enrollment in the Engineering programs at Embry-Riddle continues to be at 16%. In this presentation, we plan to talk about "Women in Math Day" event organized by a committee of Mathematics faculty, targeted towards high school female students to motivate and encourage them into exploring mathematics oriented programs.

Room **Innovative Teaching: Film Making and Mathematics**
264 Richard Tamburro; Daytona Beach CC

Abstract: Film making provides an innovative way to teach the history of statistics. As part of a history research assignment, students create short, entertaining films. Examples include reenactments of historical events, a “Who Wants to be a Millionaire” episode, and time travel interviews. Students watching these films find them to be entertaining and effective.

3:00 – 3:45 pm

Room **From integral to Young inequality**
114 Yanzhao Cao; Florida A&M University

Abstract: We will provide a calculus proof to Young inequality using a technique which gives the value of the integral in the title.

Room **The Sunshine State Standards for Mathematics**
123 Chuck Lindsey; Florida Gulf Coast University

Abstract: Florida's Sunshine State Standards for K-12 mathematics are currently being rewritten. In this talk we will provide an overview of the process and results to date, focusing on the draft standards for high school mathematics and their implications for what college faculty can expect from future high school graduates. Implications for statewide assessment programs such as FCAT will also be discussed.

Room **Student Sudoku Contest**
207 Organized by Dan Jelsovsky; Florida Southern College

Room **A Sponge-worthy Activity for the Classroom**
264 Li Zhou; Polk CC

Abstract: The Menger sponge is a well-known fractal defined as the limit of a sequence of level-n drilled cubes. Although elementary, the surface areas, genus, and chromatic numbers of these cubes have not been asked. We will show that these questions offer interesting activities for many math classes at different levels.

5:00 – 5:45 pm

Room **Arrow's Impossibility Theorem**
114 Alex Ambrosio; Hillsborough CC

Abstract: We present a connection of mathematics to voting. Kenneth Arrow proved that no method of resolving elections can satisfy a reasonable set of fairness criteria. We present a recent proof of Arrow's Impossibility Theorem. This session is intended for those who teach voting or anyone else interested in democracy.

Room **Conceptual Change Model – An Enquiry Based Learning**
123 Jayathi Raghavan; Embry-Riddle Aeronautical University

Abstract: Conceptual Change Model (CCM) is an enquiry-based teaching strategy in which the concepts are learned by the learner rather than taught by arousing the learner's curiosity. This talk describes the various steps in CCM and using this strategy in a mathematics classroom, especially in a K-12 curriculum.

Room **Mathematics Lost, Found, and Misnamed**
207 Scott Hochwold; University of North Florida

Abstract: I will talk about Mathematicians and Mathematics that could appear in an historical mathematical version of the National Enquirer or People Magazine. There will be scandals, lost treasures, wrongs righted, mistaken identity, theft, famous people, and even some mathematics.

Room **Creative Geometry**
264 James Condor; Manatee CC

Abstract: A discussion on the link between mathematics and the art world. Specific examples will be given from past to present on what mathematic topics can be used to generate different types of artwork.

6:00 – 6:50 pm

Plenary Session

Connections Between Mathematics and Biology

Carl Cowen, Indiana University – Purdue University Indianapolis
Past President, MAA

Abstract: Dr. Rita Colwell, a research microbiologist and former Director of the National Science Foundation, regards the mathematical sciences as the backbone for US Scientific and Engineering research. Many scholars see the next few decades as a time of intensive progress in the biological sciences. Dr. Colwell sees mathematics as being an integral part of the progress in biology, not a traditional view, but a forward looking one.

In this talk, Carl Cowen will outline some of the research areas in the emerging collaborations between mathematical and biological scientists. In addition, Cowen, who began his study of the mathematics of neuroscience in 2002-03 at the Mathematical Biosciences Institute at Ohio State University, and who worked in 2003-04 as a junior post-doc in the lab of Prof. Christie Sahley in the Purdue University Biology Department, will illustrate the connection between mathematics and neuroscience with a discussion of the Pulfrich phenomenon, an experiment that helps illuminate how the brain processes visual images. There are few mathematical or biological prerequisites for this discussion.

Saturday, February 18

9:00 – 9:45 am

Room **Solving the N-hat Problem Using Venn Diagrams and Hamming Codes**
123 Stephen Blumsack; Florida State University

Abstract: The three-hat problem generates millions of results on “Google” and error correcting codes are crucial in the current information age. This presentation will report on their connection and illustrate how beautiful mathematical structures and algorithms can provide unexpected solutions and insights.

Room **College Algebra Guidelines**
128 Norma Agras; Miami-Dade College

Abstract: CRAFTY, subcommittee of the MAA's CUPM, voted unanimously to adopt the College Algebra Guidelines, written by several members of CRAFTY with national input. This talk will present these guidelines, show the seamless transition between Florida's Developmental Mathematics Plan, and provide an overview of the NSF-funded project, Renewal of College Algebra.

Room **Student Integral Contest**
207 Organized by Dan Jelsovsky, Florida Southern College

Room **Mathematics in Music and Space**
264 John K. Lane; Kennedy Space Center

Abstract: Mathematical methods employed to study music are no different than the mathematics used to analyze the earth's atmosphere, space radiation, or video processing systems. Mathematical modeling, analysis, and simulation are tools that provide scientists and engineers, as well as artists, a means to characterize and understand the physical universe.

10:00 – 10:45 am

Room **The Seven Deadly Sins of Modeling**
123 Ben Fusaro; Florida State University

Abstract: It starts out with the concept of a model of an entity, system or process. The power of a model, pM , is then defined. The first deadly sin recalls (yes) real estate. We then go on to characterizations and examples of the rest of the deadly sins.

Room **Improving Student Learning in the Pre-Calculus Environment**
128 Cynthia Young; University of Central Florida

Abstract: Has a student ever said "I understand you in class but when I get home I'm lost?" There is a gap that exists between when we have students in class and when they are doing homework and studying outside of class. In this session Cynthia Young will share specific pedagogies she has used to fill that gap which increases student success in MAC 1105 (College Algebra), MAC 1114 (Trigonometry) and MAC 2147 (Combined course). Specific examples of how to get students to read mathematics, in class engagement and assessment examples, different ways to use online companion systems, and addressing different learning styles.

Room **Epidemic Models**
207 Linda Segovia; Florida Atlantic University

Abstract: Epidemic models have been used through out history in order to predict the outcome of an epidemic. I will give background on some simple epidemic models, and introduce a new model three colleagues and I created at the Applied Mathematics Science Summer Institute (AMSSI) during the summer of 2006. I will then show how this research project could be improved.

Room **Minimum Coverings with Fish**
207 Megan Logue; Jacksonville University

Abstract: A minimum covering with fish of order n is an ordered trip (S,F,P) where F is a collection of edge disjoint fish that partition the edge set of the union of the complete graph K_n with vertex set S and P , the smallest sub-graph of K_n that makes this possible. The objective of this project is to find a complete solution to the spectrum problem for minimum coverings with fish.

Room **Using Quilts to teach PreAlgebra Concepts**
264 Julie Becker; Valencia CC

Abstract: I will give some background on quilts and examples of geometrically pieced quilts. An application to the PreAlgebra curriculum will be presented.

11:00 – 11:45 am

Room **Are there more happy numbers than happy people?**
123 James Lang; Valencia CC

Abstract: Happy numbers is a topic originating in recreational mathematics in the first half of the twentieth century. We will begin with some numerical exploration, make conjecture and outline the proof given in a paper in Monthly in 1945. Then we will look at some unsolved problems relating to happy numbers.

Room **Virtual Knots and the Kauffman-Harary Conjecture**
128 Mathew Williamson; University of South Florida

Abstract: After a brief introduction to classical and virtual knot theory, the Kauffman-Harary Conjecture for classical knot colorings will be explained. My research deals with a virtualization of the Kauffman-Harary Conjecture, which will be explored after suitable background has been exposed.

Room **The Tablet PC and Online Instruction**
207 Eric Torres; Santa Fe CC

Abstract: The purpose of this presentation is to illustrate how a Tablet PC can be used to bring your lectures to your online students. The Tablet PC, in conjunction with the correct software, can actually make the online environment closer to your classroom environment then one would have ever thought possible. With a few strokes of a pen your online lesson can look like the classroom not just your handouts.

Room **Playing With Paint, Mathematics and Two-Dimensional Design**
264 Cynthia McGinnis; Okaloosa-Walton College

Abstract: Students use a simple paint program, matrices, matrix inverses, algebra and magic squares along with the concepts of symmetry to create visual images. Looking for patterns in the mathematics, students begin to form conjectures. This leads to mathematical exploration using color as a tool.

12:00 – 12:50 pm

Plenary Session

More than a Dozen Proofs that $1 = 2$: A Misguided Review of all of Mathematics

James Tanton, St. Mark's School, MA
MAA Beckenbach Book Prize Winner

Abstract: Guidobaldo del Monte (1545 – 1647), a patron and friend of Galileo Galilei, believed he had witnessed the creation of something out of nothing when he established mathematically that zero equals one. He thereby thought that he had proven the existence of God! Although I daren't be so bold with my claims, I am willing to prove instead that one equals two. And moreover, just to convince you that I am right, I will do so multiple times over, drawing upon a wide spectrum of mathematical techniques, from algebra and arithmetic, to probability theory, calculus, mechanics, propositional logic, and more! Will you be able to find fault with any of my "proofs?"

