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Earl Raymond Hedrick Lecture Series

Complex Dynamics and Crazy Mathematics
Robert L. Devaney, Boston University

The 2010 Hedrick Lectures will investigate some of the complicated dynamics and beautiful images that arise when complex functions are iterated. The chaotic regimes for these maps, the so-called Julia sets, are extremely rich from both a topological and geometric point of view. Yet to this day, the Julia sets for such simple maps as the quadratic function $z^2 + c$ and the exponential map $\lambda e^z$ are not completely understood. Each of these lectures will be independent and will focus on a particular class of complex maps. As a sub theme, each lecture will feature some of the “crazy” mathematics that is used to understand these sets.

**Lecture 1: The Fractal Geometry of the Mandelbrot Set**
Thursday, August 5, 10:30 am – 11:20 am

In this lecture we will describe the structure of the Mandelbrot set, the parameter plane for the quadratic function $z^2 + c$. While the geometry of this set is very intricate, much of it can be understood as long as you know how to add and count the crazy way some number theorists do.

**Lecture 2: Exponential Dynamics and Topology**
Friday, August 6, 9:30 am – 10:20 am

In this lecture we turn attention to the very different behavior of the complex exponential function $\lambda e^z$. We will describe some of the incredible bifurcations this map undergoes when $\lambda$ varies. And we’ll see that many crazy topological objects like Cantor bouquets and indecomposable continua arise in these Julia sets.

**Lecture 3: Sierpiński Galore**
Saturday, August 7, 9:30 am - 10:20 am

In this lecture we describe the dynamics of certain families of rational maps. Here we will focus on maps for which the Julia sets are Sierpiński curves. We will see that these types of Julia sets arise in a myriad of different ways and that they also exhibit some crazy geometric and topological properties.

MAA Invited Address

An Attempt to Turn Geometry into (Decorated) Graphs
Rebecca Goldin, George Mason University
Thursday, August 5, 8:30 am – 9:20 am

In the late 19th century, mathematicians were interested in problems such as this one: given four generically placed lines in three dimensions, how many other lines intersect all four? This question and many others can be formulated in terms of the intersections of subvarieties of the Grassmannian of k-planes in n-space, or more generally, flag varieties (whose points are sequences of inclusions of vector spaces).

These intersection questions inside the flag variety and some generalizations, together with related algebraic and combinatorial questions, form the field of Schubert calculus. Of primary importance is that flag varieties can be realized as algebraic, symplectic manifolds with Hamiltonian actions by a compact torus. Among the magic properties are that the torus acts with isolated fixed points, and that codimension-one tori fix only points and two-spheres.

The desire to compute associated algebraic invariants, such as the product structure of associated rings in special bases, has spawned many combinatorial and graph-theoretic objects. In this talk, we will discuss some graphs associated to certain manifolds with torus actions, and ask the question of how combinatorial games involving the graphs can be used to answer geometric questions about the original manifold and intersections of subvarieties therein.
Interesting areas in biology (I’ll stress neuroscience) often lead to new mathematics. For example, the characteristic rhythms of animal gaits lead to a classification of spatio-temporal symmetries of periodic solutions; the abstraction of experimentally determined connections between hypercolumns in the visual cortex (itself a Nobel Prize winning idea) leads to an embedding of the Euclidean group in the visual system (and a possible description of geometric visual hallucinations); and an attempt to understand the remarkable variety of bursting neurons leads to the understanding of the dynamics of bursting in multiple time-scale systems. In this talk I’ll survey some of these connections.

Operations researchers have eased traffic jams by closing selected streets, and gotten packages to you more quickly by planning U.P.S. routes with fewer left turns. Operations researchers have shown which personal decisions are the leading causes of death, and planned emergency responses for bioterror attacks and natural disasters.

Operations research can increase the supply of kidneys available for patients who need a transplant. In a kidney paired donation, one patient and his incompatible donor is matched with another patient and donor in the same situation for an organ exchange. Patient-donor pairs can be represented as the vertices of a graph, with an edge between two vertices if a paired donation is possible. A maximum matching on that graph is an arrangement in which the largest number of people can receive a transplant. Operations research techniques even proved the impact of paired donation on the kidney shortage, motivating Congress to pass a law allowing the United Network for Organ Sharing to arrange these transplants.
James R. Leitzel Lecture

Exploring School Mathematics with Felix Klein
William McCallum, University of Arizona
Friday, August 6, 10:30 am – 11:20 am

Felix Klein's *Elementary Mathematics from an Advanced Standpoint*, published in 1908, is a tour of the school mathematics of his time, guided by profound mathematical knowledge and deep appreciation of teachers. 100 years later it inspired the Klein Project, a joint effort of the International Mathematical Union and the International Commission on Mathematical Instruction, to develop resources that will help secondary mathematics teachers make connections between what they teach and the field of mathematics more broadly. What would a Klein tour of U.S. school mathematics look like today? How much of the countryside remains the same, and what new sights are there to see? In what condition are the original buildings? In this talk I will briefly revisit some of Klein's most striking illustrations of the fundamental unity of mathematics from high school to the frontiers of research, and then take a look at the current scenery of high school mathematics from Klein's perspective.

NAM David Blackwell Lecture

The Riordan Group Revisited: From Algebraic Structure to RNA
Asamoah Nkwanta, Morgan State University
Friday, August 6, 1:00 pm – 1:50 pm

The purpose of this talk is to survey an infinite ordered matrix group called the Riordan group. The Riordan group arises in counting problems, combinatorial number theory, and the study of special functions. In this presentation we will focus on the algebraic structure of the group and explore some applications to molecular biology.

Pi Mu Epsilon J. Sutherland Frame Lecture

Incomprehensibility
Nathaniel Dean,
Texas State University
Friday, August 6, 8:00 pm – 8:50 pm

After data collection the analysis of complex systems is usually accomplished by analyzing the data using various statistical approaches. However, to understand the structural interactions between entities (for example, people, objects or groups), systems of interactions can be modeled as graphs linking nodes (entities) with edges that represent various types of relations between the entities. Then the graph can be visualized, explored and analyzed using a variety of mathematical algorithms and computer tools. In this talk we discuss the limitations of this approach, why some graphs cannot be visualized, and hence why certain data are visually incomprehensible.

MAA Invited Address

Creating Symmetry
Frank Farris,
Santa Clara University
Saturday, August 7, 8:30 am – 9:20 am

A child can create symmetry by repeatedly stamping out a pattern with a cut potato, but a mathematician enamored of smoothness might prefer to find mathematical objects whose very nature is symmetry. A main example of a vibrating wallpaper drum leads to a more general story about symmetry that combines everyone's favorite objects: Fourier series, the Laplacian, and group actions.
The creation of math circles in the San Francisco Bay Area started a chain reaction, spreading to California and neighboring states that resulted in over 75 circles in the U.S. and Canada. What is a math circle? Are math circles designed for talented pre-college students or for those who don’t yet know if they like mathematics? Must they concentrate on math contest preparation or on discovering interesting mathematical facts? Could and should circlers be introduced to advanced mathematical theories and research?

The answer depends on which U.S. math circle you consider. Born within a day apart in 1998, the Berkeley (BMC) and San Jose Math Circles (SJMC) combine all of the above aspects. They attract and train IMO medalists and Putnam winners; but more importantly, they introduce students to beautiful mathematics in inspiring sessions by mathematical stars such as Vladimir Arnold, Elwyn Berlekamp, Robin Hartshorne, Olga Holtz, Ravi Vakil, and Kiran Kedlaya. Are you, as a mathematician, brave, skillful and confident to turn an advanced, even research, topic into a math circle session and deliver it with success? Are such “miracles” possible on a weekly basis? Does this have anything to do with your career as a research mathematician or as a math educator? In this talk, we shall address these questions and explore several possible paths of transforming advanced math topics and research into math circle sessions, by following examples selected from sessions at the BMC and SJMC over the past decade.
INVITED PAPER SESSIONS

Visualizing Combinatorics Through Tilings
James Sellers, Penn State University
Thursday, August 5, 1:00 pm – 2:50 pm
Speakers: Art Benjamin, Jennifer Quinn, Brigitte Servatius, and Bruce Sagan

Combinatorial Games and Schubert Calculus
Rebecca Goldin, George Mason University
Thursday, August 5, 1:00 pm – 4:50 pm
Friday, August 6, 2:00 pm – 3:50 pm
Speakers: Bill Graham, Julianna Tymoczko, Frank Sottile, Milena Pabiniak, Kevin Purbhoo, David Johannsen, Shrawan Kumar, Tara Holm, Aba Mbirika, Erik Insko, Susan Tolman, and Jennifer Morse
This session complements the Invited Address by Rebecca Goldin.

Complex Dynamics: Opportunities for Undergraduate Research
Dan Look, St. Lawrence University
Elizabeth Russell, United States Military Academy
Thursday, August 5, 1:00 pm – 5:20 pm
Friday, August 6, 3:00 pm – 5:50 pm
This session complements the Earl Raymond Hedrick Lectures.

Mathematical Modeling of the Immune Response, Cancer Growth, and Treatments
Ami Radunskaya, Pomona College
Saturday, August 7, 1:00 pm – 4:50 pm
Speakers: Lisette de Pillis, Peter Hinow, Kasia Rejniak, Doron Levy, Jana Gevertz, Rene Fister, Kara Pham
This session complements the Etta Z. Falconer Lecture.

Mathematical Neuroscience
Jonathan Rubin, University of Pittsburgh
Friday, August 6, 1:00 pm – 2:50 pm
Speakers: Winfried Just, Jozsi Jalics, Peter Thomas, and Stefanos Folias
This session complements the Invited Address by Martin Golubitsky.

Mathematical Visualization
Frank Farris, Santa Clara University
Saturday, August 7, 1:00 pm – 2:50 pm
Speakers: Thomas Banchoff, Frank Farris, Ockle Johnson, and Jonathan Rogness
This session complements the Invited Address by Frank Farris.

The Mathematics of Math Circles and Beyond
Zvezdelina Stankova, Mills College and UC Berkeley, Director of Berkeley Math Circle
Tatiana Shubin, San Jose State University, Director of San Jose Math Circle
Saturday, August 7, 1:00 pm – 4:20 pm
Speakers: Inna Zakharevich, Evan O’Dorney, Tiankai Liu, Ivan Matic, and Gabriel Carroll
This session complements the Invited Address by Zvezdelina Stankova.

The Klein Project
William McCallum, University of Arizona
Saturday, August 7, 1:00 pm – 4:50 pm
Speakers: James Madden, Al Cuoco, Hyman Bass, Harriet Pollatsek, Roger Howe, Susanna Epp, Bill Barton, Sybilla Beckmann
This session complements the James R. Leitzel Lecture.

An Invitation to Geometric Group Theory
Dan Margalit, Tufts University
Friday, August 6, 1:00 pm – 4:50 pm
Speakers: Greg Bell, Tara Brendle, Matt Clay, Johanna Mangahas, John Meier, Eduardo Martinez Pedroza, Kim Ruane, and Angela Kubena

CONTRIBUTED PAPER SESSIONS

The History of Mathematics and Its Uses in the Classroom
Herbert Kasube, Bradley University
John Lorch, Ball State University
Joanne Peeples, El Paso Community College
Session I, Thursday, August 5, 1:00 p.m. – 3:35 p.m.
Session II, Friday, August 6, 8:30 a.m. – 11:45 a.m.

Math & Bio 2010 in 2010
Timothy Comar, Benedictine University
Raina Robeva, Sweet Briar College
Thursday, August 5, 1:00 p.m. – 5:15 p.m.

Open and Accessible Problems in Applied Mathematics
David Housman, Goshen College
Friday, August 6, 8:30 a.m. – 11:45 a.m

Getting Students Involved in Writing Proofs
Aliza Steurer, Dominican University
Jennifer Franko-Vasquez, University of Scranton
Rachel Schwell, Central Connecticut State University
Session I, Thursday August 5, 8:50 a.m. – 10:25 a.m.
Session II, Friday August 6, 9:10 a.m. – 11:45 a.m.

Geometry Topics That Engage Students
Sarah Mabrouk, Framingham State College
Sarah Mabrouk, Framingham State College
Session I, Friday, August 6, 1:00 p.m. – 4:55 p.m.
Session II, Saturday August 6, 1:00 p.m. – 4:55 p.m.

Innovative Ideas for an Introductory Statistics Course
Nancy Boynton, SUNY Fredonia
Patricia Humphrey, Georgia Southern University
Michael Posner, Villanova University
Session I, Friday August 6, 1:00 p.m. – 4:55 p.m.
Session II, Saturday August 6, 8:30 a.m. – 11:45 a.m.

Open and Accessible Problems in Number Theory and Algebra
Thomas R. Hagedorn, The College of New Jersey
Friday, August 6, 1:00 p.m. – 5:35 p.m

Effective Practices for Teaching Mathematical Communication Skills
Russell Goodman, Central College
Saturday, August 7, 8:30 a.m. – 11:45 a.m.

Active Learning Intervention Strategies Accompanying Introductory Mathematics Courses
Catherine Beneteau, University of South Florida
Helmut Knaust, University of Texas at El Paso
Emil Schwab, University of Texas at El Paso
Gabriela Schwab, El Paso Community College – Rio Grande Campus
Saturday, August 7, 1:00 p.m. – 4:55 p.m.

First Year Seminar/First Year Experience Mathematics Courses
Jon Johnson, Elmhurst College
Cheryl McAllister, Southeast Missouri State University
Session I, Saturday August 7, 8:30 a.m. – 11:45 a.m.
Session II, Saturday August 7, 1:00 p.m. – 4:55 p.m.

Recreational Mathematics: New Problems and New Solutions
Paul R. Coe, Dominican University
Kristen Schemmerhorn, Dominican University
Saturday, August 7, 1:00 p.m. – 3:15 p.m.

General Contributed Paper Sessions
Shawnee McMurran, California State University, San Bernardino
Suzanne Dorée, Ougsburg College
Session I, Thursday August 5, 8:30 a.m. – 10:25 a.m.
Session II, Thursday August 5, 1:00 p.m. – 5:40 p.m.
Session III, Friday August 6, 8:30 a.m. – 11:55 a.m.
Session IV, Friday August 6, 8:30 a.m. – 11:55 a.m.
Session V, Friday August 6, 1:00 p.m. – 5:55 p.m.
Session VI, Saturday August 7, 8:30 a.m. – 11:55 a.m.
Session VII, Saturday August 7, 8:30 a.m. – 11:55 a.m.
Session VIII, Saturday August 7, 1:00 p.m. – 5:55 p.m.

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Panel: The Role of Mentoring in Undergraduate Mathematics: Promising Recruitment and Retention Strategies
Sylvia Bozeman, Spelman College
Ken Millett, University of California, Santa Barbara
William Velez, University of Arizona
Thursday, August 5, 1:00 pm – 2:20 pm

Workshop: What’s the Story? A Graduate Student Workshop on Creating a Research Presentation for Undergraduates
Aaron Luttman, Clarkson University
Rachel Schwell, Central Connecticut State University
Thursday, August 5, 2:00 pm – 3:20 pm

Panel: Teaching Mathematics with Tablet Computers
Jason Aubrey, University of Missouri
Michael B. Scott, California State University - Monterey Bay
Thursday, August 5, 2:30 pm – 3:50 pm

MAA Section Officers Meeting
Richard A. Gillman, Valparaiso University
Thursday, August 5, 3:30 pm – 5:00 pm

Panel: Mathematics in Interdisciplinary Survey Courses
Cinnamon Hillyard, University of Washington Bothell
Stuart Boersma, Central Washington University
Thursday, August 5, 3:30 pm – 4:50 pm

Poster Session: The Early Career and Graduate Students PosterFest at MathFest
Ed Aboufadel, MAA Committee on Early Career Mathematicians
Ralucca Gera, Young Mathematicians’ Network
Aaron Luttman, MAA Committee on Graduate Students
Thursday, August 5, 3:30 pm – 5:00 pm

Workshop: Understanding and Assessing Mathematical Proofs
Sean Larsen, Portland State University
Stacy Brown, Pitzer College
Natasha Speer, University of Maine
Thursday, August 5, 3:40 pm – 5:00 pm

Open Meeting
Getting Started with Online Teaching
Doug Ensley, Shippensburg University
Mike May, Saint Louis University
Thursday, August 5, 4:30 pm – 6:00 pm

For full descriptions of Panels and Other Sessions go to http://www.maa.org/mathfest.
UNDERGRADUATE STUDENT ACTIVITIES

MAA-PME STUDENT RECEPTION
Wednesday, August 4, 4:30 pm – 5:30 pm

Math Jeopardy
Robert Vallin, Slippery Rock University and the MAA
Michael Berry, University of Tennessee
Wednesday, August 4, 5:30 pm – 6:15 pm

Student Hospitality Center
Richard and Araceli Neal, American Society for the Communication of Mathematics
Thursday, August 5, 9:00 am – 5:00 pm
Friday, August 6, 9:00 am – 5:00 pm
Saturday, August 7, 9:00 am – 1:00 pm

MAA LECTURE FOR STUDENTS:
Faster, Safer, Healthier with Operations Research
Sommer Gentry, United States Naval Academy
Thursday, August 5, 1:00 pm – 1:50 pm

MAA UNDERGRADUATE STUDENT ACTIVITY:
Connecting Digraphs and Determinants
Jennifer Quinn, University of Washington Tacoma
Friday, August 6, 1:00 pm – 1:50 pm

MAA UNDERGRADUATE STUDENT ACTIVITY:
A Mathematical Tour of the State of the Planet
Tom Pfaff, Ithaca College
Friday, August 6, 1:00 pm – 1:50 pm

MAA Student Paper Sessions
J. Lyn Miller, Slippery Rock University
John Hamman, Montgomery College
Daluss Siewert, Black Hills State University
Thursday, August 5, 8:30 am – 10:30 am
and 2:00 pm – 6:15 pm
Friday, August 6, 8:30 am – 12:00 am
and 2:00 pm – 5:00 pm

Pi Mu Epsilon Student Paper Sessions
Angela Spalsbury, Youngstown State University
Thursday, August 6, 2:00 pm – 6:15 pm
Friday, August 7, 8:00 am – 12:00 am
and 2:00 pm – 5:00 pm

Pi Mu Epsilon Student Banquet and Awards Ceremony
Friday, August 6, 6:00 pm – 7:45 pm
For full descriptions of the Undergraduate Student Sessions go to http://www.maa.org/mathfest.

GRADUATE STUDENT ACTIVITIES

GRADUATE STUDENT POSTER SESSION
The Early Career and Graduate Students PosterFest at MathFest
Ed Aboufadel, MAA Committee on Early Career Mathematicians
Raluca Gera, Young Mathematicians’ Network
Aaron Luttman, MAA Committee on Graduate Students
Thursday, August 5, 3:30 pm – 5:00 pm

GRADUATE STUDENT RECEPTION
David Manderscheid, University of Nebraska-Lincoln
James Freeman, Cornell College
Thursday, August 5, 5:00 pm – 6:00 pm

How to Apply for a Job
David Manderscheid, University of Nebraska Lincoln
Friday, August 6, 2:10 pm – 3:30 pm

Issues for Early Career Mathematicians in Academia
Michael Dorff, Brigham Young University
Edward Aboufadel, Grand Valley State University
Friday, August 6, 4:10 pm – 5:30 pm

For full descriptions of the Graduate Student Sessions go to http://www.maa.org/mathfest.
An invitation to explore… http://mathcircles.org

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National Association of Math Circles (NAMC)

What is a Math Circle?
Mathematicians and mathematical scientists meet with pre-college students (and sometimes their teachers) in informal settings to work on interesting problems and topics in mathematics. These interactions excite students about mathematics and provide them with a community to foster their passion for mathematical thinking.

The Math Circles Experience
Math Circles emphasize bringing together professional mathematicians and secondary school students on a regular basis for problem solving and mathematical exploration.

Providing resources to create new Math Circles, maintain a directory of programs, and support the development of the Math Circle community.

Our focus is to continue development of the NAMC Website (http://mathcircles.org) which already includes the Circle in a Box wiki, contacts for Math Circles throughout North America, the Math Circle Problem Collection, and a forum for discussion of Math Circles and related issues among NAMC members.

Math Circles Wiki
Topics Include:
- What is a Math Circle
- History of Math Circles
- National Association of Math Circles
- Molding a Math Circle
- Finding Support
- Organizing the Academics
- Sustaining Math Circle

With links to the Circle in a Box book and Within a Circle DVD

Math Circle Problem Collection
The star of the website. The Collection includes a wide variety of popular Math Circle-type problems with search capability based on topic, prerequisite, author, and more.

Math Circle Community
Existing Math Circle Programs
More and more math circle programs are popping up around the globe – check them all out on our interactive map. You can also locate a Math Circle in your area with our worldwide Math Circles Directory. If your Math Circle isn’t listed, adding your Circle is as easy as 1-2-3! Math Events Competitions and Summer Programs: Looking for fun, motivating and education activities for your Math Circle to attend? Review our list of events, competitions, and summer and national programs.

Social Networking
The NAMC website will now provide the opportunity for connecting Math Circlers across the country. Share your lesson plans, post your favorite Math Circle problems, and use the site to connect to other Math Circle participants, instructors and directors.

Circle on the Road
The annual NAMC Circle on the Road is a Math Circle Workshop combined with a Math Festival with many sample circle sessions for local students and teachers. The Math Circle Workshop that will serve as an introduction to instructional techniques for circle leaders and a laboratory for circle evaluators. Participating in this workshop will give the people wishing to start Math Circles a hands-on introduction to appropriate Math Circle activities and the benefit of the advice of experienced circle leaders while developing a Math Circle. If you aren’t able to attend Circle on the Road you can still participate with online videos and other program resources made available through the NAMC website.

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SIGMAA ACTIVITIES

BIO SIGMAA
CONTRIBUTED PAPER SESSION
Math & Bio 2010 in 2010
Timothy Comar, Benedictine University and Raina Robeva, Sweet Briar College
Thursday, August 5, 1:00 pm – 5:15 pm

PANEL DISCUSSION
Celebrating Mathematics and Bio 2010
Raina Robeva, Sweet Briar College, and Jennifer Galovich, St. John’s University and the College of St. Benedict
Friday, August 6, 3:40 pm – 5:00 pm

HOM SIGMAA
CONTRIBUTED PAPER SESSION
The History of Mathematics and Its Uses in the Classroom
Herbert Kasube, Bradley University, John Lorch, Ball State University, and Joanne Peeples, El Paso Community College
Thursday, August 5, 1:00 pm – 3:55 pm

WEB SIGMAA
PANEL DISCUSSION
Teaching Mathematics with Tablet Computers
Jason Aubrey, University of Missouri, and Michael B. Scott, California State University-Monterey Bay
Thursday, August 5, 2:30 pm – 3:50 pm

OPEN MEETING
Getting Started with Online Teaching
Doug Ensley, Shippensburg University, and Mike May, Saint Louis University
Thursday, August 5, 4:30 pm – 6:00 pm

SIGMAA RUME
WORKSHOP
Understanding and Assessing Mathematical Proofs
Sean Larsen, Portland State University; Stacy Brown, Pitzer College; and Natasha Speer, University of Maine
Thursday, August 5, 3:40 pm – 5:00 pm

SIGMAA QL
PANEL DISCUSSION
Mathematics in Interdisciplinary Survey Courses
Cinnamon Hillyard, University of Washington Bothell, and Stuart Boersma, Central Washington University
Thursday, August 5, 3:30 pm – 4:50 pm

SIGMAA EM
Lecture and Business Meeting
Ben Fusaro, Florida State University
Speaker: To be announced
Thursday, August 5, 5:30 pm – 7:00 pm

POM SIGMAA
INVITED SPEAKER AND RECEPTION
Structural Proof Theory: Uncovering Capacities of the Mathematical Mind
Wilfried Sieg, Carnegie Mellon University
Thursday, August 5, 5:30 pm – 7:00 pm

SIGMAA STAT-ED
CONTRIBUTED PAPER SESSION
Innovative Ideas for an Introductory Statistics Course
Nancy Boynton, SUNY Fredonia; Patricia Humphrey, Georgia Southern University; and Michael Posner, Villanova University
Friday, August 6, 1:00 pm – 5:00 pm

SIGMAA on Math Circles
Mathematics Circles Demonstration
Tatiana Shubin, San Jose State University; Elgin Johnston, Iowa State University; and James Tanton, St. Mark’s School
Saturday, August 7, 9:00 am – 10:20 am

INVITED PAPER SESSION
The Mathematics of Math Circles and Beyond
Zvezdelina Stankova, Mills College, and Tatiana Shubin, San Jose State University
Saturday, August 7, 1:00 pm – 4:20 pm

PANEL DISCUSSION
Math Circles: Transforming (or Subverting) Pre-College Mathematics
Tatiana Shubin, San Jose State University, and Elgin Johnston, Iowa State University; Eric Hsu, San Francisco State University; Jim Lewis, University of Nebraska; William McCallum, University of Arizona; James Tanton, St. Mark’s School; and James Taylor, Santa Fe Preparatory School
Saturday, August 7, 4:30 pm – 6:00 pm
MINICOURSES

MINICOURSE #1
Recruiting Students to Take More Mathematics Courses and to be Math Majors
Michael Dorff, Brigham Young University
Part 1, Thursday, August 5, 1:00 pm – 3:00 pm
Part 2, Friday, August 6, 1:00 pm – 3:00 pm

We will discuss some principles and specific activities we have used to increase the number of students taking mathematics courses and becoming math majors. Principles include creating a culture of “Math is cool!”, exposing students to careers and opportunities available to those who study mathematics, and being proactive in your efforts. Specific activities include a “Careers in Mathematics” seminar, a freshman/sophomore class titled “Intro to being a math major,” the creation of a student advisory council, a big screen HDTV display with a PowerPoint presentation about mathematics, a set of math t-shirts, and the “When Will I Use Math” website.

MINICOURSE #2
Perspective Viewing and Drawing
Make Good Math Problems
Marc Frantz, Indiana University
Annalisa Crannell, Franklin & Marshall College
Part 1, Thursday, August 5, 1:00 pm – 3:00 pm
Part 2, Friday, August 6, 1:00 pm – 3:00 pm

The execution of the simplest line drawings in perspective can pose math problems that challenge the brightest of students. Nevertheless, the solutions are pleasingly easy to use and remember. The other side of the coin—viewing a work in perspective from the correct viewpoint—poses similarly interesting problems. When applied to viewing real artwork (or posters), these techniques lead to an astonishing experience of depth and realism that leaves a lasting impression on viewers. This minicourse conveys these techniques through hands-on activities, which the facilitators have taught to over 170 instructors in faculty development workshops. No artistic experience is required.

MINICOURSE #3
An Introduction to Geogebra, a Tool for Demonstration, Exploration, and Applet Creation
Mike May, S.J., Saint Louis University
Part 1, Thursday, August 5, 3:30 pm – 5:30 pm
Part 2, Saturday, August 7, 1:00 pm – 3:00 pm

GeoGebra is an easy to use, free, open source, cross platform, program that allows users to visualize and experiment with both algebraic and geometric representations of mathematical concepts. Constructions can be used as live demonstration or exploration tools, or saved as applets used with any java enabled browser. Sample applets can be found at http://www.slu.edu/classes.maym/GeoGebra/. The minicourse assumes only novice computer skills and covers an introduction to GeoGebra up through deploying applets in web pages. We will work through creating several activities to illustrate features of the program and to get participants to create their own activities. All participants are expected to bring a laptop computer to the minicourse.

MINICOURSE #4
Effective Placement Testing for Introductory College Mathematics Courses
Raymond Cannon, Baylor University
Marilyn Carlson, Arizona State University
Wade Ellis, West Valley College
Louise Krmptoc, Maplesoft
Bernard L. Madison, University of Arkansas
James W. Stepp, University of Houston
Gordon Woodward, University of Nebraska
Part 1, Thursday, August 5, 3:30 pm – 5:30 pm
Part 2, Saturday, August 7, 1:00 pm – 3:00 pm

Building on experience from MathFest 2009, this minicourse will describe and analyze ways to develop or modify placement testing programs so that they are more effective in placing students into challenging introductory courses where they can succeed. The topics will include innovations in item types and cognitive design, the increasingly complex transition testing landscape, structuring a placement program, and available testing resources. Both participants who are just beginning placement testing work and those with considerable experience are welcome. Prior to the minicourse, participants will be surveyed as to their expectations of the course and their experience with placement testing. Some experienced participants will be invited to share their experiences and respond to questions from others.

MINICOURSE #5
A Game Theory Path to Quantitative Literacy
David Housman, Goshen College
Rick Gillman, Valparaiso University
Part 1, Friday, August 6, 3:30 pm – 5:30 pm
Part 2, Saturday, August 7, 3:30 pm – 5:30 pm

Game Theory, defined in the broadest sense, can be used to model many real-world scenarios of decision making in situations involving conflict and cooperation. Further, mastering the basic concepts and tools of game theory require only an understanding of basic algebra, probability, and formal reasoning. These two features of game theory make it an ideal path to developing habits of quantitative literacy among our students. This audience participation
mini-course develops some of the material used by the presenters in their general education courses on game theory and encourages participants to develop their own, similar, courses.

MINICOURSE #6
Creating Demonstrations and Guided Explorations for Multivariable Calculus Using CalcPlot3D
Paul Seeburger, Monroe Community College
Part 1, Friday, August 6, 3:30 pm – 5:30 pm
Part 2, Saturday, August 7, 3:30 pm – 5:30 pm

It is often difficult for students to develop an accurate and intuitive understanding of the geometric relationships of calculus from static diagrams alone. This course explores a collection of freely available Java applets designed to help students make these connections. Our primary focus will be visualizing multivariable calculus using CalcPlot3D, a versatile new applet developed by the presenter through NSF-DUE-0736968. Participants will also learn how to customize this applet to create demonstrations and guided exploration activities for student use. Images created in this applet can be pasted into participants’ documents. See http://web.monroecc.edu/calcNSF/. Some basic HTML experience is helpful. All participants are expected to bring a laptop computer to the minicourse.

SHORT COURSE
The MathFest 2010 Short Course is presented in honor of William F. Lucas.

TWO-DAY SHORT COURSE
Hands-On Explorations in Algebra and Combinatorics
Patrick Bahls, University of North Carolina at Asheville
Robert A. Beeler, East Tennessee State University
Neil Calkin, Clemson University
Dante Manna, Virginia Wesleyan College
Dan Warner, Clemson University
Part I: Tuesday, August 3, 9:00 am – 5:00 pm
Part II: Wednesday, August 4, 9:00 am – 5:00 pm

In recent years, a new piece of mathematical software has appeared on the scene: Sage (www.sagemath.org) is an open source package capable of doing high-powered symbolic and numerical computations. It features a web-based notebook interface, local or remote operation, and can interact with other packages, both open source and commercial (if available). In this short course we will introduce the package, giving multiple examples of how to use it for mathematical explorations, both elementary and advanced. We will focus on algebraic and combinatorial investigations.

The course will consist of seven presentations and a final panel discussion. The first two sessions will focus on using Sage. The next five sessions will start with a problem or collection of problems in discrete mathematics and explore the topic with the assistance of the more advanced tools in Sage. Each of these sessions will end with a period of guided exploration by the participants. The closing session will focus on the questions: “What have we learned?” and “Where do we go from here?”

Topics covered in this short course include:

• Introduction to Sage
  Neil Calkin and Daniel Warner

• Elementary Mathematics with Sage
  Neil Calkin and Daniel Warner

• Exploring Combinatorial Group Theory
  Patrick Bahls

• Generating Functions and Sage
  Robert A. Beeler

• Benoulli Convolutions
  Neil Calkin

• Combinatorial Games and Symmetry
  Daniel Warner

• Generalizing the Bernoulli and Euler Polynomials
  Dante Manna

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BIOMATHEMATICS AT MATHFEST 2010

MAA INVITED ADDRESS
Mathematics Motivated by Biology
Martin Golubitsky, Ohio State University
Thursday, August 5, 9:30 am – 10:20 am

AWM–MAA ETTA Z. FALCONER LECTURE
Mathematical Challenges in the Treatment of Cancer
Ami Radunskaya, Pomona College
Friday, August 6, 8:30 am – 9:20 am

NAM DAVID BLACKWELL LECTURE
The Riordan Group Revisited: From Algebraic Structure to RNA
Asamoah Nkwanta, Morgan State University
Friday, August 6, 1:00 pm – 1:50 pm

MAA LECTURE FOR STUDENTS
Faster, Safer, Healthier with Operations Research
Sommer Gentry, United States Naval Academy
Thursday, August 5, 1:00 pm – 1:50 pm

INVITED PAPER SESSION
Mathematical Modeling of the Immune Response, Cancer Growth, and Treatments
Ami Radunskaya, Pomona College
Saturday, August 7, 1:00 pm – 4:50 pm

INVITED PAPER SESSION
Mathematical Neuroscience
Jonathan Rubin, University of Pittsburgh
Friday, August 6, 1:00 pm – 2:50 pm

CONTRIBUTED PAPER SESSION
Math & Bio 2010 in 2010
Timothy Comar, Benedictine University
Raina Robeva, Sweet Briar College
Thursday, August 5, 1:00 pm – 5:15 pm

PANEL DISCUSSION
Celebrating Mathematics and Bio 2010
Raina Robeva, Sweet Briar College
Jennifer Galovich, St. John’s University and the College of St. Benedict
Friday, August 6, 3:40 pm – 5:00 pm

PRESENTATION OF JANET L. ANDERSEN AWARDS
Friday, August 6, 6:00 pm – 8:00 pm and 9:00 pm – 10:00 pm
These awards are for outstanding student presentations related to mathematical or computational biology.

For full descriptions of the Biomathematics Sessions go to http://www.maa.org/mathfest.

Textbooks from AK Peters

Practical Linear Algebra
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Dianne Hansford
A linear algebra text to entice your application-motivated students.

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Make Textbooks Affordable is a non-profit student campaign to reduce textbook costs by promoting affordable alternatives like open-access textbooks. The campaign is a project of the Student PIRGs, which is a national network of state-based student groups that work to solve problems related to the environment, consumer protection, and government reform. www.studentpirgs.org/open-textbooks

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Maplesoft offers a collection of testing solutions which can free schools from the cost, effort, and limitations of paper-and-pencil assessment. Drawing on the power of Maple, web-based solutions from Maplesoft make it easy to deliver meaningful tests on any subject involving mathematical content. Through an exciting partnership with the MAA, Maplesoft brings you the Maple TA MAA Placement Test Suite. For all of your other math, engineering and science testing and assessment requirements, try Maple T.A. Both solutions bring the power of Maple into your testing and assessment program.

EXHIBITORS
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• Mathematics Department at the University of California, Riverside

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• National Association of Math Circles—2010 Sponsor

The National Association of Math Circles provides a community for Math Circles and similar programs via a website http://mathcircles.org. This fun and interactive website includes a database of Math Circles worldwide, a wiki started by Sam Vandervelde’s Circle in a Box Math Circle book, a Math Circle Problem and Lesson Collection, as well as a developing forum for discussion of Math Circle related ideas. Visit our booth to learn more or attend one of the SIGMAA-MCST sessions to learn more about Math Circles.

• National Security Agency

The National Security Agency/Central Security Service (NSA/CSS) is home to America’s codemakers and codebreakers. The National Security Agency has provided timely information to U.S. decision makers and military leaders for more than half a century.

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Educating more than 100 million people worldwide, Pearson is the global leader in education publishing. With such renowned imprints as Addison-Wesley and Prentice Hall, Pearson provides quality mathematics education solutions in all available media.

• Rational Reasoning, LLC

Rational Reasoning markets research-based mathematics materials for students and instructors. The texts are designed to help all students acquire the foundational knowledge to continue studying mathematics. The curricular materials are based on research on knowing and learning mathematics and have been repeatedly studied and revised to assure their effectiveness. An online text accompanies each bounded text. Videos, animations and check your understanding tasks are included to engage students in the deep thinking, reflection and practice necessary for learning new ideas. Procedures and skills can also be reviewed and practiced online with students receiving instant results and detailed solutions.

Teacher support tools accompany each Rational Reasoning text. Conceptually focused worksheets with solutions and teacher notes pose problems and questions to help students develop essential understandings and critical connections. Powerpoint slides with detailed teacher notes and linked animations help novice and expert teachers provide lively and coherent lectures. A professional development website accompanies each text and includes classroom videos of teachers implementing our materials. Visit RationalReasoning.net.

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WebAssign – 2010 Sponsor
WebAssign, the independent online homework and assessment solution, continues to innovate. New math tools for 2010 include the calcPad answer palette and an interactive numberline. With pre-coded questions from 200 leading math titles from every major publisher, WebAssign makes online homework easy. Stop by our booth to learn more.
Website: www.webassign.net

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W.H. Freeman & Company publishes high-quality textbooks and media in mathematics and statistics. Visit booth #18 to learn more about our titles, including the successful Rogawski Calculus, COMAP For All Practical Purposes 8/e, and four new titles: Sowder Reconceptualizing Mathematics, Moore Essential Statistics, Larose Discovering Statistics: Brief Version, and Kokoska Introductory Statistics. Demonstrations will also be provided of our innovative media and online homework systems, including CalcPortal, MathPortal, and StatsPortal, as well as our new StatClips tutorial videos.

Wiley

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The Center of Math was founded in 2008 by David B. Massey, an award-winning professor with 26 years of collegial teaching experience, and a leading research mathematician in the field of singularities. We currently offer a host of multimedia products and services that help us to enrich and enhance the lives of scholars, students, and the community at large through the increased dissemination of mathematical knowledge. We are here exhibiting our revolutionary, multimedia calculus textbooks: Worldwide Differential Calculus and Worldwide Integral Calculus. These textbooks are produced as PDFs, which allow us to hyperlink all of the cross-references in the books, put in pop-up margin comments, and embed videos at the beginning of each section that actually teach the student the content of that section; in essence, our textbooks are electronic versions of courses. Please stop by our booth (#34) to check out our interactive exhibit where you can try the books out for yourself!

xyAlgebra
xyAlgebra is a completely free Algebra I software package. Solutions can be entered step-by-step, not just as short final answers. xyAlgebra responds intelligently to each step by suggesting appropriate next steps for any solution method, flagging incorrect steps and reviewing appropriate prerequisite(s). Intelligent responses are even available at each step of verbal problems. xyAlgebra configuration options include initial placement, instruction, unlimited practice, periodic testing and distance learning. Please stop at Booth 17 for a demo.
# TIMETABLE

## TUESDAY, August 3

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00-7:00pm</td>
<td>Conference C</td>
<td>SHORT COURSE RECEPTION</td>
</tr>
<tr>
<td>9:00am-5:00pm</td>
<td>Allegheny</td>
<td>SHORT COURSE Hands-On Explorations in Algebra and Combinatorics</td>
</tr>
</tbody>
</table>

## WEDNESDAY, August 4

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00-7:30pm</td>
<td>William Penn Ballroom</td>
<td>GRAND OPENING AND RECEPTION</td>
</tr>
<tr>
<td>7:30-9:30pm</td>
<td>Grand Ballroom</td>
<td>OPENING BANQUET MC: James Sellers, Penn State University</td>
</tr>
<tr>
<td>9:00am-5:00pm</td>
<td>Allegheny</td>
<td>SHORT COURSE Hands-On Explorations in Algebra and Combinatorics</td>
</tr>
<tr>
<td>4:30-5:30pm</td>
<td>Sky</td>
<td>MAA-PME STUDENT RECEPTION</td>
</tr>
<tr>
<td>5:30-6:15pm</td>
<td>Urban</td>
<td>MATH JEOPARDY Organizers: Robert Vallin, MAA and Michael Berry, University of Tennessee</td>
</tr>
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</table>

## THURSDAY, August 5

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30-10:25am</td>
<td>Monongahela</td>
<td>CONTRIBUTED PAPER SESSION</td>
</tr>
<tr>
<td>8:30-9:20am</td>
<td>Grand Ballroom</td>
<td>MAA INVITED ADDRESS An Attempt to Turn Geometry into (Decorated) Graphs Rebecca Goldin, George Mason University</td>
</tr>
<tr>
<td>8:30-10:30am</td>
<td>Conference B</td>
<td>MAA STUDENT PAPER SESSION #1</td>
</tr>
<tr>
<td>8:30-10:30am</td>
<td>Conference C</td>
<td>MAA STUDENT PAPER SESSION #2</td>
</tr>
<tr>
<td>8:30-10:25am</td>
<td>Phipps</td>
<td>MAA STUDENT PAPER SESSION #3</td>
</tr>
<tr>
<td>8:30-10:25am</td>
<td>Oliver</td>
<td>MAA STUDENT PAPER SESSION #4</td>
</tr>
<tr>
<td>8:30-10:25am</td>
<td>Carnegie III</td>
<td>MAA STUDENT PAPER SESSION #5</td>
</tr>
<tr>
<td>8:30-10:25am</td>
<td>Three Rivers</td>
<td>MAA STUDENT PAPER SESSION #21 Organizers: J. Lyn Miller, Slippery Rock University; John Hamman, Montgomery College; and Daluss Siewert, Black Hills State University</td>
</tr>
<tr>
<td>8:50-9:05am</td>
<td></td>
<td>Elements of Style for Proofs Anders O.F. Hendrickson, Concordia College</td>
</tr>
<tr>
<td>9:10-9:25am</td>
<td></td>
<td>Involving Students in Proof Writing with Peer Review Penelope Dunham, Muhlenberg College</td>
</tr>
<tr>
<td>9:30-9:45am</td>
<td></td>
<td>Learning Proof-Writing: Applying English Composition Pedagogical Strategies to Undergraduate Mathematics Betseygail Rand, Texas Lutheran University</td>
</tr>
<tr>
<td>9:50-10:05am</td>
<td></td>
<td>Learning from my students: a personal experience with the Moore Method Patrick Bault, SUNY Geneseo</td>
</tr>
<tr>
<td>10:00-10:10am</td>
<td></td>
<td>The Role of Quantitative and Covariational Reasoning in Trigonometry Curriculum Kevin Charles Moore, Arizona State University - RIMSE</td>
</tr>
<tr>
<td>10:15-10:25am</td>
<td></td>
<td>Aspects of a Neoteric Approach to Advance Students’ Ability to Conjecture, Prove, or Disprove Padraig McLoughlin, Kutztown University of Pennsylvania</td>
</tr>
</tbody>
</table>
9:00-10:25 am, Sky

GENERAL CONTRIBUTED PAPER SESSION #1
Organizers: Kyle Riley, South Dakota State of Mines and Technology and Barbara Margolius, Cleveland State University

9:00-9:10am
Categorizing Musical Pieces by Their Correlation Coefficients
Ilhan M. Izmirli, George Mason University

9:15-9:25am
A Mathematical Tour of Robotics
Kyle Riley, SD School of Mines & Technology

9:30-9:40am
Flash applets for WeBWorK online homework system
Barbara Margolius, Cleveland State University

9:45-9:55am
Some Highs and Lows Using WeBWorK Throughout the Calculus Curriculum
Geoffrey Dietz, Gannon University

10:00-10:30am
The Role of Quantitative and Covariational Reasoning in Trigonometry Curriculum
Kevin Charles Moore, Arizona State University-RIMSE

10:30-10:50am
Applied Maple Projects in Linear Algebra
Jason Molitierno, Sacred Heart University

9:00am-5:00pm, Sternwheeler

STUDENT HOSPITALITY CENTER
Organizers: Richard and Araceli Neal, American Society for the Communications of Mathematics

9:30-10:20am, Grand Ballroom

MAA INVITED ADDRESS
Mathematics Motivated by Biology
Martin Golubitsky, Ohio State University

10:30-11:20am, Grand Ballroom

EARL RAYMOND HEDRICK LECTURE I
The Fractal Geometry of the Mandelbrot Set
Robert L. Devaney, Boston University

1:00-1:50pm, Grand Ballroom

MAA LECTURE FOR STUDENTS
Faster, Safer, Healthier with Operations Research
Sommer Gentry, United States Naval Academy

1:00-2:20pm, Urban

PANEL
The Role of Mentoring in Undergraduate Mathematics: Promising Recruitment and Retention Strategies
Organizers: Sylvia Bozeman, Spelman College; Ken Millett, University of California Santa Barbara; and William Velez, University of Arizona
Panelists: Sylvia Bozeman, Spelman College; Michelle Craddock, US Military Academy; Rebecca Garcia, Sam Houston State University; and William Velez, University of Arizona

1:00-2:50 pm, Monongahela

INVITED PAPER SESSION
Visualizing Combinatorics through Tilings
Organizer: James Sellers, Penn State University

1:00-1:20pm
Combinatorial Trigonometry
Art Benjamin, Harvey Mudd College

1:30-1:50pm
Linear Recurrences Involve Weighted Tilings
Jennifer Quinn, University of Washington

2:00-2:20pm
Stalking the Wild Fibonacci
Bruce Sagan, Michigan State University and NSF; Carla Savage, North Carolina State University

2:30-2:50pm
Symmetry, automorphisms, and self-duality of infinite planar graphs and tilings
Brigitte Servatius, Worcester Polytechnic Institute

1:00-5:00pm, Keystone/Doubletree

MINICOURSE #1 PART 1
Recruiting Students to Take More Mathematics Courses and to be Math Majors
Presenter: Michael Dorff, Brigham Young University

1:00-3:00pm, Erie/Doubletree

MINICOURSE #2 PART 1
Perspective Viewing and Drawing Make Good Math Problems
Presenters: Marc Frantz, Indiana University and Annalisa Crannell, Franklin & Marshall College

1:00-3:35pm, Frick

CONTRIBUTED PAPER SESSION
The History of Mathematics and Its Uses in the Classroom Session 1
Organizers: Herbert Kasube, Bradley University; John Lorch, Ball State University; and Joanne Peeples, El Paso Community College

1:00-1:15pm
Bringing Mr. Jefferson into the Classroom
Jim Tattersall, Providence College

1:20-1:35pm
Formulating Figurate Numbers
Janet Beery, University of Redlands

1:40-1:55pm
Lessons from reading Clavius
Anders O.F. Hendrickson, Concordia College

2:00-2:15pm
Light through a window: evidence of Muslim mathematics in Spanish colonial missions of San Antonio?
Rachel Cywinski
2:20-2:35pm
Math Set in Stone: Famous Stones in the History of Math
Doy Ott Hollman, Lipscomb University

2:40-2:55pm
Teaching Introductory Analysis in Its Historical Setting
Robert Rogers, SUNY Fredonia

3:00-3:15pm
The Cubic Controversy
Charlie Smith, Park University

3:20-3:35pm
The Heavens and the Scriptures in the Eyes of Johannes Kepler
Dale L. McIntyre, Grove City College

1:00-4:50pm, Conference A
INVITED PAPER SESSION
Combinatorial Games and Schubert Calculus, Session 1
Organizer: Rebecca Goldin, George Mason University

1:00-1:20pm
Poset pinball and Schubert calculus
Julianna Tymoczko, University of Iowa; Megumi Harada, McMaster University

1:30-1:50pm
A tableaux rasa talk on affine Schubert calculus and Macdonald polynomials
Jennifer Morse, Drexel University

2:00-2:20pm
Localization and specialization in equivariant cohomology
Milena Pabiniak, Cornell University

2:30-2:50pm
Eigencone, saturation and Horn problems for symplectic and odd orthogonal groups
Shrawan Kumar, University of North Carolina

3:00-3:20pm
Divisibility, tori, and the moment polytope
David Johannsen, George Mason University

3:30-3:50pm
Ideals of symmetric functions and a possible application to cohomology
Aba Mbirika, Bowdoin College

4:00-4:20pm
Relative Lie algebra cohomology and the Belkale-Kumar product
William Graham, University of Georgia

4:30-4:50pm
Schubert-type formulas for Hamiltonian manifolds
Susan Tolman, University of Illinois

1:00-5:15pm, Three Rivers
CONTRIBUTED PAPER SESSION
Math & Bio 2010 in 2010
Organizers: Timothy Comar, Benedictine University and Raina Robeva, Sweet Briar College

1:00-1:15pm
Connecting First-Year Students to Current Trends in Mathematical Biology
Talitha M. Washington, University of Evansville

1:20-1:35pm
Connecting the disciplines through writing assignments in a calculus course for biology majors
Florence Newberger, California State University, Long Beach

1:40-1:55pm
On Becoming Independent Problem Solvers in Biocalculus Courses
Timothy Comar, Benedictine University

2:00-2:15pm
Math, our Community and Civic Engagement - a SENCER based Approach
Urmi Ghosh-dastidar, NYCCT, CUNY

2:20-2:35pm
Mathematics of Life
Theodore Theodosopoulos, Saint Ann's School

2:40-2:55pm
Ten Equations that changed how I teach Biomathematics
Maeve Lewis McCarthy, Murray State University

3:00-3:15pm
A hitchhiker's guide to data assimilation in the ecological sciences
John Zobitz, Augsburg College

3:20-3:35pm
Using Virtual Laboratory Experiments to Motivate Mathematical Models in Biology
Glenn Ledder, University of Nebraska-Lincoln

3:40-3:55pm
Something Like a New Sense: The Biological ESTEEM Collection: Part I
Anton Weisstein, Truman State University

4:00-4:15pm
Something Like a New Sense: The Biological ESTEEM Collection: Part II
Gretchen A. Koch, Goucher College

4:20-4:35pm
The Mathbio Wiki: a module resource and educational tool
Rebecca Vandiver, Bryn Mawr College
4:40-4:55pm
Modeling Uncertainty: Challenges and Opportunity in Undergraduate Biomathematics Research
Matthew Glomski, Marist College

5:00-5:15pm
Undergraduate Research Projects in DNA Microarray Data Analysis
Darlene Olsen, Norwich University

1:00-5:20 pm, Allegheny
INVITED PAPER SESSION
Complex Dynamics: Opportunities for Undergraduate Research Session 1
Organizers: Dan Look, St. Lawrence University and Elizabeth Russell, United States Military Academy

1:00-1:20pm
Undergraduate explorations in complex dynamics
Rich Stankewitz, Ball State University

1:30-1:50pm
The Complex Dynamics of Rational Maps
Elizabeth Russell, United States Military Academy

2:00-2:20pm
Iterating Elliptic Functions
Lorelei Koss, Dickinson College

2:30-2:50pm
Fibonacci plays the chaos game
Sebastian Marotta, University of the Pacific

3:00-3:20pm
Matings of Polynomials
Sarah Koch, Harvard University

3:30-3:50pm
From Julia sets to laminations
William Bond, University of Alabama-Birmingham

4:00-4:20pm
Pullback Laminations
John Mayer, University of Alabama Birmingham

4:30-4:50pm
Critical Leaf Configurations for $\mathbb{P}^3$
Debra Mimbs, University of Alabama Birmingham

5:00-5:20pm
Useful Tools in the Study of Laminations
Jeffrey Houghton, University of Alabama Birmingham

100-5:55pm, Sky
GENERAL CONTRIBUTED PAPER SESSION
Assessment, Teaching Communication, and Outreach
Organizers: Anne Albert, University of Findlay; Jeff Hildebrand, Georgia Gwinnett College; Monika Vo, St. Leo University; Jeff Clark, Elon College; Betsy Yanik, Emporia State University; and John Frohliger, St. Norbert College

1:00-1:10pm
Assessment - Required; Worthwhile? - Yes!
Anne G. Albert, The University of Findlay

1:15-1:25pm
Designing an assessment program for a mathematics major.
Jeff Hildebrand, Georgia Gwinnett College

1:30-1:40pm
The Mathematics Seminar and Program Assessment at a Small Liberal Arts College
Jeffery D. Sykes, Ouachita Baptist University

1:45-1:55pm
A Capstone Course for Mathematics Majors
Ronald M. Brzenk, Hartwick College

2:00-2:10pm
A summer interdisciplinary model of service learning for First Year Seminar
Zdenka Guadarrama, Rockhurst University

2:15-2:25pm
Senior Projects in Computational Mathematics with MATLAB at the University of Houston-Downtown
Timothy A. Redl, University of Houston-Downtown

2:30-2:40pm
Developing Mathematical Thinking and Communication Skills through Guided Discovery Learning in Modern Algebra
Mollie R. Jones, Immaculata University

2:45-2:55pm
The Developmental Discussion in the Mathematics Classroom: Let’s Do It Together
Sarah L. Mabrouk, Framingham State College

3:00-3:10pm
Undergraduate Research and LaTeX
Jeffrey Clark, Elon University

3:15-3:25pm
Using “jigsaw” presentations to develops student communication skills
Diana White, University of Colorado Denver

3:30-3:40pm
WAC - Writing Across the Curriculum in Mathematics classes
Monika Vo, Saint Leo University
3:45-3:55pm  
Auditory Mathematics: Podcasting as Mathematics Outreach  
Samuel Hansen, University of Nevada, Las Vegas/ACMEScience

4:00-4:10pm  
Differentiated Instruction and Gender: the Illinois College Science and Math Learning Collaborative  
Patricia Kiihne, Illinois College

4:15-4:25pm  
How To Get More Underrepresented Minority Students in Mathematics Related Fields  
Senan Hayes, Western Connecticut State University

4:30-4:40pm  
Outreach programs for Hispanic Students  
Elizabeth Yanik, Emporia State University

4:45-4:55pm  
St. Norbert College's Natural Science PRIDE Program  
John Frohliger, St. Norbert College

5:00-5:10pm  
Texas A&M Summer Educational Enrichment (SEE-Math) for Middle School Students: The Use of Technology  
Philip B. Yasskin, Texas A&M University

5:15-5:25pm  
Top Ten Mathematical Topics that Undergraduates in Mathematics should Master  
Aloysius B. Kasturiarachi, Kent State University at Stark

5:30-5:40pm  
Effects of Staggered Lunch Periods on Geometry Students at an Inner-City High School  
Kristel Ehrhardt, University Maryland Baltimore County

5:45-5:55pm  
Where is a Mathematically Competent Teacher Candidate?  
Kazuko Ito West, Keio Academy of New York

2:00-3:20pm, Bob Hope  
A GRADUATE STUDENT WORKSHOP ON CREATING A RESEARCH PRESENTATION FOR UNDERGRADUATES  
What's the story?  
Organizers: Aaron Luttman, Clarkson University, and Rachel Schwell, Central Connecticut State University

2:00-3:55pm, Conference B  
MAA STUDENT PAPER SESSION #6

2:00-3:55pm, Conference C  
MAA STUDENT PAPER SESSION #7

2:00-3:55pm, Carrie B  
MAA STUDENT PAPER SESSION #8  
Organizers: J. Lyn Miller, Slippery Rock University; John Hamman, Montgomery College; and Daluss Stiewert, Black Hills State University

2:00-3:55pm, Oliver  
PI MU EPSILON STUDENT PAPER SESSION #1

2:00-3:55pm, Phipps  
PI MU EPSILON STUDENT PAPER SESSION #2  
Organizer: Angela Spalsbury, Youngstown State University

2:30-3:50pm, Grand Ballroom  
PANEL  
Mathematics in Interdisciplinary Survey Courses  
Organizers: Cinnamon Hillyard, University of Washington Bothell and Stuart Boersma, Central Washington University  
Panelists: Maura Mast, University of Massachusetts Boston; Mike Pinter, Belmont University; Robert Root, Lafayette College; Alexandre Barchechat, University of Washington Bothell; and Nancy Kool, University of Washington Bothell

3:30-5:00pm, Urban  
MAA SECTION OFFICERS MEETING  
Organizer: Rick Gillman, Valparaiso University

3:30-4:50pm, Monongahela  
PANEL  
Teaching Mathematics with Tablet Computers  
Organizers: Jason Aubrey, University of Missouri and Michael B. Scott, California State University Monterey Bay  
Panelists: Andrew G. Bennett, Kansas State University; Lila Roberts, Clayton State University; Marilyn A. Reba, Clemson University; and Maria Anderson, Muskegon Community College

3:30-5:30pm, Sternwheeler  
THE EARLY CAREER AND GRADUATE STUDENTS POSTERFEST AT MATHFEST  
Organizers: Ralucca Gera, Young Mathematicians’ Network; and Aaron Luttman, MAA Committee on Graduate Students

3:30-5:30pm, Keystone/Doubletree  
MINICOURSE #3 PART 1  
An Introduction to GeoGebra, a Tool for Demonstration, Exploration, and Applet Creation  
Presenter: Mike May, S.J., Saint Louis University

3:30-5:30pm, Erie/Doubletree  
MINICOURSE #4 PART 1  
Effective Placement Testing for Introductory College Mathematics Courses  
Organizers: Bernard Madison, University of Arkansas; Raymond Cannon, Baylor University; MarilynCarlson, Arizona State University; Wade Ellis, West Valley College; Louise Krmpotic, Microsoft; James W. Stepp, University of Houston; and Gordon Woodward, University of Nebraska
3:40–5:00pm, Bob Hope

**WORKSHOP**
Understanding and Assessing Mathematical Proofs
Organizers: Sean Larsen, Portland State University; Stacy Brown, Pitzer College; and Natasha Speer, University of Maine
Presenters: Keith Weber, Rutgers University, and Evan Fuller, Montclair State University

4:20–6:15pm, Conference B

**MAA STUDENT PAPER SESSION #9**

4:20–6:15pm, Conference C

**MAA STUDENT PAPER SESSION #10**

4:20–6:15pm, Carnegie III

**MAA STUDENT PAPER SESSION #11**
Organizers: J. Lyn Miller, Slippery Rock University; John Hamman, Montgomery College; and Daluss Siewert, Black Hills State University

4:20–6:15pm, Phipps

**PI MU EPSILON STUDENT PAPER SESSION #3**

4:20–6:15pm, Oliver

**PI MU EPSILON STUDENT PAPER SESSION #4**
Organizer: Angela Spalsbury, Youngstown State University

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**FRIDAY, August 6**

8:00–8:25am, Grand Ballroom

**AWM-MAA MORNING COFFEE**

8:30–9:20am, Grand Ballroom

**AWM-MAA ETTA Z. FALCONER LECTURE**
The Mathematical Challenges in the Treatment of Cancer
Ami Radunskaya, Pomona College

8:30–11:45am, Allegheny

**CONTRIBUTED PAPER SESSION**
The History of Mathematics and Its Uses in the Classroom Session 2
Organizers: Herbet Kasube, Bradley University; John Lorch, Ball State University; and Joanne Peeples, El Paso Community College

8:30–8:45am
Ciphering to the Rule of Three and the Evolution of Teaching Proportion
Deana Deichert, University of Central Florida

8:50–9:05am
Deduction Through the Ages: Teaching Elementary Logic via Primary Historical Sources
Jerry Lodder, New Mexico State University

9:10–9:25am
Euclid’s Neglected Postulate
Jeff Johannes, SUNY Geneseo

9:30–9:45am
History and Mathematics in Cryptology
Charles Rocca, Western Connecticut State University

9:50–10:05am
Rethinking the way we teach Point-Set Topology
Nicholas A Scoville, Ursinus College

10:10–10:25am
The Benefits of Primary Sources in an ODE class.
Adam Edgar Parker, Wittenberg University

10:30–10:45am
The ordered pair: how its history and philosophy has pedagogical importance in teaching mathematics
Jeff Buechner, Rutgers Univ-Newark

10:50–11:05am
The other curves of Agnesi
Antonella Cupillari, Penn State Erie

11:10–11:25am
Using the History of Divergent Series to Motivate Discussions about Series Convergence
Shawnee L. McMarran, California State University San Bernardino; Jim Tattersall, Providence College

11:30–11:45am
Using The History of Mathematics in a Basic Statistics Course
Pat Touhey, Misericordia University
8:30-11:45am, Conference A

**CONTRIBUTED PAPER SESSION**
Open and Accessible Problems in Applied Mathematics
Organizers: David Houseman, Goshen College, and Lynette Boos, Providence College

8:50-9:05am
A Mathematical Modeling of Glassy-winged Sharpshooter Population in the Texas Vineyards
Jeong-Mi Yoon, University of Houston-Downtown

9:10-9:25am
Mathematical Modeling of Solute Transfer during Hemodialysis Session
Kodwo Annan, Minot State University

9:30-9:45am
An Applied Mathematician Visits the Navier-Stokes Equations
Ricardo Sanchez, DRC Data Recognition Corporation

9:50-10:05am
Homotopy Analysis Method: Analytical Solutions for the 21st Century
Antonio Mastroberardino, Penn State Erie

10:10-10:25am
So You Think You Can Add? The Summed Behavior of Nonlinear Systems
Robert Rovetti, Loyola Marymount University

10:30-10:45am
Tangling and Untangling DNA
Junalyn Navarra-Madsen, Texas Woman’s University

10:50-11:05am
Graph Theory Takes on International Terrorism in the United States
Pamela Kay Warton, The University of Findlay

11:10-11:25am
Zipf’s Distribution in “Gadsby”
Guang-Chong Zhu, Lawrence Technological University

11:30-11:45am
Four Lower Division Student Research Topics: Preliminary Materials from UCI’s Interdisciplinary Computational Applied Mathematics Program (iCamp)
Sarah Elizabeth Eichhorn, UC Irvine

8:30-11:25am, Sky

**GENERAL CONTRIBUTED PAPER SESSION**
Calculus
Organizers: Stephen Davis, Davidson College; Stephen Kokoska, Bloomsburg University of Pennsylvania; Paul Seeburger, Monroe Community College; and Susan Wildstrom, Montgomery County Public Schools

8:50-8:40am
AP Calculus: Facts, Figures, and FAQs, I
Stephen Davis, Davidson College

8:45-8:55am
AP Calculus: Facts, Figures, and FAQs (II)
Stephen Kokoska, Bloomsburg University

9:00-9:10am
What to do on Day One in Calculus One
Thomas McMillan, University of Arkansas at Little Rock

9:15-9:25am
Calculus Consultants
Linda McGuire, Muhlenberg College

9:30-9:40am
Engaging Projects for Problem-Based Learning in Calculus
Guang-Chong Zhu, Lawrence Technological University

9:45-9:55am
Early Vector Calculus: A Path Through Third-Semester Calculus
Bob Robertson, Drury University

10:00-10:10am
Resequencing Calculus: An Early Multivariate Approach
David Dwyer, University of Evansville

10:15-10:25am
Helping Students Make Sense of Multivariable Functions: A Case Study
Eric Weber, Arizona State University

10:30-10:40am
Playing with Multivariable Calculus Concepts Wearing 3D Glasses
Paul Seeburger, Monroe Community College

10:45-10:55am
Homework Helpers–Using MAPLE in a Multivariable Calculus Course
Susan Wildstrom, Walt Whitman High School

11:00-11:10am
Using Gateway Exams in Calculus I
Teena Carroll, St. Norbert College

11:15-11:25am
Is Your Integral Zero?
Kenneth Luther, Valparaiso University
8:30-11:55 am, Frick

**GENERAL CONTRIBUTED PAPER SESSION**
Teaching Introductory Mathematics I
Organizers: Carol Vobach, University of Houston; Michael Miner, American Military University; Natalya Vinogradova, Plymouth State University; and Sue Beck, Montgomery County Public Schools

8:30-8:40am
An Examination of Student Attitudes in a Business Statistics Course
Deborah J. Gougeon, University of Scranton

8:45-8:55am
Community Engagement in an Applied Statistics Course
Carol Vobach, University of Houston Downtown

9:00-9:10am
Effective Ideas to Engage Repeating Developmental Mathematics Students
Gowribalan Vamadeva, University of Cincinnati

9:15-9:25am
Current Events Friday
Kira Hamman, Penn State Mont Alto

9:30-9:40am
Increase Success Using Stories That Teach Mathematics
Susan Lea Beane, University of Houston-Downtown

9:45-9:55am
Gateways Ensuring Mathematics Mastery
Dan Hrozencik, Chicago State University

10:00-10:10am
Introducing Online Resources to College Algebra Students in Online Classes
Michael Miner, American Public University System

10:15-10:25am
Quantitative Reasoning
Darcel Ford, Strayer University

10:30-10:40am
Questioning the Questions of Liberal Arts Math Students
Kayla Bradley Dwell, Ouachita Baptist University

10:45-10:55am
Rigor, Error, and Humor in the Mathematics Classroom
Christian Constanda, University of Tulsa

11:00-11:10am
Show me the formula
Natalya Vinogradova, Plymouth State University

11:15-11:25am
Success in Face-to-Face versus Online Finite Mathematics Class
David Shoenthal, Longwood University

11:30-11:40am
Reforming Developmental Mathematics at the College and High School Level
Sue R. Beck, Morehead State University

11:45-11:55pm
Preparatory Assignments: Changing Students’ Attributions, Motivations & Epistemic Beliefs
Allen Gregg Harbaugh, Seattle Central Community College

8:30-11:55am, Conference B

MAA STUDENT PAPER SESSION #12
8:30-11:55am, Conference C

MAA STUDENT PAPER SESSION #13
8:30-11:55am, Carnegie III

MAA STUDENT PAPER SESSION #14
8:30-11:55am, Three Rivers

MAA STUDENT PAPER SESSION #22
Organizers: J. Lyn Miller, Slippery Rock University; John Hamman, Montgomery College; and Daluss Siewert, Black Hills State University

9:00am-5:00pm, Sternwheeler

STUDENT HOSPITALITY CENTER
Organizers: Richard and Araceli Neal, American Society for the Communications of Mathematics

9:10-11:45am, Monongahela

**CONTRIBUTED PAPER SESSION**
Getting Students Involved in Writing Proofs, Session 2
Organizers: Aliza Steurer, Dominican University; Jennifer Franko-Vasquez, University of Scranton; and Rachel Schwell, Central Connecticut State University

9:10-9:25am
Student Proofs: Points of Entry in Developmental & Precalculus Math Courses
Allen Gregg Harbaugh, Seattle Central Community College

9:30-9:45am
A Proof a Day keeps the Red Pen Away
Jennifer Gorman, Kutztown University of PA

9:50-10:05am
Introduce Students to Their First Proofs
Yun Lu, Kutztown University of PA

10:10-10:25am
Proof Writing Activities in Abstract Algebra
Violeta Vasilevska, The University of South Dakota
10:30-10:45am
Growing Proof-Writing Skills Throughout the Undergraduate (Majors') Curriculum
Bonnie Gold, Monmouth University

10:50-11:05am
Writing Proofs in Undergraduate Mathematics Courses
Joyati Debnath, Winona State University

11:10-11:25am
Improving Proof Writing by Increasing Confidence, Communication, and Understanding
Molli R. Jones, Immaculata University

11:30-11:45am
Successful Strategies for Getting Students Involved in Proof Writing at Multiple Levels.
Kathleen Shannon, Salisbury University

9:30-10:20am, Grand Ballroom
EARL RAYMOND HEDRICK LECTURE II
Exponential Dynamics and Topology
Robert L. Devaney, Boston University

10:30-11:20am, Grand Ballroom
JAMES R. LEITZEL LECTURE
Exploring School Mathematics with Felix Klein
William McCallum, University of Arizona

11:30am-12:00noon, Grand Ballroom
MAA PRIZE SESSION

1:00-1:50pm, Urban
MAA UNDERGRADUATE STUDENT ACTIVITY
Connecting Digraphs and Determinants
Jennifer Quinn, University of Washington

1:00-1:50pm, Monongahela
MAA UNDERGRADUATE STUDENT ACTIVITY
A Mathematical Tour of the State of the Planet
Tom Pfaff, Ithaca College

1:00-1:50pm, Grand Ballroom
NAM DAVID BLACKWELL LECTURE
The Riordan Group Revisited: From Algebraic Structure to RNA
Asamoun Nkwanta, Morgan State University

1:00-2:50pm, Allegheny
INVITED PAPER SESSION
Mathematical Neuroscience
Organizer: Jonathan Rubin, University of Pittsburgh

1:00-1:20pm
Exploring a simple discrete model of neuronal networks
Winfried Just, Ohio University

1:30-1:50pm
Spatially-localized synchronous oscillations in neuronal networks
Stefanos Folias, University of Pittsburgh

2:00-2:20pm
Stimulus-driven Traveling Waves in a Neuronal Model
Jozsi Jalics, Youngstown State University; G. Bard Ermentrout, University of Pittsburgh; Jonathan Rubin, University of Pittsburgh

2:30-2:50pm
Synchronization of Noisy Integrate and Fire Neurons
Peter Thomas, Case Western Reserve University

1:00-3:00pm, Keystone/Doubletree
MINICOURSE #1 PART 2
Recruiting Students to Take More Mathematics Courses and to be Math Majors
Presenter: Michael Dorff, Brigham Young University

1:00-4:50pm, Conference A
INVITED PAPER SESSION
Geometric Group Theory
Organizer: Dan Margalit, Tufts University

1:00-1:20pm
Free Group Stretching Exercise
Matt Clay, Allegheny College

1:30-1:50pm
Ping-Pong for Free Groups
Johanna Mangahas, University of Michigan

2:00-2:20pm
Groups and Trees: Action!
Angela K. Kubena, University of Michigan

2:30-2:50pm
Examples of CAT(0) Groups
Kim Ruane, Tufts University

3:00-3:20pm
Dehn Functions of Groups
Eduardo Martinez-Pedroza, McMaster University

3:30-3:50pm
Mapping class groups: where algebra meets topology
Tara Brendle, University of Glasgow

4:00-4:20pm
Introduction to asymptotic dimension
Greg Bell, University of North Carolina

4:30-4:50pm
What’s at the End of an Infinite Group?
John Meier, Lafayette College
CONTRIBUTED PAPER SESSION
Innovative Ideas for an Introductory Statistics Course Session 1
Organizers: Nancy Boynton, SUNY Fredonia; Patricia Humphrey, Georgia Southern University; and Michael Posner, Villanova University

1:00-1:15pm
Y'all Ready For This? The First Night of Stats Class!
Michael Miner, American Public University System

1:20-1:35pm
Using the Wolfram Demonstrations Project to Illustrate Elementary Statistical Concepts
Jeff Hamrick, Rhodes College

1:40-1:55pm
Analyzing Real Biomedical Data Using Scientific Writing and TI Calculators
Magdalena Luca, Massachusetts College of Pharmacy and Health Sciences

2:00-2:15pm
Popular Media and Introductory Statistics
Karen Sue Briggs, North Georgia College & State University

2:20-2:35pm
An Outbreak of Outliers
Sue McMillen, Buffalo State College

2:40-2:55pm
Interdisciplinary Statistics Projects: Competitive Cross Curriculum Projects in Statistics
Nathan Shank, Moravian College

3:00-3:15pm
Authentic Discovery Experiences and Student-Centered Statistical Research Projects
Robb Sinn, North Georgia College & State University

3:20-3:35pm
What’s in your wallet? Analyzing dollar bills to reinforce statistical concepts
Brian Hollenbeck, Emporia State University

3:40-3:55pm
Putting the Inferential back in Introductory Statistics: A randomization approach
Vicki-Lynn Holmes, Hope College; Brooke Quisenberry, Hope College

4:00-4:15pm
Probability with the Survivor Function and Expected Value Games
Annela Kelly, Roger Williams University

1:00-1:15pm
Activities to Enliven a Course on Euclidean and non-Euclidean Geometries
Sarah J. Greenwald, Appalachian State University

1:20-1:35pm
Finite Geometries and Games
Kay Ellen Smith, Saint Olaf College

1:40-1:55pm
Excursions on the Sphere
Kristen Schemmerhorn, Dominican University

2:00-2:15pm
Engaging Students in Learning about Scaling
Davida Fischman, CSU San Bernardino

2:20-2:35pm
Geometric Art and Algebraic Surfaces
Ivona Grzegorczyk, California State University Channel Islands

2:40-2:55pm
Projective Geometry—Visualizing proofs and interpretations in Euclidean Space
Xiaoxue Hattie Li, Emory & Henry College

3:00-3:15pm
Non-euclidean geometry across the ’7th grade / major’ spectrum
Jack Mealy, Austin College

3:20-3:35pm
A Feuerbach Refresher
Len Smiley, University of Alaska Anchorage

3:40-3:55pm
An inquiry-based approach to middle-level geometry for preservice secondary teachers
Diana White, University of Colorado Denver

4:00-4:15pm
Developing Visualization Skills through an Exploration of Platonic Solids Using Technology and Traditional Method
Cheryl Elizabeth Crowe, Eastern Kentucky University

4:20-4:35pm
Informal Geometry for Aspiring TV/Film Directors and K-8 Educators
Lucy Dechene, Fitchburg State College

4:40-4:55pm
Reuse, Recycle, Re-Ceva
Martha Waggone, Simpson College
CONTRIBUTED PAPER SESSION
Open and Accessible Problems in Number Theory and Algebra
Organizer: Thomas R. Hagedorn, The College of New Jersey

1:00-1:15pm
Catalan's Factorial Problem
Thomas Koshy, Framingham State College

1:20-1:35pm
Mapping the Discrete Logarithm
Joshua Holden, Rose-Hulman Institute of Technology

1:40-1:55pm
Interesting Problems in Apollonian Circle Packings
Michael "Cap" Khoury, University of Michigan

2:00-2:15pm
Number derivatives: A treasure trove of undergraduate research projects
Michael Krebs, California State University, Los Angeles

2:20-2:35pm
On Conjugacies of the 3x+1 Map Induced by Continuous Endomorphisms of the Shift Dynamical System
Benjamin Kraft, Liberty High School

2:40-2:55pm
Open Questions About Compositions
Brian Hopkins, Saint Peter’s College

3:00-3:15pm
Some accessible problems mostly involving sequences
Sam Northshield, SUNY Plattsburgh

3:20-3:35pm
Polytopes, Polynomials, and String Theory
Ursula Whitcher, Harvey Mudd College

3:40-3:55pm
Conjugating matrices to get uniform diagonals
Michael Nathanson, St. Mary’s College of California

4:00-4:15pm
Absolute Length in Triangle Groups
Brian Drake, Grand Valley State University

4:20-4:35pm
Tabulating Irreducible Polynomials over Finite Fields
Andrew Shallue, Illinois Wesleyan University

4:40-4:55pm
The Probability of Relatively Prime Polynomials in \( \mathbb{Z}/p^2\mathbb{Z}[x] \)
Thomas Hagedorn, The College of New Jersey

5:00-5:15pm
Is the Square Root of 2 Rational?
Mu-Ling Chang, University of Wisconsin-Platteville
3:45-3:55pm  
**Sum of terms of periodic continued fractions**  
*Brad Emmons, Utica College*

4:00-4:10pm  
**Combinatorial Interpretations of Convolutions of Catalan Numbers**  
*Steven J. Tedford, Misericordia University*

4:15-4:25pm  
**Proving Fibonacci Identities Using Generating Functions**  
*Eric M. Werley, Lehigh University*

4:30-4:40pm  
**Sequences of Rationals from Games**  
*Paul D. Olson, Penn State Erie*

4:45-4:55pm  
**The Collatz Conjecture and the 2-adic Integers**  
*Ryan Staffelbeck, Transylvania University*

5:00-5:10pm  
**Basic systems of integral octonions**  
*Norman W. Johnson, Wheaton College (Mass.)*

5:15-5:25pm  
**On Orbits of Semi-simple Lie Groups acting on Flag Manifolds**  
*Benisamonyuyu Ntatin, Austin Peay State University*

5:30-5:40pm  
**Eigencone, saturation and Horn problems for symplectic and odd orthogonal groups**  
*Shrawan Kumar, University of North Carolina*

5:45-5:55pm  
**Complex Numbers in Plane Geometry**  
*Chris Frenzen, Naval Postgraduate School*

2:00-3:55pm, Conference B  
**MAA STUDENT PAPER SESSION #15**

2:00-3:55pm, Conference C  
**MAA STUDENT PAPER SESSION #16**

2:00-3:55pm, Carnegie III  
**MAA STUDENT PAPER SESSION #17**  
Organizers: J. Lyn Miller, Slippery Rock University; John Hamman, Montgomery College; and Daluss Siewert, Black Hills State University

2:00-3:55pm, Phipps  
**PI MU EPSILON STUDENT PAPER SESSION #7**

2:00-3:55pm, Oliver  
**PI MU EPSILON STUDENT PAPER SESSION #8**  
Organizer: Angela Spalsbury, Youngstown State University

2:10-3:30pm, Urban  
**PANEL**  
*How to Apply for a Job*  
Organizer: David Manderscheid, University of Nebraska Lincoln  
Panelists: Tricia Brown, Armstrong Atlantic State University; James Freeman, Cornell College; David Manderscheid, University of Nebraska; and Joanne Peeples, El Paso Community College

2:15-3:05pm, Grand Ballroom  
**ALDER AWARD SESSION**  
David Bressoud, MAA President  
Speakers: Kathleen Fowler, Clarkson University, and Nathan Carter, Bentley University

3:00-5:50pm, Allegheny  
**INVITED PAPER SESSION**  
Complex Dynamics: Opportunities for Undergraduate Research Session 2  
Organizers: Dan Look, St. Lawrence University, and Elizabeth Russell, United States Military Academy

3:00-3:20pm  
**Parameter spaces for some slices of cubics**  
*Clinton Currry, Stony Brook University*

3:30-3:50pm  
**Dynamics of Cubic Siegel Laminations**  
*Ross Ptacek, University of Alabama Birmingham*

4:00-4:20pm  
**Degeneracy of Cubic Pull-Back Laminations**  
*Kendrick White, University of Alabama Birmingham; John Mayer, University of Alabama Birmingham; Lex Oversteegen, University of Alabama-Birmingham*

4:30-4:50  
**Elusive Zeros Under Newton's Method**  
*Gareth Roberts, College of the Holy Cross*
5:00-5:20pm
Fibonacci Harps and a Shift of Finite Type
Annalisa Crannell, Franklin and Marshall College

5:30-5:50pm
Introduction to Complex Dynamics via Multiple Circle Inversions
Daniel M. Look, St. Lawrence University

3:30-5:30pm, Keystone/Doubletree
MINICOURSE #5 PART 1
A Game Theory Path to Quantitative Literacy
Presenters: David Housman, Goshen College, and Rick Gillman, Valparaiso University

3:30-5:30pm, Erie/Doubletree
MINICOURSE #6 PART 1
Creating Demonstrations and Guided Explorations for Multivariable Calculus using CalcPlot3D
Presenter: Paul Seeburger, Monroe Community College

3:40-5:00pm, Grand Ballroom
PANEL
Celebrating Mathematics and Bio 2010
Organizers: Raina Robeva, Sweet Briar College, and Jennifer Galovich, St. John's University
Panelists: Lester Claudill, University of Richmond; Carole Hom, University of California Davis; Amimal Huq, Department of Mathematics; Kelsey Metzger, Department of Biology University of Minnesota Rochester; and Randall Pruim, Calvin College

4:00-5:20pm, Monongahela
PANEL
Issues for Early Career Mathematicians in Academia
Organizers: Michael Dorff, Brigham Young University, and Edward Aboufadel, Grand Valley State University
Panelists: Michael Bolt, Calvin College; James Sellers, Penn State University; and Dana Ernst, Plymouth State University

4:20-6:15pm, Conference B
MAA STUDENT PAPER SESSION #18

4:20-6:15pm, Conference C
MAA STUDENT PAPER SESSION #19

4:20-6:15pm, Carnegie III
MAA STUDENT PAPER SESSION #20
Organizers: J. Lyn Miller, Slippery Rock University; John Hamman, Montgomery College; and Daluss Siewert, Black Hills State University

4:20-6:15pm, Phipps
PI MU EPSILON STUDENT PAPER SESSION #9

4:20-6:15pm, Oliver
PI MU EPSILON STUDENT PAPER SESSION #10
Organizer: Angela Spalsbury, Youngstown State University

6:00-7:45pm, Urban
PI MU EPSILON STUDENT BANQUET AND AWARD CEREMONY

8:00-8:50pm, Grand Ballroom
PI MU EPSILON J. SUTHERLAND FRAME LECTURE
Incomprehensibility
Nathaniel Dean, Texas State University

9:00-10:00pm, Monongahela
MAA ICE CREAM SOCIAL
SUNDAY, August 7

8:30-9:20am, Grand Ballroom

**INVITED ADDRESS**
Creating Symmetry
Frank Farris, Santa Clara University

8:30-11:05am, Conference A

**CONTRIBUTED PAPER SESSION**
Innovative Ideas for an Introductory Statistics Course, Session 2
Organizers: Nancy Boynton, SUNY Fredonia; Patricia Humphrey, Georgia Southern University; and Michael Posner, Villanova University

8:30-8:45am
Examples of data collection using clickers
Paul Taylor, Shippensburg University

8:50-9:05am
Happyville and Statistical Thinking
Kevin Scott Robinson, Millersville University of Pennsylvania

9:10-9:25am
A Hole in One: Using Miniature Golf in an Introductory Statistics Course
Patrick Gorman, Kutztown University

9:30-9:45am
Exploring Linear Regression with Bouncing Balls
Dean Nelson, University of Pittsburgh at Greensburg

9:50-10:05am
A Matched Pairs Study Involving Proportions
Chris Oehrlein, Oklahoma City Community College

10:10-10:25am
Preparing students to communicate technical information
Lew Ludwig, Denison University

10:30-10:45am
First-Year Introduction to Communications
Charles Rocca, Western Connecticut State University; David Barns, Western Connecticut State University

11:10-11:25am
Conversational Mathematics: Fostering Mathematical Communication Skills and Thinking in Introductory Courses
Martha Allen, Georgia College & State University; Blair T. Dietrich, Georgia Military College

8:30-11:55am, Sky

**GENERAL CONTRIBUTED PAPER SESSION**
Graph Theory and Geometry
Organizers: Rebecca Gera, Naval Postgraduate School; Hollie Buchanan, West Virginia University; Jack Mealy, Austin College; and Kevin Ferland, Bloomsburg University of Pennsylvania

8:30-8:40am
Funcitgraphs: A generalization of permutation graphs
Ralucca M. Gera, Naval Postgraduate School

8:45-8:55am
A $(2n-2)$ regular Graph on $2n+1$ Vertices Admits a Hamiltonian Decomposition
Hollie L. Buchanan, West Liberty University

9:00-9:10am
Covering powers of cycles by equivalence graphs
Robin Blankenship, Morehead State University
9:15-9:25am
On antimagic labelings of graphs
Michael D. Barrus, Black Hills State University

9:30-9:40am
The uplift principle and the Riordan group
Louis Shapiro, Howard University Mathematics Department

9:45-9:55am
Group Divisible Designs with Block Size Six and First and Second Associates
Melanie Laffin, Michigan Technological University

10:00-10:10am
A Modification of Sylvester’s Four Point Problem
Rosemary Sullivan, West Chester University

10:15-10:25am
Constructing hyperbolic-like systems via Snell Geometry
Jack Mealy, Austin College

10:30-10:40am
Exploring Relationships Within Families of Triangles Via Reperepresentation Spaces
G. Gerard Wojnar, Frostburg State University

10:45-10:55am
Generalizing the Pythagorean Theorem and Its Proof
Kevin Ferland, Bloomsburg University

11:00-11:10am
Rep-tiling the trapezoid
Leon Brin, Southern CT State University

11:15-11:25am
Undergraduate Research Projects on Hextile Knot Mosaics
Robin Blankenship, Morehead State University

11:30-11:40am
Interrelating tumors and fractals
Timothy Atabong Agendia, Madonna University Okija, Elele Campus (Nigeria)

8:30-11:55am, Frick
GENERAL CONTRIBUTED PAPER SESSION
Teaching Introductory Mathematics II
Organizers: J. Bradford Burkman, Louisiana School for Math; Science and the Arts, Alison Ahlgren, University of Illinois; Ivona Grzegorczyk, California State University Channel Islands; and Mary Walkins, Lee University

8:30-8:40am
Choosing Exercises for Well-Rounded Problem Sets
J Bradford Burkman, Louisiana School for Math, Science, and the Arts

8:45-8:55am
Implementation of web-based skill tests for Pre-calculus, Calculus I and Calculus II
Lynne Yengulalp, University of Dayton

9:00-9:10am
Readiness Assessment, Course Placement, and Effective Course Redesign through Introductory Calculus
Alison Ahlgren, University of Illinois

9:15-9:25am
Redesigning Algebra in the Classroom: Using Assessment to Drive Instruction
Mike Hall, Arkansas State University

9:30-9:40am
Pixie Sines: Viewing $y = \sin(50x)$ through the “Wrong” Windows on the TI-84+
Andy Martin, Kentucky State University

9:45-9:55am
Use of Online Homework System in Teaching Mathematics
Yun Lu, Kutztown University of PA

10:00-10:10am
The Math Dimension: A Centralized Mathematics Tutoring Center
Gina Monks, Pennsylvania State University

10:15-10:25am
A Calculus-oriented Inquiry Based Learning approach to teach a PreCalculus course
Rama Rao, University of North Florida

10:30-10:40am
Mathematical Habits of Mind: Teaching Students How to Think Mathematically
Marshall Gordon, Park School of Baltimore

10:45-10:55am
First-Year Mathematics at USMA: Modeling in a Real and Complex World
David Arney, United States Military Academy

11:00-11:10am
Models and Not Models--College Algebra and the Real World
Saleem Watson, California State University, Long Beach

11:15-11:25am
Poetry, games and art activities in algebra classroom
Ivona Grzegorczyk, California State University Channel Islands

11:30-11:40am
Two Kinds of College Algebra for Two Kinds of Students
Beverly K. Michael, University of Pittsburgh

11:45-11:55am
Using Critical Thinking Skills in College Algebra
Mary B. Walkins, Lee University

9:00-10:20am, Monongahela
MATHEMATICS CIRCLES DEMONSTRATION
Organizers: Tatiana Shubin, San Jose State University; Elgin Johnston, Iowa State University; and James Tanton, St. Mark’s School
9:00-10:30am, Urban

**MAA MATHEMATICAL COMPETITION IN MODELING (MCM) AWARDS CEREMONY**
Organizer: Ben Fusaro, Florida State University

9:00am-1:00pm, Sternwheeler

**STUDENT HOSPITALITY CENTER**
Richard and Araceli Neal, American Society for the Communications of Mathematics

9:30-10:20am, Grand Ballroom

**EARL RAYMOND HEDRICK LECTURE III**
Sierpinski Galore
Robert L. Devaney, Boston University

9:30-11:45am, Allegheny

**CONTRIBUTED PAPER SESSION**
First Year Seminar/ First Year Experience Mathematics Courses Session 1
Organizers: Jon Johnson, Elmhurst College, and Cheryl McAllister, Southeast Missouri State University

9:30-9:45am
First Year Seminar Voting Theory Course at TCNJ
Karen Clark, The College of New Jersey

9:50-10:05am
Freshmen, Problem Solving, and the Unknown Audience
Matthew Menzel, Marietta College

10:10-10:25am
The Art of Mathematical Thinking
Lew Ludwig, Denison University

10:30-10:45am
A Course on the Mathematics of Numb3rs
Sarah Elizabeth Eichhorn, UC Irvine

10:50-11:05am
A Model of a First-Year Seminar Integrated with a College Algebra Course
Joyce Cutler, Framingham State College

11:10-11:25am
Reluctantly Creating a Mathematics First Year Seminar
David Marshall, Monmouth University

11:30-11:45am
“Equation” as a Metaphor for Life in a Two Cultures Class
Steven B. Zides, Wofford College

10:30-11:20am, Grand Ballroom

**MAA INVITED ADDRESS**
The Mathematics of Math Circles
Zvezdelina Stankova, Mills College

11:30am-12:00noon, Grand Ballroom

**MAA BUSINESS MEETING**
David Bressoud, MAA President

1:00-2:15pm, Lawrence Welk

**STUDENT PROBLEM SOLVING COMPETITION**
Organizers: Richard and Araceli Neal, American Society for the Communications of Mathematics

1:00-2:20pm, Carnegie III

**TRANSFORMING UNDERGRADUATE EDUCATION IN STEM: RECENT CHANGES AT NSF**
Sponsored by MAA Science Policy Committee. Panelists: Joan Ferrini-Mundy, National Science Foundation; Jim Lewis, University of Nebraska-Lincoln; Dan Maki, University of Indiana-Bloomington. Moderator: Jason Miller, Truman State University.

1:00-2:50pm, Urban

**INVITED PAPER SESSION**
Mathematical Visualization
Organizer: Frank Farris, Santa Clara University

1:00-1:20pm
How to See Normal and Tangential Euler Numbers for a 2-Surface in 4-Space
Thomas Banchoff, Brown University

1:30-1:50pm
Lissajous Spheres: Twisted Spheres in 4-Space
Frank Farris, Santa Clara University

2:00-2:20pm
Visualizing the Normal Euler Class for Polyhedral Surfaces in 4-Space
Ockle Johnson, Keene State College

2:30-2:50pm
Flying through 3-Manifolds
Jonathan Rogness, University of Minnesota

1:00-3:00pm, Keystone/Doubletree

**MINICOURSE #3 PART 2**
An Introduction to GeoGebra, a Tool for Demonstration, Exploration, and Applet Creation
Presenter: Mike May, S.J., Saint Louis University

1:00-3:00pm, Erie/Doubletree

**MINICOURSE #4 PART 2**
Effective Placement Testing for Introductory College Mathematics Courses
Presenters: Bernard Madison, University of Arkansas; Raymond Cannon, Baylor University; Marilyn Carlson, Arizona State University; Wade Ellis, West Valley College; Louise Krmpotic, Microsoft; James W. Stepp, University of Houston; and Gordon Woodward, University of Nebraska
1:00-3:15, Conference B

**CONTRIBUTED PAPER SESSION**
Recreational Mathematics: New Problems and New Solutions  
*Organizers: Paul R. Coe, Dominican University, and Kristen Schemmerhorn, Dominican University*

1:00-1:15pm  
Withdrawn - No Presentation

1:20-1:35pm  
Tantrix and the Permutahedron  
Heidi Burgiel, Bridgewater State College; Mahmoud El-Hashash, Bridgewater State College

1:40-1:55pm  
A Non Random Dice Rolling Game  
Ryan Mullen, Sacred Heart University

2:00-2:15pm  
Exploring Prime Decades Less Than Ten Billion  
Jay Lawrence Schiffman, Rowan University

2:20-2:35pm  
Title: Randomness and Patterns in the Digits of Squares  
Roger Bilisoly

2:40-2:55pm  
Symmetry vs. Economy in Dissections of Squares and Cubes  
Greg N. Frederickson, Purdue University

3:00-3:15pm  
Oodles and Oodles of Googols; Iterations of the \textit{Words to Numbers} Function  
Matthew Coppenbarger, Rochester Institute of Technology

3:00-3:20pm

**INVITED PAPER SESSION**
The Mathematics of Math Circles  
*Organizers: Zvezdelina Stankova, Mills College, and Tatiana Shubin, San Jose State University*

1:00-1:20pm  
How to Allocate Indivisible Objects to People  
Gabriel Carroll, MIT

1:30-1:50pm  
Hilbert’s Third Problem for All Ages  
Inna Zakharevich, MIT

2:00-2:20pm  
The Dynamics of Continued Fractions  
Evan O’Dorney, Berkeley Math Circle

2:30-2:50pm  
Modern Perspectives on Classical Geometry  
Tiankai Liu, MIT

3:00-3:20pm

Collaborative Strategies in Multi-Player Mathematical Games  
Ivan Matic, University of California, Berkeley

3:30-4:00pm

Math Circles and Research Mathematics: Gaps, Bridges, and Successes  
*Panel discussion: nine past/present math circlers will share their stories.*

1:00-3:35pm, Three Rivers

**CONTRIBUTED PAPER SESSION**
First Year Seminar/ First Year Experience Mathematics Courses Session 2  
*Organizers: Jon Johnson, Elmhurst College, and Cheryl McAllister, Southeast Missouri State University*

1:00-1:15pm  
A First Year Seminar on Cryptography  
Darren Glass, Gettysburg College

1:20-1:35pm  
An interdisciplinary first seminar on symmetry  
Tamara Lakins, Allegheny College

1:40-1:55pm  
An Interdisciplinary First Year Experience in Mathematics and Music Theory  
Emily Helen Sprague, Edinboro University of PA

2:20-2:35pm  
Culture, Science, and Mathematics in the Pre-Columbian Americas  
Ximena Catepillan, Millersville University of Pennsylvania

2:40-2:55pm  
Four Different Experiences  
Jeff Johannes, SUNY Geneseo

3:00-3:15pm

FYS: Cryptologic Mathematics  
Timothy John McDevitt, Elizabethtown College

3:20-3:35pm  
Teaching a First Year Seminar on STEM Breakthroughs and Controversies  
Sarah J. Greenwald, Appalachian State University

3:20-3:35pm  
Balancing Numerous Goals in a Mathematics FYS - My Penn State Experience  
James Sellers, Penn State University
1:00-4:20pm, Conference A

**INVITED PAPER SESSION**
Mathematical Modeling of the Immune Response, Cancer Growth and Treatments
Organizer: Ami Radunskaya, Pomona College

1:00-1:20pm
Modeling the Immune Response to Cancer
Lisette de Pillis, Harvey Mudd College

1:30-1:50pm
Can Mathematics Cure Leukemia?
Doron Levy, University of Maryland

2:00-2:20pm
Optimal Control Scenarios in Cancer Dynamics
Renee Fister, MAA

2:30-2:50pm
A Spatial Model of Tumor-Host Interaction: Application of Chemotherapy
Peter Hinow, University of Wisconsin

3:00-3:20pm
Linking Changes in Epithelial Morphogenesis to Cancer Mutations: An Integrative Model
Kasia Rejniak, Moffitt Cancer Center

3:30-3:50pm
Mathematical Simulations of Tumor Response to Cancer Treatment
Jana Gevertz, The College of New Jersey

4:00-4:20pm
Predictions of tumor morphological stability and evaluation against experimental observations
Kara Thuy Pham, Mathematics Department, University of California, Irvine

1:00-4:50pm, Allegheny

**INVITED PAPER SESSION**
The Klein Project
Organizer: William McCallum, University of Arizona

1:00-1:20pm
Algebraic structure as a source of coherence in the school curriculum
Hyman Bass, University of Michigan

1:30-1:50pm
Cyclotomic Polynomials
Harriet Pollatsek, Mount Holyoke College

2:00-2:20pm
Eudoxus, Euclid and Hölder on measurement, ratio and proportion
James madden, Louisiana State University

2:30-2:50pm
Issues in the Transition from Concrete to Formal Mathematics
Susanna Epp, DePaul University

3:00-3:20pm
Repeating Decimal Representations of Fractions and Group Theory
Sybilla Beckmann, University of Georgia

3:30-3:50pm
Revisiting Felix Klein's Elementary Mathematics From An Advanced Standpoint
Bill Barton, University of Auckland

4:00-4:20pm
The Mathematics of Task Design
Al Cuoco, Educational Development Center; Glenn Stevens, Boston University

4:30-4:50pm
The Secret Life of the ax+b Group
Roger Howe, Yale University

1:00-4:15pm, Frick

**CONTRIBUTED PAPER SESSION**
Geometry Topics That Engage Students, Session 2
Organizer: Sarah Mabrouk, Framingham State College

1:00-1:15pm
Centers of Triangles (for GSP 5 and Geogebra)
Jane Cushman, Buffalo State College

1:20-1:35pm
GeoGebra and the Fermat-Torricelli Point
Marc Renault, Shippensburg University

1:40-1:55pm
Minkowski geometry and special relativity
Theodore Theodossopoulos, Saint Ann’s School

2:00-2:15pm
Baserunner’s Optimal Path
Frank Morgan, Williams College

2:20-2:35pm
A modern geometry class works overtime
Premalatha Jeevith, Mansfield University
1:00-1:15pm
An innovative approach to trigonometry recitation involving pre-service secondary math teachers
Diana White, University of Colorado Denver

1:20-1:35pm
Do inquiry-based active learning strategies add value to computer-assisted instruction?
William Bond, University of Alabama-Birmingham

1:40-1:55pm
Electronic Study Guide for Precalculus and Calculus
Philip B. Yasskin, Texas A&M University

2:00-2:15pm
Enhanced Student Services in Calculus 1 Classes
Cristina Villalobos, University of Texas-Pan American

2:20-2:35pm
Formative Assessments to Improve Performance in Pre-calculus and Calculus
Jose Huberto Giraldo, Texas A&M University Corpus Christi

2:40-2:55pm
Service Learning In A Precalculus Class: An Environmental Awareness Campaign
Angie Hodge, North Dakota State University

3:00-3:15pm
I Lost My Voice and Learned to Teach
Leslie M. Horton, Delta State University

3:20-3:35pm
Moore Method in PreCalculus: An Interim Report
Karen Sue Briggs, North Georgia College & State University

3:40-3:55pm
Promoting Success in Calculus Through Problem Solving and Undergraduate Teaching Assistants
David Wilson, SUNY, Buffalo State

4:00-4:15pm
Service learning in a Precalculus class: An environmental awareness campaign
Zdenka Guadarrama, Rockhurst University
2:45-2:55pm
Ray-based Tomography: An application for linear algebra
Martha Waggoner, Simpson College

3:00-3:10pm
Solutions to a generalization of the mixture problem from differential equations.
John Noonan, Mount Vernon Nazarene University

3:15-3:25pm
The effects of climate change on a species with temperature dependent sex determination.
Amy Parrott, University of Wisconsin-Oshkosh

3:30-3:40pm
An Epidemiology Model Suggested by Yellow Fever
Daniel Joseph Galiffa, Penn State Erie

3:45-3:55pm
Sensitivity and robustness of a neuron model are affected by dendrite shape
Christina Weaver, Franklin & Marshall College

4:00-4:10pm
The evolution of mountain pine beetle development time in response to climate change
Brian Patrick Yurk, Hope College

4:15-4:25pm
Relative efficiency gains of a monotone functional non-linear model.
Eduardo Montoya, CSU-Bakersfield

4:30-4:40pm
Spirographic Orbits in Extended Mass Distributions: Results From a Collaborative Research Effort with Undergraduates
Lisa Joan Holden, Northern Kentucky University

4:45-4:55pm
A comparison of mechanical and thermal damping in a thermoelastic beam
Richard Marchand, Slippery Rock University

5:00-5:10pm
A Dynamic Network Interdiction Problem
Brian J. Lunday, Grado Department of Industrial and Systems Engineering, Virginia Polytechnic Institute and State University

5:15-5:25pm
Analyzing Differentially Expressed Genes in Short Time Series Microarray Data
Darlene Olsen, Norwich University

5:30-5:40pm
What does the Julia Set for f(z)=z^{1/2}-1/2+i10 really look like?
Joshua C Sasmor, Seton Hill University

3:00-4:20pm, Lawrence Welk
PANEL
The Single Mathematician
Organizers: Georgia Benkart, University of Wisconsin; Maura Mast, University of Massachusetts Boston; and Maeve Lewis McCarthy, Murray State University
Panelists: Julie Barnes, Western Carolina University; Ellen Kirkman, Wake Forest University; Deborah Lockhart, National Science Foundation; and Mary Beth Ruskai, Tufts University

3:30-5:30pm, Keystone/Doubletree
MINICOURSE #5 PART 2
A Game Theory Path to Quantitative Literacy
Presenters: David Housmaen, Goshen College, and Rick Gillman, Valparaiso University

3:30-5:30pm, Erie/Doubletree
MINICOURSE #6 PART 2
Creating Demonstrations and Guided Explorations for Multivariable Calculus using CalcPlot3D
Presenter: Paul Seeburger, Monroe Community College

4:30-6:00pm, Monongahela
PANEL
Math Circles: Transforming (or Subverting) Pre-College Mathematics
Organizers: Tatiana Shubin, San Jose State University, and Elgin Johnston, Iowa State University
Panelists: Eric Hsu, San Francisco State University; Elgin Johnston, Iowa State University; Jim Lewis, University of Nebraska; William McCallum, University of Arizona; James Tanton, St. Mark’s School; and James Taylor, Saint Fe Prepatory School

6:00-7:00pm, Urban
SILVER & GOLD RECEPTION

7:00-9:00pm, Urban
SILVER & GOLD BANQUET
MC: Barbara Faires, Westminster College

CLIMATE CHANGE AT THE TOP OF THE WORLD: A PURE MATHEMATICIAN WORRIES ABOUT A DECIDEDLY APPLIED PROBLEM
Speaker: Robert Megginson, University of Michigan
SOCIAL EVENTS

Clayton and Frick Museum Tour
Wednesday, August 4
9:30 am – 4:00 pm
Travel to the Clayton Estate, one of the nation’s most complete Victorian homes and the residence of the industrialist Henry Clay Frick. Enjoy the quiet refinement of a Victorian past, visit the extensive car and carriage museum for a look at old-time travel, and enjoy the estate’s lovely greenhouse. The Clayton estate is also the home to a private art museum that has an exquisite permanent collection of European and Asian paintings, sculpture, and decorative arts from the 12th to 18th century. The tour will stop by the Cathedral of Learning at the University of Pittsburgh to see the 27 Nationality Rooms. Lunch is included and tickets are $53 per person.

MAA-PME Student Reception
Wednesday, August 4, 4:30 pm – 5:30 pm

Math Jeopardy
Wednesday, August 4, 5:30 pm – 6:15 pm
Robert Vallin, Slippery Rock University and MAA
Michael Berry
University of Tennessee

Answer: A fun undergraduate mathematics contest to lead off MathFest.

Question: What is Math Jeopardy?
Four teams of students will provide the questions to go with the mathematical answers in many categories. Come cheer for your favorite team. The session will be emceed by Michael Berry.

Opening Reception
Wednesday, August 4, 6:00 pm – 7:30 pm
The MAA is pleased to hold a reception with a cash bar for all MathFest participants immediately preceding the Opening Banquet.

Opening Banquet
Wednesday, August 4, 7:30 p.m – 9:30 pm
Continue the exciting evening by joining new and longtime friends and colleagues for a fine dinner. There will be an after dinner presentation by Jonathan Rogness, University of Minnesota who will present the talk: “Seeing Mathematics!”

Serving as master of ceremonies will be James Sellers from Penn State University (Governor, Allegany Mountain Section). Tickets are $52 per person. Purchasing tickets through advance registration is recommended, since only a limited number of tickets will be available for sale on site. Choice of entrees available.

Graduate Student Reception
David Manderscheid, University of Nebraska-Lincoln
James Freeman, Cornell College
Thursday, August 5, 5:00 pm – 6:00 pm

AWM-MAA Morning Coffee
Friday, August 6, 8:00 am – 8:25 am
The Association for Women in Mathematics and the Mathematical Association of America invite you to enjoy coffee and light refreshments before the Etta Z. Falconer Lecture.

Pi Mu Epsilon Student Banquet and Awards Ceremony
Friday, August 6, 6:00 pm – 8:00 pm
All PME members and their supporters are welcome. See the registration form for more information on this ticketed event.

MAA Ice Cream Social
Friday, August 6, 9:00 pm – 10:00 pm
Besides ice cream, we will recognize all students who gave talks in the MAA Student Paper Sessions, and award prizes for the best of them. All undergraduate students are invited to attend.

3rd Annual MathFest 5K Fun Run/Walk
Saturday, August 7, 6:30 am
Get active with your colleagues and have some fun Saturday, August 7 along the bike path at North Shore Park! More than 150 MathFest attendees participated in the 2009 MathFest 5K Fun Run/Walk and this year is sure to be a hit. The fee is $25 and all participants will receive a t-shirt. Donations are being accepted to present to a local Pittsburgh charity.

Silver & Gold Banquet
Saturday, August 7, 6:00 pm – 9:00 pm
Our annual end-of-meeting banquet is a time to honor long-time MAA members and have a very special conclusion to the meeting. Please join us for this ticketed event. Robert Megginson from the University of Michigan is the invited speaker. His talk will be “Climate Change at the Top of the World: A Pure Mathematician Worries About a Decidedly Applied Problem.” Barbara Faires, Westminster College (MAA Secretary) will be the emcee. Cash bar. Tickets are $60 per person. Purchasing tickets through advance registration is recommended, since only a limited number of tickets will be available for sale on site.

Fallingwater Tour
Sunday, August 8
9:00 am – 4:00 pm
Fallingwater is nestled in the heart of the Laurel Highlands in the small village of Mill Run, PA. It is one of the most widely acclaimed works of architect Frank Lloyd Wright. Fallingwater is Wright’s greatest essay in horizontal space, with his most powerful piece of structural drama. The group will visit the Christian Klay Winery for a tasting and also enjoy a hay ride to the crest of the mountain where the vineyards are and tour the wine processing area. Since considerable walking and steps are involved, good walking shoes are strongly advised. Lunch is included and tickets are $66.
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- **Maple T.A. MAA Placement Test Suite**: the renowned Mathematical Association of America placement tests in an online testing environment.

Visit booth #13 and ask about Maplesoft’s complimentary evaluation opportunities!

Maplesoft Presentation at MathFest 2010
**Friday August 6th, 3:30 to 5:00, Fox Chapel Room**

Redefining Math Education with Clickable Math
Clickable Math offers educators a better way of engaging students so that they fully understand the materials they are being taught. It responds to the most common complaint of faculty who integrate software into the classroom — time is spent teaching the tool, not the concepts. Join Louise Krmptoc as she demonstrates Clickable Math techniques that are redefining mathematics education.
Complete the pink, yellow, and blue grids simultaneously so that for every grid, each row, column, and block contains the numbers 1–9 exactly once.

The three grids are pseudo-puzzles, each with the same symmetric configuration of clues. Taken separately, the pink grid has 1977 solutions, the yellow has 2231, and the blue has 2181. But only ONE combination is a solution to the combined Venn diagram combination of puzzles.

Thanks to Brainfreeze Puzzles (brainfreezepuzzles.com) for providing this year’s MathFest Sudoku. This year’s puzzle will appear in a new book, tentatively titled Taking Sudoku Seriously, by Laura Taalman and Jason Rosenhouse, to be published in 2011 by Oxford University Press.