

# MathFest Program

August 6-8, 2009 | Portland, OR



Annual Summer Meeting

 Mathematical Association of America

# The key to success & saving money



You CAN get the BEST materials  
at the BEST price!

Hawkes courseware provides proven  
results at economical prices

**In today's uncertain  
economic times, your  
student needs every  
advantage in order  
to get ahead.  
– Wall Street Journal**

- ✓ Most Cost Effective
- ✓ Textbook with Software Start at \$70
- ✓ No Cost or Contract to School
- ✓ Proven Results



**HAWKES**  
**LEARNING**  
**SYSTEMS**  
*math courseware specialists*

**Visit us at booths 1 & 2 to find out more!**

[www.hawkeslearning.com](http://www.hawkeslearning.com)



# Table of Contents

## MathFest Program

August 6-8 | 2009  
Portland, OR

<b>Invited Addresses</b>	<b>4</b>
<b>Invited Paper Sessions</b>	<b>8</b>
<b>Contributed Paper Sessions</b>	<b>10</b>
<b>Undergraduate Student Sessions</b>	<b>12</b>
<b>Panels and Other Sessions</b>	<b>15</b>
<b>Graduate Student Sessions</b>	<b>18</b>
<b>Minicourses</b>	<b>20</b>
<b>Short Course</b>	<b>22</b>
<b>SIGMAA Activities</b>	<b>23</b>
<b>Social Events</b>	<b>24</b>
<b>Exhibit Hall</b>	<b>27</b>
<b>Floor Plan</b>	<b>29</b>
<b>Map of Portland</b>	<b>30</b>
<b>Paper Session Appendix</b>	<b>31</b>
<b>Sudoku</b>	<b>39</b>

# Invited Addresses

## Earl Raymond Hedrick Lecture Series



### Classical Structure in Modern Geometry, or Modern Structure in Classical Geometry

Ravi Vakil,  
Stanford University

One of the beauties of mathematics is the fact that many themes run through the subject, over many centuries. Many classical ideas continue to bear fruit in modern contexts, and modern ideas can still shed new light on classical problems. The Hedrick series will explore this in geometry. This series is intended for a general mathematical audience, and the talks will be independent.

**Lecture 1: The Mathematics of Doodling**  
Thursday, August 6 | 10:30 a.m. – 11:20 a.m.  
Oregon Ballroom

Doodling has many mathematical aspects: patterns, shapes, numbers, and more. Not surprisingly, there is often some sophisticated and fun mathematics buried inside common doodles. I'll begin by doodling, and see where it takes us.

**Lecture 2: Murphy's Law in Geometry**  
Friday, August 7 | 9:30 a.m. – 10:20 a.m.  
Oregon Ballroom

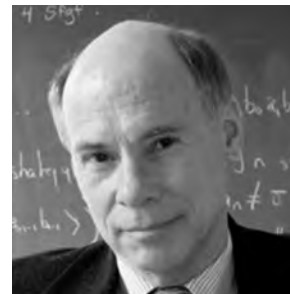
When mathematicians consider their favorite kind of object, the set of such objects often has a richer structure than just a set — often some sort of geometric structure. For example, it may make sense to say that one object is “close to” another. As another example, solutions to equations (or differential equations) may form manifolds. These “moduli spaces” often are hoped to behave well (for example be smooth). I'll explain how many ones algebraic geometers work with are unexpectedly as far from smooth as they possibly can be.

**Lecture 3: Generalizing the Cross Ratio: The Space of  $n$  Points on the Projective Line**  
Saturday, August 8 | 9:30 a.m. – 10:20 a.m.  
Oregon Ballroom

Four ordered points on the projective line, up to projective equivalence, are classified by the cross ratio, a notion introduced by Cayley in the 19th century. This theory can be extended to more points, leading to one of the first

important examples of an invariant theory problem, studied by Kempe, Hilbert, and others. Instead of the cross ratio (a point on the projective line), we get a point in a larger projective space, and the equations necessarily satisfied by such points exhibit classical combinatorial and geometric structure. For example, the case of six points is intimately connected to the outer automorphism of  $S_6$ . Much of the talk will be spent discussing the problem, and an elementary graphical means of understanding it. This is joint work with Ben Howard, John Millson, and Andrew Snowden.

## MAA Invited Address



### Predicting Values of Arbitrary Functions

Alan Taylor, Union College  
Thursday, August 6  
8:30 a.m. – 9:20 a.m.  
Oregon Ballroom

To what extent is a function's value at a point  $x$  of a topological space determined by its values in an arbitrarily small (deleted) neighborhood of  $x$ ? For continuous functions, the answer is typically “always” and the method of prediction of  $f(x)$  is just the limit operator. Chris Hardin and I generalized this observation on limits to the case of an arbitrary function mapping a topological space to an arbitrary set, and showed that the best one can ever hope to do is to predict correctly except on a scattered set. Moreover, we produced a predictor whose error set is always scattered. In this talk, we outline the proofs of these two theorems and then derive some of the main results from our two earlier papers, “An introduction to infinite hat problems” (*Mathematical Intelligencer*, 2008) and “A peculiar connection between the axiom of choice and predicting the future” (*American Mathematical Monthly*, 2008). In particular, we show that given the values of a function on an interval  $(-\infty, t)$ , the strategy produces a guess for the value of the function at  $t$  and this guess is correct except for a countable set that is nowhere dense. In this sense, if time is modeled by the real line, then the present can almost always be correctly predicted from the past.

## MAA Invited Address

---



**The Mathematics of Collective Synchronization**  
*Steven Strogatz,*  
*Cornell University*  
Thursday, August 6  
9:30 a.m. – 10:20 a.m.  
*Oregon Ballroom*

Every night along the tidal rivers of Malaysia, thousands of male fireflies congregate in the mangrove trees and flash on and off in silent, hypnotic unison. This display extends for miles along the river and occurs spontaneously; it does not require any leader or cue from the environment. Similar feats of synchronization occur throughout the natural world, whenever large groups of self-sustained oscillators interact. This lecture will provide an introduction to the Kuramoto model, the simplest mathematical model of collective synchronization. Its analysis has fascinated theorists for the past 35 years, and involves a beautiful interplay of ideas from nonlinear dynamics, statistical physics, and fluid mechanics. Classic results, recent breakthroughs, and open problems will be discussed, and a video of synchronous fireflies will be shown.

## MAA Invited Address

---



**Statistics in Algebraic Combinatorics**  
*Greg Warrington,*  
*University of Vermont*  
Saturday, August 8  
8:30 a.m. – 9:20 a.m.  
*Oregon Ballroom*

A central tension in mathematics is knowing how much to forget. Retain too many properties and the conjecture is not true. Lose too much structure and there is nothing meaningful to say. A variation of this balance is especially evident in algebraic combinatorics; oftentimes the objects of study are shadows of deep algebraic and geometric constructs.

The association of statistics (i.e., weights) to simple combinatorial objects lets us recover some of the deeper structure. For example, permutations index a class

of geometric objects known as Schubert varieties. By recording the number of inversions of a permutation we obtain the dimension of the corresponding variety.

In this talk I describe some statistics on familiar combinatorial objects such as permutations, lattice paths, and partitions. These statistics can be appreciated for the beautiful identities they satisfy and the surprising relationships among them. I will illustrate both qualities with examples. However, such statistics can also serve to illuminate the theory of symmetric functions. I will describe several situations where the underlying algebra suggests we should be able to find statistics satisfying certain properties. In a few cases such statistics have been found/invented; in other cases we are still looking.

## MAA Invited Address

---



**Cryptography: How to Keep a Secret**  
*Alice Silverberg, University of California at Irvine*  
Saturday, August 8  
10:30 a.m. – 11:20 a.m.  
*Oregon Ballroom*

When you send your credit card number over the Internet, cryptography helps to ensure that no one can steal the number in transit. Julius Caesar and Mary Queen of Scots used cryptography to send secret messages, in the latter case with ill-fated results. More recently, cryptography is used in electronic voting, and it is also used to “sign” documents electronically. While cryptography has been used for thousands of years, public-key cryptography dates only from the 1970’s. Some recent exciting breakthroughs in public-key cryptography include elliptic curve cryptography, pairing-based cryptography, and identity-based cryptography, all of which are based on the number theory of elliptic curves. This talk will give an elementary introduction to cryptography, including elliptic curve and pairing-based cryptography.

# Invited Addresses

## MAA Lecture for Students



**Mathemagic with a Deck of Cards on the Interval Between 5.700439718 and 8065817517094387857166 063685640376697528950 544088327782400000000 0000**

*Colm Mulcahy,  
Spelman College*

Thursday, August 6, 1:00 p.m. – 1:50 p.m.  
*Salon E*

Some unavoidable coincidences — as well as some truly surprising ones — will be explored as we survey 21st century mathematical creations/entertainments with a deck of cards, touching on topics in combinatorics, algebra, and probability.

## James R. Leitzel Lecture



**Communicating Among Communities and Calling for Change: Continuing the Improvement of**

**Mathematics Education**  
*Joan Ferrini-Mundy,  
Michigan State University  
and the National Science  
Foundation*

Friday, August 7, 10:30 a.m. – 11:20 a.m.  
*Oregon Ballroom*

Almost two decades ago Jim Leitzel's vision for the continued improvement of mathematics education called for communication among mathematicians, educational researchers, teacher educators, and others. Collaborations among stakeholders with diverse perspectives are central to many of today's major mathematics education initiatives. What shared commitments have emerged as most promising for improving mathematics learning? What is the role of undergraduate mathematics education, mathematics education research, and the mathematical education of teachers in addressing problems of national scope and urgency? A discussion of the challenges and opportunities in the current federal policy climate for continuing to call for change in mathematics education.

## NAM David Blackwell Lecture



**Why Should I Care About Elliptic Curves?**

*Edray Goins,  
Purdue University  
Friday, August 7  
1:00 p.m. – 1:50 p.m.  
Salon F*

An elliptic curve  $E$  possessing a rational point is an arithmetic-algebraic object: It is simultaneously a nonsingular projective curve with an affine equation  $y^2 = x^3 + Ax + B$ , which allows one to perform arithmetic on its points; and a finitely generated abelian group which allows one to apply results from abstract algebra.

In this talk, we discuss some basic properties of elliptic curves, and give applications along the way.

## Pi Mu Epsilon J. Sutherland Frame Lecture



**The Mathematics of Perfect Shuffles**

*Persi Diaconis,  
Stanford University  
Friday, August 7  
8:00 p.m. – 8:50 p.m.  
Oregon Ballroom*

Magicians and gamblers can shuffle cards perfectly (demonstrations provided). Understanding what can (and cannot) be done with shuffles leads to math problems, some beyond modern mathematics. The math is also useful for describing all sorts of computer algorithms.



# Invited Addresses

## AWM-MAA Etta Z. Falconer Lecture



### The Sum of Squares of Wavelengths of a Closed Surface

Kate Okikiolu, University of California at San Diego  
Friday, August 7  
8:30 a.m. – 9:20 a.m.  
Oregon Ballroom

For the Laplacian on a closed manifold, we define a spectral invariant which is heuristically the sum of squares of the wavelengths which is a regularized trace of the inverse of the Laplacian. On a technical level, this is an analog for surfaces of the ADM mass from general relativity. We discuss a negative mass theorem for surfaces of positive genus, and give a probabilistic interpretation.



**MathFest 2009**

## grand opening reception

Grand Opening Reception  
Portland Marriot, Exhibit Hall—Lower Level 2  
Wednesday, August 5, 6:00 p.m. to 7:30 p.m.

Cash Bar and Light Snacks



Mathematical Association of America

IT'S TIME *to redefine the classroom.*

### ONLINE STATISTICS PROGRAMS

Statistically speaking, advancing your career is more probable when you have the right skills.

#### Specialized training:

- Certificates
- Masters Degree
- AP® Teacher Workshop

Areas of emphasis include: business analytics, biostatistics and applied statistics.

[www.stat.tamu.edu/dist/](http://www.stat.tamu.edu/dist/)

IT'S TIME FOR



TEXAS A&M UNIVERSITY



take a seat



raise your hand



SCAVENGER HUNT participants, stop by BOOTH 13 for a chance to win an iPod shuffle.

# Invited Paper Sessions

## History of Mathematics

Janet Beery, *University of Redlands*  
Amy Shell-Gellasch, *Pacific Lutheran University*  
Charlotte Simmons, *University of Central Oklahoma*  
**Thursday, August 6 | 1:00 p.m. – 3:30 p.m.**  
*Salon I*

## Mathematical and Computational Genomics

Cedric Chauve, *Simon Fraser University*  
**Thursday, August 6 | 3:00 p.m. – 5:30 p.m.**  
*Columbia*

## Discrete Mathematics

John Caughman, *Portland State University*  
**Thursday, August 6 | 3:30 p.m. – 6:30 p.m.**  
*Salon I*

## Open and Accessible Problems in Knot Theory

Laura Taalman, *James Madison University*  
**Part I**  
**Friday, August 7 | 10:30 a.m. - 12:00 p.m.**  
**Part II**  
**Friday, August 7 | 1:00 p.m. – 3:30 p.m.**  
*Both Sessions | Salon I*

## Matroids You Have Known

Nancy Ann Neudauer, *Pacific University*  
**Friday, August 7 | 2:00 p.m. – 5:00 p.m.**  
*Mt. Hood*

## Gems of Combinatorics

Ezra Brown, *Virginia Tech*  
Arthur Benjamin, *Harvey Mudd College*  
**Friday, August 7 | 3:30 p.m. – 5:30 p.m.**  
*Salon I*

## Applications of Fluid Dynamics

Katherine Socha, *St. Mary's College of Maryland*  
**Saturday, August 8 | 8:30 a.m. – 10:30 a.m.**  
*Salon I*

## The Mathematics of Poker

Steve Bleiler, *Portland State University*  
**Saturday, August 8 | 1:00 p.m. – 3:30 p.m.**  
*Salon E*

## Research with Undergraduates

Mario Martelli, *Claremont Graduate University*  
**Saturday, August 8 | 2:00 p.m. – 5:00 p.m.**  
*Salon I*

## Graphs, Networks, and Inverse Problems

James Morrow, *University of Washington*  
**Saturday, August 8 | 2:30 p.m. – 5:00 p.m.**  
*Mt. Hood*

**All sessions are in the Portland Marriott Downtown Waterfront.**

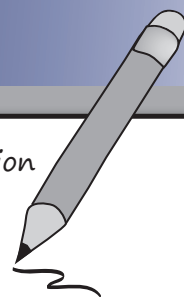
## Poster Sessions

*...in the Exhibit Hall*

*Graduate Student Poster Session*  
Jim Freeman, *Cornell College*  
*Thursday, August 6*  
*3:30 p.m. – 5:00 p.m.*

*First Day of Class Activities*  
Cinnamon Hillyard, *Chair of SIGMAA QL*  
Don Lotesto, *Chair of SIGMAA TAHSM*  
*Friday, August 7*  
*10:30 a.m. – 12:00 p.m.*

*Research By Early Career Mathematicians*  
*Friday, August 7*  
*3:30 p.m. – 5:00 p.m.*



**For more information on the Invited Paper Sessions, please see the Appendix on pages 31-32.**



## 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 National Math Circles 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.

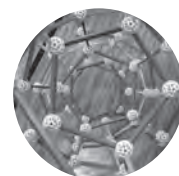
**Forums** Looking for someone else to discuss a Math Circle issues like funding and student recruitment? Do you want to brainstorm ideas for teaching your favorite topic? The NAMC Forums provide a central community for Math Circle organizers, teachers and students to discuss their Math Circle ideas.

#### Forum topics to date include:

*For Organizers:* New Organizers, Looking for Funding, How to Evaluate a Math Circle

*For Circle Teachers:* New Math Circle Teachers, Lesson Ideas

*For Circle Students:* Competitions, Summer Programs, Applying for College



# Contributed Paper Sessions

All sessions are in the Portland Marriott  
Downtown Waterfront

---

## Advances in Recreational Mathematics

Paul R. Coe, *Dominican University*  
Kristen Schemmerhorn, *Dominican University*  
Thursday, August 6 | 2:00 p.m. - 5:20 p.m.  
Salon E

---

## Current Research in Mathematics Education for In-service Teachers

Nancy Leveille, *University of Houston-Downtown*  
Carol Vobach, *University of Houston-Downtown*  
Thursday, August 6 | 1:00 p.m. - 3:00 p.m.  
Columbia

---

## Effective Use of Dynamic Mathematical Software in the Classroom

Murphy Waggoner, *Simpson College*  
Thursday, August 6 | Session 1  
8:30 a.m. - 10:30 a.m.  
Salon C

Friday, August 7 | Session 2  
8:30 a.m. - 11:30 a.m.  
Salon C

Saturday, August 8 | Session 3  
8:30 a.m. - 11:30 a.m.  
Salon C

---

## Resources for Teaching Math and the Arts

Douglas Norton, *Villanova University*  
Thursday, August 6 | Session 1  
9:00 a.m. - 10:20 a.m.

Thursday, August 6 | Session 2  
1:00 p.m. - 5:40 p.m.  
Both Sessions | Salon D

For more information on the Contributed  
Paper Sessions, please see the Appendix on  
pages 33-38.

Effective Ways to Teach  
Upper Level Mathematics  
Courses for Secondary  
Mathematics Education Majors  
Joyati Debnath, *Winona State University*  
Friday, August 7 | Session 1  
1:00 p.m. - 3:00 p.m.

Saturday, August 8 | Session 2  
8:30 a.m. - 11:50 a.m.  
Both Sessions | Columbia

---

## Fascinating Examples from Combinatorics, Number Theory, and Discrete Mathematics

Pallavi Jayawant, *Bates College*  
Todd Cadwallader Olsker, *California State University,  
Fullerton*

Thursday, August 6 | Session 1  
8:30 a.m. - 10:30 am  
Salon I

Friday, August 7 | Session 2  
8:30 a.m. - 12:10 p.m.  
Mt. Hood

Saturday, August 8 | Session 3  
10:30 am - 12:30 p.m.  
Salon I

---

## The History and Philosophy of Mathematics, and Their Uses in the Classroom

Bonnie Gold, *Monmouth University*  
Amy Shell-Gellasch, *Pacific Lutheran University*  
Janet Beery, *University of Redlands*  
Charlotte Simmons, *University of Central Oklahoma*  
Friday, August 7 | Session 1, 8:30 am - 11:50 am

Friday, August 7 | Session 2, 1:00 p.m. - 6:20 p.m.  
Both Sessions | Salon D

---

## Teaching Numerical Methods

Kyle Riley, *South Dakota School of Mines  
& Technology*  
Friday, August 7 | 3:00 p.m. - 6:20 p.m.  
Columbia

# Contributed Paper Sessions

## Active and Innovative Learning Approaches for Pre-service Mathematics Teachers at the K-12 and University Levels

Elizabeth Burroughs, Montana State University  
Cheryl Beaver, Western Oregon University  
Laurie Burton, Western Oregon University  
Jessica Deshler, West Virginia University  
Klay Kruczek, Western Oregon University  
**Friday, August 7 | 2:30 p.m. – 6:10 p.m.**  
Salon C

## Biomathematics in the Undergraduate Curriculum

Timothy D. Comar, Benedictine University  
**Saturday, August 8 | 1:00 p.m. – 4:20 p.m.**  
Columbia

## Getting Students Involved in Writing Proofs

Rachel Schwell, Central Connecticut State University  
Jennifer M. Franko, The University of Scranton  
Aliza Steurer, Dominican University  
**Friday, August 7 | Session 1**  
**8:30 a.m. -11:30 a.m.**  
Columbia  
**Saturday, August 8 | Session 2**  
**8:30 a.m. -11:50 a.m.**  
Salon D

## Graph Theory and Applications

Raluca Gera, Naval Postgraduate School  
**Saturday, August 8 | 1:00 p.m. – 6:40 p.m.**  
Salon D

## MAA Publications at MathFest

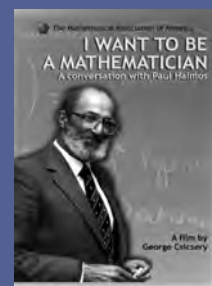
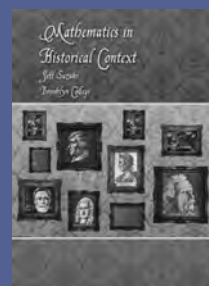
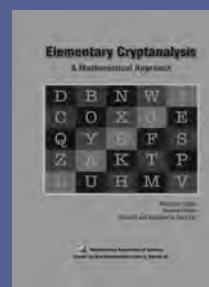
Stop by booths # 25-27 for the newest titles from the MAA and for signings by popular authors!

### Our new titles include:

- New MAA Guides: *A Guide to Topology*, *A Guide to Advanced Real Analysis*, & *A Guide to Real Variables*.
- *Elementary Cryptanalysis: A Mathematical Approach*
- *Mathematics in Historical Context*
- 2 new DVDs: *I Want to be a Mathematician: A Conversation with Paul Halmos & The United States of Mathematics Presidential Debate*
- *Who Gave You the Epsilon?* the sequel to *Sherlock Holmes in Babylon*
- *Calculus Deconstructed*
- *Voltaire's Riddle*
- and many more!



Mathematical Association of America





# Contributed Paper Sessions

## General Contributed Paper Sessions

---

*Sarah Mabrouk, Framingham State College*

### General Contributed Paper Session 1

*Thursday, August 6, 8:30 a.m. - 10:30 a.m.*

**Columbia**

---

### General Contributed Paper Session 2

*Thursday, August 6, 8:30 a.m. - 10:30 a.m.*

**Salon H**

---

### General Contributed Paper Session 3

*Thursday, August 6, 1:00 p.m. - 6:00 p.m.*

**Salon H**

---

### General Contributed Paper Session 4

*Friday, August 7, 8:30 a.m. - 12:00 p.m.*

**Salon H**

---

### General Contributed Paper Session 5

*Friday, August 7, 1:00 p.m. - 6:30 p.m.*

**Salon H**

---

### General Contributed Paper Session 6

*Saturday, August 8, 8:30 a.m. - 12:00 p.m.*

**Salon H**

---

### General Contributed Paper Session 7

*Saturday, August 8, 1:15 p.m. - 5:45 p.m.*

**Salon H**

**For more information on the General Contributed Paper Sessions see pages 36-38.**

## Undergraduate Student Sessions

---

### MAA-PME Student Reception

**Wednesday, August 5 | 4:30 p.m. – 5:30 p.m.**

*Columbia*

---

### Math JEOPARDY

*Michael Berry, University of Tennessee*

**Wednesday, August 5 | 6:00 p.m. – 7:15 p.m.**

*Mt. Hood*

---

### Student Hospitality Center

*Richard and Araceli Neal*

*American Society for the Communication of Mathematics*

**Thursday, August 6 | 9:00 a.m. - 5:00 p.m.**

**Friday, August 7 | 9:00 a.m. - 5:00 p.m.**

**Saturday, August 8 | 9:00 a.m. - 2:00 p.m.**

*All sessions | Exhibit Hall, Lower Level 2*

---

### MAA Lecture for Students

**Mathemagic with a Deck of Cards on the Interval Between 5.700439718 and 8065817517094387857 166063685640376697528950544088327782400 0000000000**

*Colm Mulcahy, Spelman College*

**Thursday, August 6 | 1:00 p.m. – 1:50 p.m.**

*Salon E*

---

### MAA Undergraduate

#### Student Activity

**Chop-chop! A Look at Dissection Puzzles**

*Travis Kowalski, South Dakota School of Mines and Technology*

**Friday, August 7 | 1:00 p.m. – 1:50 p.m.**

*Mt. Hood*

# Undergraduate Student Sessions

## MAA Undergraduate Student Activity

### Secrets of Mental Math

Arthur Benjamin, Harvey Mudd College

Friday, August 7 | 1:00 p.m. – 1:50 p.m.

Salon E

---

## MAA Student Paper Sessions

J. Lyn Miller, Slippery Rock University

John Hamman, Montgomery College

Daluss Siewert, Black Hills State University

Thursday, August 6 | 8:30 a.m. – 10:30 a.m.

Session 1, Portland

Session 2, Eugene

Sessions 3, Medford

Session 4, Salem

Session 5, Salon B

and

2:00 p.m. – 3:55 p.m.

Session #6 Portland

Session #7 Salon B

and

4:20 pm -6:15 pm

Session 8, Portland

Friday, August 7 | 8:30 a.m. – 10:30 a.m.

Session 9, Eugene

Session 10, Salon B

and

2:00 p.m. – 4:55 p.m.

Session 11, Salon B

---

## Pi Mu Epsilon Student Paper Sessions

Angela Spalsbury, Youngstown State University

Thursday, August 6 | 2:00 p.m. – 3:55 p.m.

Session #1, Medford

Session #2, Salem

and

4:20-6:15

Session #3, Medford

Session #4, Salem

---

Friday, August 7 | 8:30 a.m. – 10:30 a.m.

Session #5, Medford

Session #6, Salem

Session #7 Portland

and

2:00 p.m. – 4:55 p.m.

Session #8 Medford

Session #9 Salem

---

## Pi Mu Epsilon Student Banquet and Awards Ceremony

Friday, August 7 | 6:30 p.m. – 8:00 p.m.

Mt. Hood

---

## Pi Mu Epsilon

### J. Sutherland Frame Lecture

#### The Mathematics of Perfect Shuffles

Persi Diaconis, Stanford University

Friday, August 7 | 8:00 p.m. – 8:50 p.m.

Oregon Ballroom

---

## MAA Ice Cream Social

Friday, August 7 | 9:00 p.m. – 10:00 p.m.

Salon I

---

## MAA Mathematical

### Contest in Modeling (MCM) Winners

Ben Fusaro, Florida State University

Saturday, August 8 | 9:00 a.m. – 10:30 a.m.

Mt. Hood

---

## Student Problem Solving Competition

Richard Neal, American Society for the

Communication of Mathematics

Saturday, August 8 | 1:00 p.m. – 2:15 p.m.

Mt. Hood

---

## Special Session

### Expository Talks for Undergraduates by Graduate Students

Jim Freeman, Cornell College

Saturday, August 8 | 1:00 p.m. – 5:30 p.m.

Portland

---



Who knew 20  
paper plates  
could change  
the world?

MELANIE SMITH, 2005 MfA FELLOW,  
URBAN ASSEMBLY SCHOOL FOR LAW AND JUSTICE

Teaching math is about more than making icosahedra fun, it's about inspiring students.

Math for America provides aspiring math teachers a full-tuition scholarship for a master's degree in mathematics education, and a stipend of \$100,000 over five years in addition to New York City's competitive teacher's salary. The best part is that you join a community of math teachers dedicated to student success, professional development, mentoring, and leadership opportunities.

Become a Math for America Fellow today. Change a life tomorrow.

Fellowship opportunities also available in Los Angeles, San Diego, and Washington, DC.



Take part in the MathFest  
Scavenger Hunt for the  
chance to win great prizes!

Prize Drawings

Friday | August 7

Saturday | August 8

Grand Prize Drawing

Saturday | August 8

You must be present to win  
the Grand Prize!

Grand Prize  
Flip Video Ultra

## MathFest 2009 Scavenger Hunt in the Exhibit Hall

iPod Shuffle

Mathematical T-shirts

WebAssign Backpack

TI – Nspire Handheld &  
Software Bundle

\$100 Gift Card

Barnes and Noble  
Gift Certificate

TeX pin and DVD

\$50 Gift Certificate  
to AK Peters

Gift Baskets



# Panels and Other Sessions

## Family Matters

Georgia Benkart, University of Wisconsin-Madison

Maura Mast, University of Massachusetts-Boston

Maeve Lewis McCarthy, AWM & Murray  
State University

*Thursday, August 6, 1:00 p.m. – 2:20 p.m.*

Salon F

---

## Workshop on Teaching Abstract Algebra for Understanding

Sean Larsen, Portland State University

Keith Weber, Rutgers University

*Part I: Thursday, August 6*

*1:00 p.m. – 2:20 p.m.*

*Part II: Friday, August 7*

*1:00 p.m. – 2:20 p.m.*

*Both Sessions | Salon C*

---

## So You Want To Use An Online Homework System

Jason Aubrey, University of Missouri

Michael B. Scott, California State University,  
Monterrey Bay

Charles Weaver, University of Phoenix and  
Washtenaw Community College

*Thursday, August 6, 2:30 p.m. – 3:50 p.m.*

Salon F

---

## MAA Section Officers Meeting

Richard A. Gillman, Valparaiso University

*Thursday, August 6, 2:30 p.m. – 5:00 p.m.*

*Mt. Hood*

---

## Intensive Individual Experiences in the Math Major

Carol Schumacher, Kenyon College

Michael Pearson, MAA

*Thursday, August 6, 4:00 p.m. – 5:20 p.m.*

Salon F

---

## Issues for Early Career Mathematicians in Academia

Michael Dorff, Brigham Young University

David Stone, Georgia Southern University

*Thursday, August 6, 5:00 p.m. – 7:00 p.m.*

Salon C

---

## Mathematics Illuminated

Susan Wildstrom, Walt Whitman High School

*Thursday, August 6, 5:30 p.m. – 6:30 p.m.*

Salon E

---

## Count: A Reading of a Play

by John Martin

*Thursday, August 6, 8:00 p.m. – 9:30 p.m.*

Salon I

---

## Poster Session: First Day of Class Activities

Cinnamon Hillyard, Chair of SIGMAA QL

Dan Lotesto, Chair of SIGMAA TAHSM

*Friday, August 7, 10:30 a.m. – noon*

*Exhibit Hall*

---

## MAA Prize Session

Martha J. Siegel, Towson University,  
MAA Secretary

*Friday, August 7, 11:30 a.m. – noon*

*Oregon Ballroom*

---

# Panels and Other Sessions

## Alder Award Session

David Bressoud, Macalester College,  
MAA President

Friday, August 7, 2:00 p.m. – 3:20 p.m.

Salon E

---

## Assessing the Effectiveness of Online Homework

Michael Gage, Arnold Pizer, Vicki Roth,  
University of Rochester

Friday, August 7, 2:30 p.m. – 3:50 p.m.

Salon F

---

## Poster Session: Research by Early Career Mathematicians

Michael Dorff, Brigham Young University  
David Stone, Georgia Southern University

Friday, August 7, 3:00 p.m. – 5:00 p.m.

Exhibit Hall

---

## How to Apply for Jobs

David Manderscheid, University of  
Nebraska-Lincoln

Friday, August 7, 4:00 p.m. – 5:20 p.m.

Salon F

---

## Mathematics Outreach Programs for Pre-college Students

Robert Rogers, State University of New York  
at Fredonia

James A. Sellers, Pennsylvania State University

Friday, August 7, 4:00 p.m. – 5:20 p.m.

Salon E

---

## The MAA Business Meeting

Saturday, August 8, 11:30 a.m. – 12:00 p.m.

Oregon

---

## Issues of Common Concern Between MAA and NCTM

Gail Burrill, Michigan State University

Saturday, August 8, 1:00 p.m. – 2:20 p.m.

Salon F

---

## MAA's New Online Calculus Text

Don Albers, MAA

Saturday, August 8, 1:00 p.m. – 3:00 p.m.

Medford

---

## SIGMAA on Math Circles for Students and Teachers

Tatiana Shubin, San Jose State University

James Tanton, St. Mark's School

Saturday, August 8, 1:00 p.m. – 5:00 p.m.

Eugene

---

## Assessment of Learning in College Algebra or Pre-Calculus Courses

Bonnie Gold, Monmouth University

Barbara Jur, Macomb Community College

Saturday, August 8, 2:30 p.m. – 3:50 p.m.

Salon F

---

## The Value of Competition: a Discussion on Math Modeling Contests

Doug Ensley, Shippensburg University

Ben Galluzzo, Shippensburg University

Saturday, August 8, 2:30 – 4:00 pm

Salon C

---

## Working with Students who aren't STEM Majors, but who Could be!

Dan Teague

Saturday, August 8, 4:00 p.m. – 5:20 p.m.

Salon F

---

# Panels and Other Sessions

## SUMMA Session on MAA Summer Research Programs

William Hawkins, MAA and the University of the District of Columbia

Robert Megginson, University of Michigan

Saturday, August 8, 4:00 p.m. – 5:20 p.m.

Salon E

---

## Poster Session: First Day of Class Activities

Friday, August 7, 10:30 am – noon

Exhibit Hall Lower Level 2

### Encouraging Problem-Solving the First Day of Class

Mike Pinter, Belmont University

### Life's Expectations and Requirements

Susan Lea Beane, University of Houston-Downtown

### Gather Specific Student Information on an Index Card

Alice Kaseberg, retired

### I Don't Teach Math. I Teach Students Math.

Stacey Allyn Cederbloom, Mount Union College

### Creating a Rubric for Graphing

Caren Diefenderfer, Hollins University

## Poster Session: Research by Early Career Mathematicians

Friday, August 7, 3:00 p.m. – 5:00 p.m.

Exhibit Hall Lower Level 2

### Notions of Bounded Variation and Perimeter in Metric Measure Spaces

Chris Camfield, Kenyon College

### Supplemental Instruction for Calculus

Oscar Macedo, Melissa Anna Maria Pugh

Jessica Ione Reyes, University of Texas at El Paso

### Exploring Nearly Planar Graphs

Pratik Talati,

The University of Alabama at Birmingham

### New Method to Compute the Determinant of a 4x4 Matrix

Qefsere Doko Gjonbalaj,

University of Prishtina, Kosova

### Sums of Consecutive Integers That Make Perfect Squares

Peter Kosek, SUNY Brockport

### Applications of Linear Algebra to Graph Theory

Jason Moliterno, Sacred Heart University

## First Thursday

The art galleries in downtown Portland, Oregon, invite you to join them on the "First Thursday" of every month for an evening of art, wine and music.

Walk from gallery to gallery to view all of the new art exhibits. Generally the hours are 6pm to 9pm, but please check each gallery's website for more information and to view other artists works that they represent.

See details at [www.FirstThursdayPortland.com](http://www.FirstThursdayPortland.com), or stop by the MathFest registration desk and pick up a copy of the Portland Art Gallery Map.



# Graduate Student Sessions

All sessions are in the Portland Marriott  
Downtown Waterfront

## Graduate Student Poster Session

James Freeman, Cornell College

Thursday August 6 | 3:30 p.m. – 5:00 p.m.

Exhibit Hall Lower Level 2

## Graduate Student Reception

David Manderscheid, University of  
Nebraska-Lincoln

James Freeman, Cornell College

Thursday, August 6 | 5:00 p.m. – 6:00 p.m.

Williamette

## Graduate Student Workshop

What's the Story? A Graduate Student  
Workshop on Formulating an Effective  
Mathematical Presentation

Rachel Schwell, Central Connecticut State  
University

Aaron Luttmann, Clarkson University

Friday, August 7 | 2:00 p.m. – 3:30 p.m.

Salmon

## How to Apply for Jobs

David Manderscheid, University of  
Nebraska-Lincoln

Friday, August 7 | 4:00 p.m. – 5:20 p.m.

Salon F

## Expository Talks for Undergraduates by Graduate Students

James Freeman, Cornell College

Saturday, August 8 | 1:00 p.m. – 5:30 p.m.

Portland

## Commercial Presentations

Commercial Presentations provide our meeting attendees with an opportunity to find out more on various products and services in a workshop format. Participation in these workshops are on a first come first serve basis.

### Preparation, Remediation, and Validation for Students

Presented by: Louise Krmpotic

Students need to be prepared for college or university, they may need some remediation to learn topics that they didn't understand or learn previously, and they need to be tested to see what they do or don't know. Maplesoft offers a full suite of educational tools ranging from prognostic and placement tests in the Maplesoft-MAA Placement Test Suite to the easy-to-use learning environment of Maple.



Thursday, August 6,  
1:00 pm – 2:30 pm  
Williamette Room,  
Lobby Level

### All Math Software is not Created Equal: What's the Difference

Presented by: Abby McBride

The use of technology has become increasingly implemented in Mathematics courses, but what makes one software system different from another? Hawkes Learning Systems (HLS) is a unique program that is proven to be more effective in improving student performance. Discover how HLS's differences make it the perfect solution for student success!



Friday, August 7,  
3:30 pm – 5:00 pm  
Williamette Room,  
Lobby Level

# Learn How Maplesoft™ is Redefining Math Education!

Visit **Maplesoft at Booth #3**. While you're at the booth, enter our draw to win a free home-use copy of Maple 13. With Maplesoft, math just clicks!

## Maple™ 13

The Essential Tool for Mathematics and Modeling

Maplesoft has introduced one of the most exciting concepts in math software history: **Clickable Math™**. The idea of powerful mathematics delivered using very visual, interactive point-and-click methods is launching a new generation of teaching and learning techniques in mathematics. With the introduction of Maple 13, Maple now offers new and enhanced clickable tools that virtually eliminate the learning curve! Clickable Calculus™, Clickable Algebra™, Clickable Engineering™... No matter what the subject, Maple 13's point-and-click interface makes math easy to do, easy to learn, and easy to teach.

## Maplesoft™-MAA® Placement Test Suite

Partnering with the MAA to revolutionize placement testing

Maplesoft also offers the Maplesoft-MAA Placement Test Suite! The Placement Test Suite is backed by the power of Maple. Bring the Placement Test Suite to your institution and make placement testing as easy as point-and-click. Place your incoming students in the right mathematics courses quickly and painlessly using the renowned Mathematical Association of America (MAA) placement tests offered through an online testing environment.

## Maple T.A.™

Online Testing and Assessment ... Powered by Maple™

Maple T.A. is an online student testing and assessment platform perfectly suited to mathematics, science, engineering or any course that requires mathematics. Backed by the power of Maple, Maple T.A. supports complex, free form entry of mathematic equations and its advanced authoring environment lets you create custom content quickly and easily. Student performance is automatically assessed, providing immediate feedback while the questions are still fresh in their minds. Offer tests anywhere and at anytime! It does the marking for you and makes it simple to analyze the results. With Maple T.A. you can know exactly the strengths and weaknesses of each student and plan accordingly.

To learn more, attend the presentation "**Preparation, Remediation, and Validation for Students**" on Thursday, August 6th from 1:00-2:30PM, The Willamette Room located on the lobby level.

# Minicourses

## Minicourse #1

---

### A Beginner's Guide to the Scholarship of Teaching and Learning in Mathematics

*Jackie Dewar, Loyola Marymount University*

**Part 1: Thursday, August 6 | 1:00 p.m. – 3:00 p.m.**

**Part 2: Friday, August 7 | 1:00 p.m. – 3:00 p.m.**

*Both Sessions | Salon A*

This course will introduce people to the scholarship of teaching and learning in mathematics. We will present a framework that illustrates the similarities between disciplinary research and SoTL work, offer examples of SoTL projects in mathematics at varying stages of development, discuss methods for investigation, and help participants begin projects of their own. Participants will be guided in transforming a teaching problem of their own into a problem for scholarly investigation. Suggestions for how to make this work public will also be given.

## Minicourse #2

---

### Effective Placement Testing for Introductory College Mathematics Courses

*Raymond Cannon, Baylor University;*

*Marilyn Carlson, Arizona State University;*

*Wade Ellis, West Valley College;*

*Bernard L. Madison, University of Arkansas;*

*Gordon Woodward, University of Nebraska*

**Part 1: Thursday, August 6 | 1:00 p.m. – 3:00 p.m.**

**Part 2: Friday, August 7 | 1:00 p.m. – 3:00 p.m.**

*Both Sessions | Salon G*

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.

## Minicourse #3

---

### Preparing Students to Communicate Mathematics

*Lew Ludwig, Denison University*

*Michael Orrison, Harvey Mudd College*

**Part 1: Thursday, August 6 | 3:30 p.m. – 5:30 p.m.**

**Part 2: Saturday, August 8 | 1:00 p.m. – 3:00 p.m.**

*Both Sessions | Salon A*

The number of oral presentations by undergraduate mathematicians at local, regional, and national meetings continues to increase. Moreover, effective oral communication is a skill highly sought by employers. In this course, participants will learn how to instruct students in effective oral communication skills and how to evaluate their outcomes. By the end of the minicourse, participants will have developed a working model of a course with an oral communication component that they can incorporate at their institution. In addition, each person will receive a copy of an instructional DVD on effective oral communication, developed under an NSF grant, and training on how to best use these materials in their curriculum.

## Minicourse #4

---

### Combinatorially Thinking

*Arthur T. Benjamin, Harvey Mudd College*

*Jennifer J. Quinn, University of Washington, Tacoma*

**Part 1, Thursday, August 6 | 3:30 p.m. – 5:30 p.m.**

**Part 2, Saturday, August 8 | 1:00 p.m. – 3:00 p.m.**

*Both Sessions | Salon G*

Faced with an identity, how do you create a combinatorial proof? This hands-on minicourse provides you with some useful combinatorial interpretations, well-selected examples, and the challenge of finding your own combinatorial proofs. Along with numbers that are defined through counting (binomial coefficients, Stirling numbers, Catalan numbers), you will acquire a combinatorial appreciation for quantities like harmonic numbers, continued fractions, determinants, Fibonacci numbers, and the golden ratio. An extensive list of identities – some with known interpretations and others without – will serve as the basis for your exploration. Of course, you are welcome to bring along your personal favorites to explore.



## Minicourse #5

### A Game Theory Path to Quantitative Literacy

David Housman, Goshen College  
Rick Gillman, Valparaiso University

Part 1: Friday, August 7 | 3:30 p.m. – 5:30 p.m.

Part 2: Saturday, August 8 | 3:30 p.m. – 5:30 p.m.

Both Sessions | Salon A

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 7 | 3:30 p.m. – 5:30 p.m.

Part 2, Saturday, August 8 | 3:30 p.m. – 5:30 p.m.

Both Sessions | Salon G

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 will explore a collection of freely available Java applets designed to help students make these connections. Our primary focus will be on visualizing multivariable calculus using CalcPlot3D, a versatile new applet developed by the presenter through NSF-DUE-0736968. Participants will learn how to customize this applet to create demonstrations and guided exploration activities for student use. Images created in this applet can also be pasted into participant's documents. See <http://web.monroecc.edu/calcNSF/>. Some basic HTML experience is helpful.

## Find your connection to the Statistics Community with the American Statistical Association.

Become a student member of the American Statistical Association for **only \$10**.

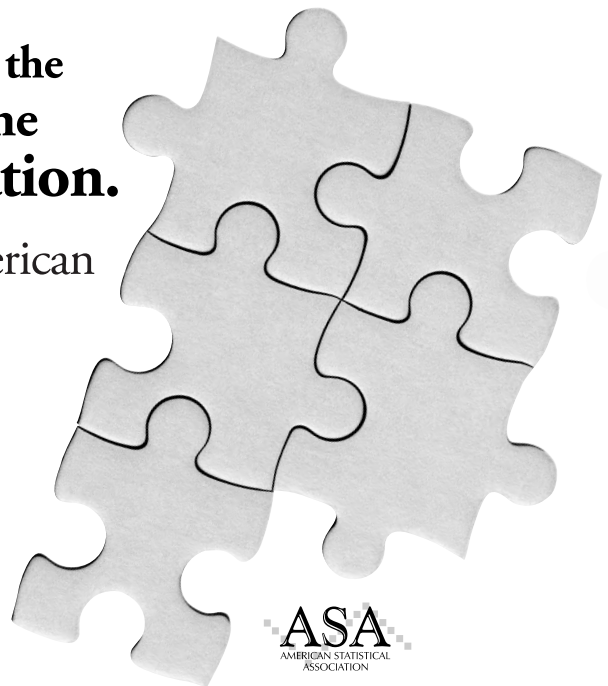
### Members Enjoy:

A subscription to *Amstat News*, the ASA's monthly membership magazine

Online access to our first-rate journals

Career opportunities through the Career Placement Service at the Joint Statistical Meetings and JobWeb

A network of professional colleagues and peers made up of more than 18,000 ASA members, including 4,000 students



Learn more about the premier association serving the statistics community since 1839 at [www.amstat.org](http://www.amstat.org).

# Short Course

## Financial Mathematics

Steven Shreve, Carnegie Mellon University

Part I: Tuesday, August 4 |

9:00 a.m. – 5:00 p.m.

Part II: Wednesday, August 5 |

9:00 a.m. – 5:00 p.m.

Both Sessions | Salon C

Over the past 20 years, mathematical methods have permeated the finance and insurance industries. Universities have responded by offering undergraduate courses or degree programs in mathematics related to finance. This short course is based on the core of such a program at Carnegie Mellon. The purpose of this short course is to acquaint potential undergraduate instructors of financial mathematics with the main financial concepts and mathematical methodology that one can include in an undergraduate curriculum on this subject.

The first part, Introduction to Mathematical Finance, requires only that students are familiar with differential calculus. It presents calculations related to loans, annuities and bonds, no-arbitrage pricing of derivative securities, and mean-variance analysis.

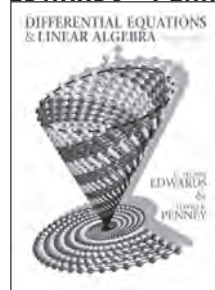
The second, Discrete-Time Finance, requires students to understand probability on finite event spaces. It covers dynamic models for financial markets within that context and a derivation of the Nobel-Prize-winning Black-Scholes formula as a limit of a discrete model.

The third part, Continuous-Time Finance, expects students to know calculus-based probability and have the facility to handle analysis arguments at an undergraduate level. It introduces Brownian motion and stochastic calculus, and then derives the Black-Scholes formula within this context. We conclude with an introduction to problems in optimal consumption and investment, which provide opportunities for student projects in financial mathematics.

PEARSON

COUNT ON US for the Best in Advanced Math!  
New Editions from Authors You Know

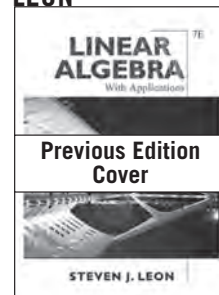
EDWARDS • PENNEY



*Differential Equations and Linear Algebra, Third Edition*

by C. Henry Edwards and David E. Penney • © 2010  
ISBN-13: 978-0-13-605425-2  
ISBN-10: 0-13-605425-0

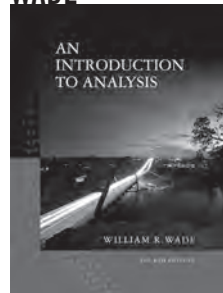
LEON



*Linear Algebra with Applications, Eighth Edition*

by Steven J. Leon • © 2010  
ISBN-13: 978-0-13-600929-0  
ISBN-10: 0-13-600929-8

WADE



*Introduction to Analysis, Fourth Edition*

by William R. Wade • © 2010  
ISBN-13: 978-0-13-229638-0  
ISBN-10: 0-13-229638-1

BRUALDI



*Introductory Combinatorics, Fifth Edition*

by Richard A. Brualdi • © 2010  
ISBN-13: 978-0-13-602040-0  
ISBN-10: 0-13-602040-2

Find the Title That's Right for You with **FIND YOUR FIT**

Our popular **Find Your Fit** tool will help you find the best book for your course. It is available for all of the following courses. Visit [www.pearsonhighered.com/findyourfit](http://www.pearsonhighered.com/findyourfit)

- Calculus
- Discrete Math
- Linear Algebra
- Introduction to Advanced Math
- Differential Equations
- Numerical Analysis

COUNT ON US  
PEARSON MATHEMATICS



For a complete list of titles, please visit [www.pearsonhighered.com/math](http://www.pearsonhighered.com/math)

## SIGMAA History of Mathematics

IPS History of Mathematics

*Thursday, August 6, 1:00 p.m. - 3:30 p.m.*

Salon I

---

## SIGMAA on Mathematics Instruction

Using the Web

Business Meeting

*Thursday, August 6, 4:00 p.m. - 5:30 p.m.*

Salmon

---

## SIGMAA History of Mathematics

CPS The History and Philosophy of Mathematics,  
and Their Uses in the Classroom

*Friday, August 7, 8:30 a.m. - 11:50 a.m.*

*Friday, August 7, 1:00 p.m. - 6:20 p.m.*

Salon D

---

## SIGMAA Mathematics and the Arts

CPS Resources for Teaching Math and the Arts

*Thursday, August 6, 9:00 a.m. - 10:15 a.m.*

*Thursday, August 6, 1:00 p.m. - 5:35 p.m.*

Salon D

---

## SIGMAA Mathematical and Computational Biology

CPS Biomathematics in the Undergraduate  
Curriculum

*Saturday, August 8, 1:00 p.m. - 4:15 p.m.*

Columbia

---

## SIGMAA on Math Circles for Students and Teachers

*Saturday, August 8, 1:00 p.m. - 5:00 p.m.*

Eugene

## SIGMAA Philosophy of Mathematics

Reception and Moderated Discussion:

The Role of The Philosophy of  
Mathematics in Teaching and Learning

*Thursday, August 6, 5:30 p.m. - 7:00 p.m.*

Mt. Hood

---

## SIGMAA TAHSM &

## SIGMAA QL

Poster Session: First Day of Class Activities

*Friday, August 7, 10:30 a.m. - noon*

Exhibit Hall, Lower Level 2

## Sweet Treats

*Stressed spelled backwards is desserts. Coincidence?  
I think not! ~Author Unknown*



Join your colleagues in the exhibit  
hall for a dessert break.  
Friday, August 7 | 3:30 p.m.

# Social Events

## Portland Garden Tour

Wednesday, August 5

9:00 a.m. – 4:00 p.m. | Portland Marriott Lobby

Explore Portland, visit the Classical Chinese, Rose and Japanese Gardens, and shop and enjoy lunch in Nob Hill on the Garden Tour. Visit the Classical Chinese Garden, the largest Suzhou-style garden outside of China. and enjoy a guided tour of this unique 40,000 square foot walled garden. Travel above the city into Washington Park to the International Rose Test Garden. Established in 1917, the Garden is recognized as the oldest public rose test garden in the United States. Then visit the beautiful Japanese Gardens, considered one of the most authentic outside of Japan. Discover the tranquil beauty of the Strolling Pond, Tea, Natural, Sand and Stone, and Flat Gardens influenced by Shinto, Buddhist and Taoist philosophies emphasizing plants, stones and water - the essence of nature with a docent from the garden. Enjoy lunch on your own and shopping on "Trendy 23rd," also known as Nob Hill. Cost of the tour is \$49 per person. The tour will depart at 9:00 a.m. from the Portland Marriott Downtown Waterfront and return at 4:00 p.m.

## Math JEOPARDY

Wednesday, August 5

6:00 p.m. – 7:15 p.m. | Mt. Hood

**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 5

6:00 p.m. – 7:30 p.m. | Exhibit Hall Lower Level 2

The Association is pleased to hold a reception with a cash bar for all MathFest participants immediately preceding the Opening Banquet.

## Opening Banquet

Wednesday, August 5

7:30 p.m. – 9:00 p.m. | Oregon Ballroom

Continue the exciting evening by joining new and long-time friends and colleagues for a fine dinner. There will be an after dinner presentation by Ed Sandifer, Western Connecticut State University and editor of the MAA online column "How Euler Did It," who will present the talk "Prove it again, Sam."

Serving as mistress of ceremonies will be Nancy Neudauer from Pacific University. Tickets are \$50 per person. Purchasing tickets through advanced registration is recommended, since only a limited number of tickets will be available for sale on site. Choice of entrees available.

## MathFest 5K Fun Run/Walk

Saturday, August 8

7:00 a.m. | Tom McCall Park

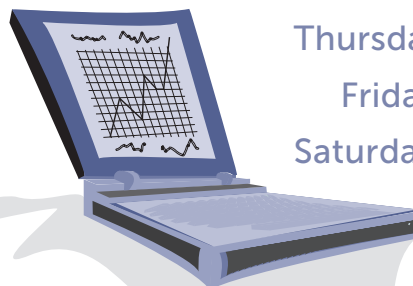
The 2nd Annual 5K will take place Saturday, August 8 in Tom McCall Waterfront Park. Registration is \$15 and includes entrance to the event, a t-shirt, and a water bottle. The last day to register is Friday, August 7. A portion of the proceeds will go to JOIN: Connecting the streets to a home!

**Thank you to our 2009 5K Sponsors:**

**Texas A&M and Brooks/Cole Cengage Learning**

Visit the  
Email Lab

Exhibit Hall, Lower Level 2



Thursday | 9 a.m. - 5 p.m.

Friday | 9 a.m. - 5 p.m.

Saturday | 9 a.m. - 1:45 p.m.



FOR EVERY WAY YOU TEACH.  
FOR EVERY WAY THEY LEARN.



# Cengage Learning + Mathematics = *Innovation*

NEW FOR FALL 2009!

## ENHANCED EDITIONS

Cengage Learning is proud to offer Enhanced Editions of 21 Mathematics titles. Each includes:

- Access to Cengage Learning Enhanced WebAssign®
- A fully integrated eBook with search, highlighting, and note-taking functionality
- The bound-in **Start Smart Guide** that teaches students the basics for using EWA
- **And priced to SAVE your students money**

**Enhanced WebAssign** contains thousands of homework problems, featuring *Master It* (tutorials), *Watch It* (videos), *Chat About It* (live online tutoring), and more to help your students succeed in this course.



## 4LTR PRESS

**Student Tested. Faculty Approved.**

Designed for today's students in every detail—from its abbreviated, no-nonsense title, to its engaging, effective content—**STAT** is the perfect general introductory statistics text for modern learners.

**STAT** is a concise, visually appealing text that introduces essential statistical concepts without any delays or distractions. This brief, affordable paperback includes a full suite of learning aids, including:

- Downloadable flash cards
- Practice problems
- Video tutorials, and
- Features that allow students to study wherever they are, whenever they have time.



## Enhanced WebAssign® Product Demonstrations!



Stop by booth 37 and let a **Cengage Learning** representative show you how easy it is to use EWA, the most widely-used online homework management system. You can be confident that **Brooks/Cole** and **WebAssign** have the content and support that you need for your course.

**STOP BY CENGAGE LEARNING'S BOOTH # 37  
AND ENTER FOR YOUR CHANCE TO WIN AN AMAZON KINDLE™!**

# Social Events

## MAA Silver and Gold Banquet

Saturday, August 8

6:00 p.m. – 9:00 p.m. | Mt. Hood

Our annual end-of-meeting banquet is a time to honor MAA dignitaries and have a very special conclusion to the meeting. Please join us in the Mt. Hood room for this ticketed event. Robert Osserman, Professor Emeritus from Stanford University is the invited speaker. His talk will be “The Shape of the Gateway Arch: A Mathematical Detective Story.” Afton Cayford, University of British Columbia will be the emcee. Cash bar. Purchasing tickets through advanced registration is recommended, since only a limited number of tickets will be available for sale on site.

## Mt. Hood Timberline Lodge Adventure

Sunday, August 9

9:00 a.m. – 4:00 p.m. | Portland Marriott Lobby


Scale majestic, snow-capped Mt. Hood in a luxury motor coach and partake in the splendor. Your tour guide will share the area’s history and ecology as you travel through several small Oregon towns, into the Mt. Hood National Forest, as we ascend to the 6,000 foot level of Mt. Hood, and what is considered the grandest example of Cascadian architecture, Timberline Lodge. The Lodge is the grandest example of Cascadian architecture. Inside and out the Lodge is handmade, from its hand-hewn beams to its hand-woven draperies and is inspired by pioneer, Indian, and wildlife themes. Timberline is also a year-round ski area and summer home of the U.S. Ski Team. At the Lodge, we’ll join the U.S. Forest Service for a film, a tour, and lunch at Timberline. You’ll also have time to explore on your own, visit the gift shop and take a short walk. Cost of the tour is \$59 per person. The tour will depart at 9:00 a.m. from the Portland Marriott Downtown Waterfront and return at 4:00 p.m.

## Columbia River Gorge & Wine Tasting Adventure

Sunday, August 9

9:00 a.m. – 4:00 p.m. | Portland Marriott Lobby

Experience the grandeur of the Columbia River Gorge, and discover the ecology and history of one of the world’s most magnificent landscapes as we travel along the Old Columbia River Gorge Highway. Visit Multnomah Falls, which plummets 620 feet, making it the second highest year-round waterfall in the United States. From Multnomah Falls we continue along the Columbia River to the town of Hood River and Cathedral Ridge Winery. Taste award winning wines and enjoy a prepared box lunch. Following lunch we’ll travel back to Portland stopping at Bonneville Dam, one of the first of eight federal locks and dams on the Columbia and Snake Rivers. Cost of the tour is \$70 per person.



**Clark County School District in Las Vegas, Nevada**  
is currently accepting applications for the  
following teaching position:

**Math Teacher (Grades 7-12)**

*Excellent Benefits Package*  
*Mentoring For New Employees*  
*No State, County, or City Tax*

Interested applicants apply online at:  
<http://www.ccsd.net/jobs>  
(702) 855-5414

**Location:**  
**Portland Marriott Downtown**  
**Waterfront, Lower Level 2**

*Wednesday, August 5*     6:00 pm – 7:30 pm  
*Thursday, August 6*     9:00 am – 5:00 pm  
*Friday, August 7*       9:00 am – 5:00 pm  
*Saturday, August 8*     9:00 am – 2:00 pm

## Exhibitors

---

A K Peters  
AMSCO  
American Mathematical Society  
Archives of American Mathematics, UT-Austin  
Association for Women and Mathematics  
Birkhauser  
Brooks/Cole Cengage Learning *Sponsor*  
Cambridge University Press  
Casio America, Inc.  
Clark County School District  
Council for International Exchange of Scholars  
Geometry Expressions  
Hawkes Learning Systems *Sponsor*  
Maplesoft *Sponsor*  
Math for America *Sponsor*  
Mathematical Association of America  
Mathematical Association of America -  
American Mathematics Competitions  
Mathematical Sciences Publishers  
Mathematicians Against Free Trade  
National Association of Math Circles *Sponsor*  
Navajo Jewelry & Crafts  
Pearson  
The Pi-Dye T-Shirt Shop  
QSO – The Mathematics and Physics of Quasi-  
Spherical Orbits  
SIGMAA-Arts  
SingaporeMath.com Inc.  
Springer  
Tessellations  
Texas A&M University *Sponsor*  
Texas Instruments  
TeX Users Group  
WebAssign  
W.H. Freeman & Company  
Wiley

## @Booth 14 - by Josh Cummings

---

Yea, O, Nerd! O, Geeks!  
Parabolic Pi Heaven  
Calls You--Treat Yourself!  
Come with your own pi-ku and get \$3 off your purchase!

## A K Peters

---

A K Peters, Ltd. is a leading independent scientific technical publisher specializing in mathematics, physics, computer graphics, and computer game development. A K Peters has nearly 300 titles in print, with 35 new titles since last August. Come check them out at our booth and save 20% on all titles.

## AMSCO School Publications, Inc.

---

Amsco publishes textbooks, workbooks, test-prep and supplementary programs for the mathematics curriculum, Geometry, Algebra, AP Statistics, AP Calculus, Algebra 2 & Trigonometry etc. for students in grades 7-12.

## Brooks/Cole Cengage Learning

---

Cengage Learning delivers highly customized learning solutions for colleges, universities, professors, students, libraries, government agencies, corporations and professionals around the world. These solutions are delivered through specialized content, applications and services that foster academic excellence, professional development, and measurable learning outcomes. Cengage Learning's existing company and imprint brands include Heinle, Gale, Wadsworth, Delmar, Brooks/Cole and South-Western, among others.

## Council for International Exchange of Scholars

---

For more than 60 years, the Council for International Exchange of Scholars (CIES) has administered the Fulbright Scholar Program, the U.S. government's flagship academic exchange effort, on behalf of the United States Department of State, Bureau of Educational and Cultural Affairs. Founded in 1947, CIES is a private organization located in Washington, DC. It is a division of the Institute of International Education (IIE) in New York, NY.

## Hawkes Learning Systems (HLS)

---

HLS is celebrating thirty years as a company specializing in mathematics software. HLS promotes grade improvement and motivates students by engaging them in the

# Exhibit Hall

learning process. Students learn more effectively through tutorials, unlimited practice, mastery-based homework, and error-specific feedback. HLS is the solution for your students' success!

## John Wiley & Sons

Founded in 1807, John Wiley & Sons, Inc. is an independent, global publisher of print and electronic products. Wiley Higher Education publishes for a broad range of post secondary education with leading programs in the Sciences, Business, Technology and the Social Sciences. Wiley's Internet Site can be accessed at <http://www.wiley.com>.

## Maplesoft

Through an exciting partnership with the MAA, Maplesoft brings you the Maplesoft-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. Visit the Maplesoft booth to learn more and to enter our draw for a free home use copy of Maple 13!

## Math for America

Math for America's mission is to improve math education in secondary public schools by recruiting, training, and retaining outstanding mathematics teachers. MfA Fellows receive a full tuition scholarship to earn a Masters Degree, a stipend in addition to their teacher's salary along with continuous professional development, mentoring and leadership opportunities.

## Mystery Exhibitor

What happens when a point rotates simultaneously on two or more axes? Find out at booth 21."

## National Association of Math Circles

The National Association of Math Circles provides support for Math Circles and similar programs via the community website <http://mathcircles.org>. This fun and interactive website includes a database of Math Circles worldwide, the Circle in a Box wiki, the Math Circle Problem Collection, and a forum for discussion of related issues.

## SingaporeMath.com Inc.

SingaporeMath.com Inc. is the exclusive distributor of the Parker/Baldrige titles 'Elementary Mathematics for Teachers' and 'Elementary Geometry for Teachers'. These texts for mathematics content courses utilize Singapore elementary math textbooks to illustrate best practices in elementary mathematics education. Singapore is the top-performing country in TIMSS.

## Tessellations

Tessellations offers a wide variety of fun and intriguing math products: dissection and tiling puzzles; Escher T-shirts and neckties; polyhedral dice; manipulatives; mathematical building toys such as Polydron, Zometool, Juno's Spinners, and Leonardo Sticks; and books on recreational math and connections between math and art, including titles by Tarquin Publications.

## Texas A& M University

The Department of Statistics at Texas A&M University offers Online AP<sup>®</sup> teacher training workshops for high school statistics teachers, Masters' degrees and Certificates in Business Analytics, Biostatistics, or Applied Statistics. An integrated extension of our renowned on-campus program, distance students receive the same instruction, course materials, and exams - with flexibility.

## Texas Instruments

Supporting educators' passion for teaching, TI's research-based technology for instruction and assessment, curricular materials and professional development combine to provide essential elements for greater student achievement in math and science. See how TI-Nspire<sup>™</sup> learning handhelds and software deepen understanding and how the TI-Navigator<sup>™</sup> system enables real-time assessment. Visit [education.ti.com](http://education.ti.com)

## TeX Users Group

The TeX Users Group provides information and support to users of TeX, a freely available computer typesetting language. This is done by publications, sales, conferences and courses. Please see: [www.tug.org](http://www.tug.org) for more information.

## Shared Book Display

Stop by the Exhibit Hall and explore items on display.

PRINCETON UNIVERSITY PRESS  
IOS PRESS  
HORWOOD PUBLISHING



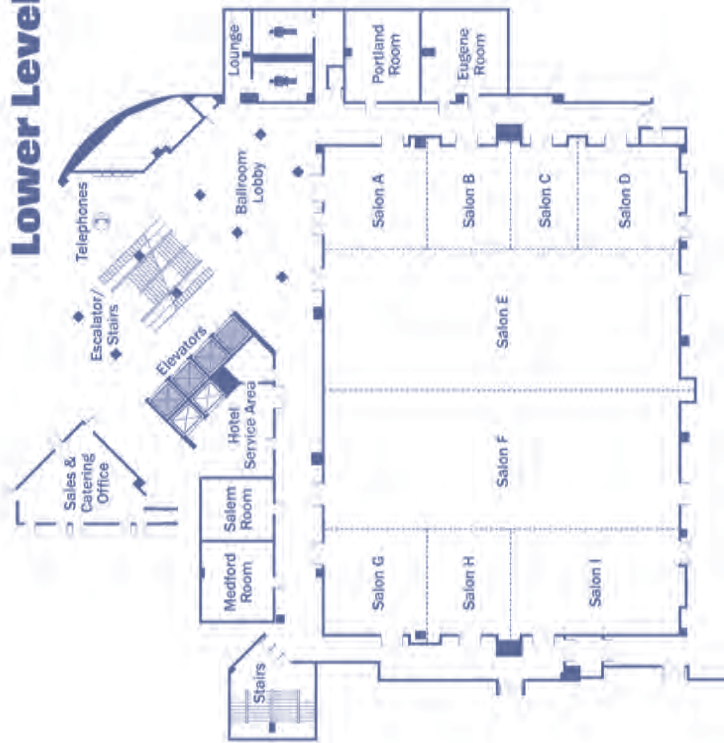
## Main Lobby



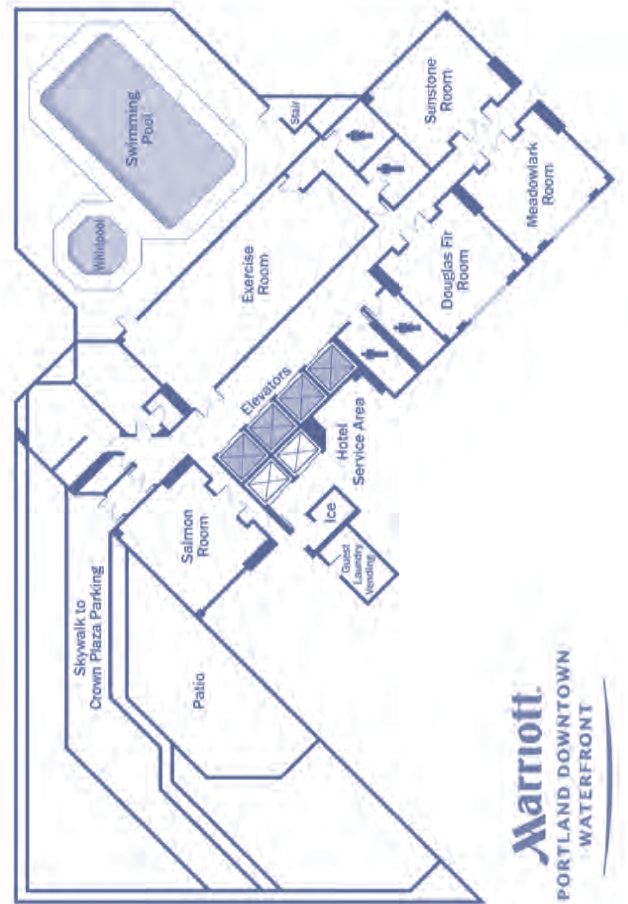
## Restaurant Level



## Lower Level 1



## 3rd Floor



# Attractions

(details on reverse)

- 1 Powell's City of Books
- 2 Powell's Technical Books
- 3 Garding Theater
- 4 Tanner Springs Park
- 5 Jamison Square
- 6 Museum of Contemporary Craft
- 7 Chinatown Gate
- 8 Classical Chinese Garden
- 9 Saturday Market
- 10 Chapman & Lowndale Squares
- 11 Portland Building & Portlandia
- 12 Pioneer Courthouse Square
- 13 Mill Ends Park
- 14 Center for the Performing Arts
- 15 Oregon History Center
- 16 Northwest Film Center
- 17 Portland Art Museum
- 18 19 20 Portland Farmers Market(s)
- 21 Da Tung Elephant Sculpture
- 22 Gov. Tom McCall Waterfront Park
- 23 Salmon Street Springs
- 24 Japanese-American Historical Plaza
- 25 Keller Fountain Park
- 26 OMSI

# Hotels

(downtown & lloyd center)

- A Hotel deLuxe
- B Mark Spencer
- C Ace
- D Governor
- E Westin
- F Benson
- G Hotel Lucia
- H Vintage Plaza
- I Marriott City Center
- J Hotel Monaco
- K The Nines
- L Embassy Suites
- M Hotel Fifty
- N Hilton
- O Heathman
- P Paramount
- Q Hotel Modera
- R Marriott Waterfront
- S Riverplace
- T Residence Inn Riverplace
- U Crowne Plaza
- V Shilo Inn
- W Courtyard Marriott
- X La Quinta
- Y Red Lion
- Z Inn at the Convention Ctr.
- Ab Shilo Inn





## Invited Paper Sessions

History of Mathematics

Thursday, August 6, 1:00 – 3:30 pm

- 01:00 PM-01:20 PM **Emilia's Arithmetic: A Brazilian Intellectual Tackles Mathematics Education**  
Fernando Gouvêa, Colby College
- 01:30 PM-01:50 PM **Augustus De Morgan: The Man Behind the Scenes**  
Charlotte Simmons, University of Central Oklahoma
- 02:00 PM-02:20 PM **Mathematical Queries from Late Nineteenth Century American Publications**  
Jim Tattersall, Providence College
- 02:30 PM-02:50 PM **Sums of Powers of Integers**  
Janet Beery, University of Redlands
- 03:00 PM-03:20 PM **Newton's Theory of the Speed of Sound**  
Stacy Langton, University of San Diego

Mathematical and Computational Genomics

Thursday, August 6, 3:00 – 5:30 pm

- 03:00 PM-03:20 PM **An Introduction to Some Mathematical Aspects of Genome Rearrangements**  
Cedric Chauve, Simon Fraser University
- 03:30 PM-03:50 PM **Sorting Genomes with Parking Functions**  
Anne Bergeron, Université du Québec à Montréal
- 04:00 PM-04:20 PM **Approximability and Fixed-Parameter Tractability for the Exemplar Genomic Distance Problems**  
Binhai Zhu, Montana State University
- 04:30 PM-04:50 PM **Ancestral Genome Architecture Reconstruction**  
Aida Ouangraoua, Simon Fraser University and Université du Québec à Montréal
- 05:00 PM-05:20 PM **Predicting RNA-RNA Interaction Probability and Structure**  
Hamidreza Chitsaz, Simon Fraser University

Discrete Mathematics

Thursday, August 6, 3:30 – 6:30 pm

- 03:30 PM-03:50 PM **2-odd Graphs and Prime Distance Graphs**  
Colin Starr, Willamette University; Josh Laison, Willamette University
- 04:00 PM-04:20 PM **Everything You Wanted to Know About the Hoffman-Singleton Graph, But Were Afraid to Draw**  
Rob Beezer, University of Puget Sound
- 04:30 PM-04:50 PM **Higher Order Lattice Chains and Delannoy Numbers: The Enumeration**  
John Caughman, Portland State University
- 05:00 PM-05:20 PM **Higher Order Lattice Chains and Delannoy Numbers: The Generating Functions**  
Chuck Dunn, Linfield College
- 05:30 PM-05:50 PM **Vertex Adjacencies in Random Planar Trees**  
Erin McNicholas, Willamette University
- 06:00 PM-06:20 PM **Bounds for Cut-and-Paste Sorting of Permutations**  
Daniel Cranston, Rutgers University; I. Hal Sudborough, University of Texas at Dallas; Doug West, University of Illinois at Urbana-Champaign

Open and Accessible: Problems in Knot Theory

Session 1: Friday, August 7, 10:30 am – 12:00 pm

- 10:30 AM-10:50 AM **Knot Colorability: Undergraduate Research Using Crayons, Computers and Linear Algebra**  
Matthew E. DeLong, Taylor University
- 11:00 AM-11:20 AM **Lots of New Intrinsically Knotted Graphs via Computer Programs**  
Ramin Naimi, Occidental College
- 11:30 AM-11:50 AM **Knotted Graphs and Boundary Slopes**  
Thomas Mattman, California State University, Chico

Session 2: Friday, August 7, 1:00 – 3:30 pm

- 01:00 PM-01:20 PM **Linking Graph Theory and Knot Theory**  
Joel Foisy, State University of New York at Potsdam

- 01:30 PM-01:50 PM **Link and Knots in Complete Graphs with Linear Edges**  
Lew Ludwig, Denison University
- 02:00 PM-02:20 PM **Knots, Ephemeral Knots and Slipknots in Random Walks and Equilateral Polygons**  
Kenneth C. Millett, University of California, Santa Barbara
- 02:30 PM-02:50 PM **Hot Jones!**  
Sandy Ganzell, St. Mary's College of Maryland
- 03:00 PM-03:20 PM **Three Knotty Tales: Complementary Regions, Spiral Index and Spanning Surfaces**  
Colin Adams, Williams College

Matroids You Have Known

Friday, August 7, 2:00 – 5:00 pm

- 02:00 PM-02:20 PM **Matroids and the Third Deadly Sin**  
David Neel, Seattle University
- 02:30 PM-02:50 PM **Pretty Pictures Produce Pretty Matroids**  
Gary Gordon, Lafayette College
- 03:00 PM-03:20 PM **From Digraphs and Determinants to Oriented Matroids**  
Jakayla R. Robbins, University of Kentucky
- 03:30 PM-03:50 PM **Clone Wars: Clones in Matroids**  
Carla Denise Cotwright, Hampton University
- 04:00 PM-04:20 PM **On Circuit Sizes in Matroids**  
Talmage James Reid, University of Mississippi
- 04:30 PM-04:50 PM **The Solution to the Shannon Switching Game**  
Brett Stevens, Carleton University

Gems of Combinatorics

Friday, August 7, 3:30 – 5:30 pm

- 03:30 PM-03:50 PM **Combinatorial Enumeration via the Riordan Group**  
Naiomi Cameron, Lewis and Clark College
- 04:00 PM-04:20 PM **Juggling Bijections**  
Joe Buhler, Center for Communications Research
- 04:30 PM-04:50 PM **A Combinatorial Variation of Sylvester's Four-Point Problem?**  
Gregory Warrington, University of Vermont
- 05:00 PM-05:20 PM **A New Description of the Outer Automorphism of  $S_6$**   
Ravi Vakil, Stanford University

Applications of Fluid Dynamics

Saturday, August 8, 8:30 – 10:30 am

- 08:30 AM-08:50 AM **Stokes, Taylor, Wilton and the Power of Series**  
Benjamin Akers, University of Illinois at Chicago
- 09:00 AM-09:20 AM **Micro-Locomotion: Squirmers, Rowers, Spinners, and Singers**  
Kurt Ehlers, Truckee Meadows Community College
- 09:30 AM-09:50 AM **Flow and Transport in Subsurface with Multiple Scales**  
Malgorzata Peszynska, Oregon State University
- 10:00 AM-10:20 AM **Mathematical Modeling of Coastal Ocean Circulation**  
Roger Samelson, Oregon State University

The Mathematics of Poker

Saturday, August 8, 1:00 – 3:30 pm

- 01:00 PM-01:20 PM **Three Mathematical Gems Arising from Poker**  
Brian Roger Alspach, University of Newcastle
- 01:30 PM-01:50 PM **Convergence of Discrete Poker Endgame Models**  
David Bachman, Pitzer College
- 02:00 PM-02:20 PM **Variations on Basic-End-Game in Poker**  
Thomas S. Ferguson, University of California, Los Angeles
- 02:30 PM-02:50 PM **Bet Sizing for No Limit**  
Bill Chen, Susquehanna International Group; Jarrod Ankenman, Brown University
- 03:00 PM-03:20 PM **Quantized Poker**  
Steven Bleiler, Portland State University

# Appendix

Research with Undergraduates  
Saturday, August 8, 2:00 – 5:00 pm

- 02:00 PM-02:20 PM **A Mathematical Model of Weight Change with Adaptation**  
Diana M. Thomas, Montclair State University
- 02:30 PM-02:50 PM **Directing Undergraduate Research: Issues Beyond Solving the Mathematical Problem**  
Aparna Higgins, University of Dayton
- 03:00 PM-03:20 PM **Electrowetting and Digital Microfluidics**  
Ali Nadim, Claremont Graduate University
- 03:30 PM-03:50 PM **Graph Labeling Problems Appropriate for Undergraduate Research**  
Cynthia Wyels, California State University Channel Islands
- 04:00 PM-04:20 PM **Mathematical Models in Ecology and Epidemiology**  
Abdul-Aziz Yakubu, Howard University
- 04:30 PM-04:50 PM **Mathematical Models of Tumor Growth: Lessons Learned from (and with) Undergraduates.**  
Ami Radunskaya, Pomona College

Graphs, Networks, and Inverse Problems  
Saturday, August 8, 2:30 – 5:00 pm

- 02:30 PM-02:50 PM **Nonunique Solutions to the Inverse Problem for Electrical Networks**  
Chad Klumb, University of Washington
- 03:00 PM-03:20 PM **Embedding Permutation String Diagrams**  
Tom Boothby, University of Washington
- 03:30 PM-03:50 PM **What is an Orbifold Graph**  
Liz Stanhope, Lewis and Clark College
- 04:00 PM-04:20 PM **Absolutely Continuous Spectrum for Discrete Schrodinger Operators**  
Richard Froese, University of British Columbia
- 04:30 PM-04:50 PM **A Few Nonlinear Inverse Problems for Simple Networks**  
Alberto Grunbaum, University of California, Berkeley

## Contributed Paper Sessions

Effective Use of Dynamic Mathematical Software in the Classroom  
Session 1: Thursday, August 6, 8:30 – 10:30 am

- 08:30 AM-08:45 AM **Designer Functions: Power Tools for Mathematics Instruction**  
Marcia Weller Weinhold, Purdue University Calumet
- 08:50 AM-09:05 AM **Drawing Cycloids with Geometer's Sketchpad**  
Nora Strasser, Friends University
- 09:10 AM-09:25 AM **Inversive Geometry in Geometer's Sketchpad**  
James Parson, Hood College
- 09:30 AM-09:45 AM **Rethinking Pythagorus with Geometry Playground**  
Daniel J. Heath, Pacific Lutheran University
- 09:50 AM-10:05 AM **Using Geometry Expressions to Explore Crop Circles**  
Larry Ottman, Haddon Heights Public Schools
- 10:10 AM-10:25 AM **Lights Out for Linear Algebra**  
Bruce Torrence, Randolph-Macon College

Session 2: Friday, August 7, 8:30 – 11:30 am

- 08:30 AM-08:45 AM **Demonstrating the Central Limit Theorem with Minitab**  
David Robert Gurney, Southeastern Louisiana University
- 08:50 AM-09:05 AM **Dynamic Graphical User Interface in MATLAB Using GUIDE**  
James Quinlan, Ohio State University
- 09:10 AM-09:25 AM **Identifying Self-Similarity**  
Leon Brin, Southern Connecticut State University
- 09:30 AM-09:45 AM **Interactive MS Excel Workbooks: Learning Tools that are More than Spreadsheets**  
Sarah L. Mabrouk, Framingham State College
- 09:50 AM-10:05 AM **Online Interactive Worksheets with Sage**  
Jason Grout, Iowa State University

- 10:10 AM-10:25 AM **Using E-Activities with the ClassPad 300**  
Constance Edwards, Western Kentucky University
- 10:30 AM-10:45 AM **Using the ClassPad Manager Software to Assist in Teaching Mathematics**  
Diane Whitfield, Portland Community College
- 10:50 AM-11:05 AM **Verifying Surface Intersection Curves Visually**  
Paul Seeburger, Monroe Community College
- 11:10 AM-11:25 AM **Visualizing Cycles in Random Sequences**  
Jack Ryder, Kean University

Session 3: Saturday, August 8, 8:30 – 11:30 am

- 08:30 AM-08:45 AM **Decision-Making and Iteration**  
Pallavi Jayawant, Bates College
- 08:50 AM-09:05 AM **A Game to Illustrate the Definite Integral**  
Michael Rogers, Oxford College of Emory University
- 09:10 AM-09:25 AM **Exploring Machin's Approximation of  $\pi$**   
Helmut Knaust, University of Texas at El Paso
- 09:30 AM-09:45 AM **Visualizing an Accumulation Function**  
Therese Shelton, Southwestern University
- 09:50 AM-10:05 AM **Interactive Demonstrations for Calculus**  
Lyle E. Cochran, Whitworth University
- 10:10 AM-10:25 AM **Animating Multiple Maple Plots to Demonstrate Damped Harmonic Oscillation**  
Chris Camfield, Kenyon College
- 10:30 AM-10:45 AM **Maplets for Calculus: Developing Intuition in a Computer Lab**  
Philip B. Yasskin, Texas A&M University; Douglas B. Meade, University of South Carolina
- 10:50 AM-11:05 AM **Using Maple to Apply Cubic Spline Techniques in Calculus and Mathematical Modeling**  
Brian Hollenbeck, Emporia State University

Fascinating Examples from Combinatorics, Number Theory, and Discrete Mathematics  
Session 1: Thursday, August 6, 8:30 – 10:30 am

- 08:30 AM-08:45 AM **New and Old Combinatorial Identities**  
Aklilu Zeleke, Michigan State University
- 08:50 AM-09:05 AM **Building a Bridge Between Problems of Mathematical Olympiads and "Real" Problems of Mathematics**  
Alexander Soifer, University of Colorado
- 09:10 AM-09:25 AM **The 2-adic Valuation of the Complementary Bell Numbers**  
Valerio De Angelis, Xavier University of Louisiana; Victor Moll, Tulane University; Tewodros Amdeberhan, Tulane University
- 09:30 AM-09:45 AM **Counting Student Groupings**  
Jeff Johannes, State University of New York at Geneseo
- 09:50 AM-10:05 AM **"How Do You Say 'Cryptography' in Romanian?" Learning About Integers from Ciphers in Different Languages**  
Joshua Holden, Rose-Hulman Institute of Technology
- 10:10 AM-10:25 AM **Fixed Points and Modular Calculations in Cryptology**  
Annela Kelly, Roger Williams University

Session 2: Friday, August 7, 8:30 am – 12:10 pm

- 08:30 AM-08:45 AM **Generalizing Some Well Known Congruences Using Burnside's Theorem**  
Tyler J. Evans, Humboldt State University
- 08:50 AM-09:05 AM **12 Coins Problem, Yet Again, a New Viewing**  
Len Smiley, University of Alaska Anchorage; Brian Wick, University of Alaska Anchorage
- 09:10 AM-09:25 AM **Pattern-Avoiding of Self-Avoiding Walks**  
Shanzen Gao, Florida Atlantic University
- 09:30 AM-09:45 AM **Counting on the Hanoi Graphs**  
Suzanne Ingrid Doree, Augsburg College
- 09:50 AM-10:05 AM **Pell Numbers and Related Identities via Charged Tilings**  
Brian Hopkins, St. Peter's College
- 10:10 AM-10:25 AM **Permutation Patterns in Enumerative Combinatorics**  
Brant Jones, University of California, Davis
- 10:30 AM-10:45 AM **Circular  $(n, k)$ -Games**  
Silvia Heubach, California State University, Los Angeles; Matthieu Dufour, Université du Québec à Montréal



10:50 AM-11:05 AM	<b>The Amazing, Astounding, Phantasmagorical Central Binomial Coefficient</b> Scott Hochwald, University of North Florida	04:40 PM-04:55 PM	<b>The Use of Repeating Patterns to Teach Hyperbolic Geometry Concepts</b> Douglas James Dunham, University of Minnesota Duluth
11:10 AM-11:25 AM	<b>Students, Sudoku, Permanents, and Combinatorial Proof: An Upper Bound for Permanents of (0,1)-Matrices</b> Adam G. Weyhaupt, Southern Illinois University Edwardsville	05:00 PM-05:15 PM	<b>Drawing Humpty Dumpty In Perspective: Side Topics In Projective Geometry</b> Fumiko Futamura, Southwestern University
11:30 AM-11:45 AM	<b>The Best Proof is Combinatorial -- and Now Reed-Dawson has One</b> Gara Pruesse, Vancouver Island University	05:20 PM-05:35 PM	<b>The Art of Balance: Mobiles in a Calculus Class</b> Zdenka Guadarrama, Rockhurst University
11:50 AM-12:05 PM	<b>The Pill Problem and Catalan Numbers</b> Keith Brandt, Rockhurst University	Current Research in Mathematics Education for In-service Teachers Thursday, August 6, 1:00 – 3:00 pm	
10:30 AM-10:45 AM	<b>Optimal Selection of Recombinant Inbred Lines for Locating Genes: A Preliminary Report</b> Eric Gottlieb, Rhodes College; Jonathan Fitz Gerald, Rhodes College	01:00 PM-01:15 PM	<b>Common Error Patterns in Pre-Service Teachers' Attempts at Writing Fraction Word Problems</b> Cheryl McAllister, Southeast Missouri State University; Cheryl Beaver, Western Oregon University
10:50 AM-11:05 AM	<b>Clique Swaps, Polytopes, and "Near Cubes"</b> James Mihalisin, Meredith College	01:20 PM-01:35 PM	<b>Factoring Polynomials</b> Ivona Grzegorzczuk, California State University Channel Islands
11:10 AM-11:25 AM	<b>Characterizations of Prime Numbers via Arithmetic Functions</b> Emil Daniel Schwab, University of Texas at El Paso	01:40 PM-01:55 PM	<b>Can Inservice Mathematics Teachers Answer Mathematical Questions that Arise from Classroom Use of Dynamic Software?</b> James Anthony Mendoza Epperson, University of Texas at Arlington
11:30 AM-11:45 AM	<b>Groups of Perfect Shuffles</b> Kent E. Morrison, California Polytechnic State University, San Luis Obispo	02:00 PM-02:15 PM	<b>Implementation of Inquiry-Based Pedagogy Significantly Improves Student Achievement</b> John C. Mayer, University of Alabama at Birmingham
11:50 AM-12:05 PM	<b>Repeating Decimals</b> Kenneth A. Ross, University of Oregon	02:20 PM-02:35 PM	<b>Clicking with Class</b> Ronald F. Barnes, University of Houston-Downtown
12:10 PM-12:25 PM	<b>Some Odd Things About Partitions</b> David Penniston, University of Wisconsin Oshkosh	02:40 PM-02:55 PM	<b>Using Learning Groups to Remove Reasoning Gaps: Implications of Piaget's Theory of Numbers, Vygotsky's Social Theory, and Glasson's Choice Theory</b> Susan Lea Beane, University of Houston-Downtown
Resources for Teaching Math and the Arts Session 1: Thursday, August 6, 9:00 – 10:20 am		Advances in Recreational Mathematics Thursday, August 6, 2:30 – 5:20 pm	
09:00 AM-09:15 AM	<b>An Honors Seminar in Music and Mathematics</b> William Fenton, Bellarmine University	02:00 PM-02:15 PM	<b>Moviemaking Magic and Mishaps</b> John Beam, University of Wisconsin Oshkosh
09:20 AM-09:35 AM	<b>A Truth So Joyously Blueniversal: An Inherently Uniform Succinct 3-D Decoding of Archetypal Jazz/Blues Harmony</b> David Alan Becker, Florida International University	02:20 PM-02:35 PM	<b>Can War Last Forever?</b> Mike Spivey, University of Puget Sound
09:40 AM-09:55 AM	<b>Fret Not!</b> Ioana Mihaila, California Polytechnic State University, Pomona	02:40 PM-02:55 PM	<b>Towers of Hanoi, Spin-Out, Graphs, and New Puzzles</b> Paul Cull, Oregon State University; Beth Skubak, Oregon State University; Nick Stevenson, Oregon State University
10:00 AM-10:15 AM	<b>Frieze Music</b> R. Daniel Hurwitz, Skidmore College; Mark Sicilian, Skidmore College	03:00 PM-03:15 PM	<b>Abstract Algebra Sheds Light on Peg Solitaire, and Vice Versa</b> Gary R. Lawlor, Brigham Young University
01:00 PM-01:15 PM	<b>Math and the Other Arts: A Course at Western Michigan University</b> Arthur Thomas White, Western Michigan University	03:20 PM-03:35 PM	<b>Slitherlink as a Model of Levels of Abstraction</b> Joel Haack, University of Northern Iowa
01:20 PM-01:35 PM	<b>Beyond Math and the Arts</b> Ann Robertson, Connecticut College	03:40 PM-03:55 PM	<b>Short Impartial Combinatorial Games Played on Partitions</b> Eric Gottlieb, Rhodes College; Whitney DuVal, Rhodes College
01:40 PM-01:55 PM	<b>Using the Mathematics of Art as a Freshman Seminar Theme</b> Cheryl McAllister, Southeast Missouri State University	04:00 PM-04:15 PM	<b>A Hadamard Matrix Coin-Sifting Algorithm</b> Matthew Hudelson, Washington State University
02:00 PM-02:15 PM	<b>Liberal Arts Mathematics: A Conceptual Art Form</b> Steven B. Zides, Wofford College	04:20 PM-04:35 PM	<b>Valuation of Discount Points</b> Brian Kelly, Bryant University
02:20 PM-02:35 PM	<b>Student Projects in a Geometry and Art Course</b> Ruth G. Favro, Lawrence Technological University	04:40 PM-04:55 PM	<b>Geogebra, Geodesics, and Gift Wrapping</b> Cindy Traub, Southern Illinois University Edwardsville
02:40 PM-02:55 PM	<b>Using Fractals to Motivate Linear Algebra</b> Annalisa Crannell, Franklin and Marshall College	05:00 PM-05:15 PM	<b>Radioactive <math>\pi</math>?</b> Christopher J. Dugaw, Humboldt State University
03:00 PM-03:15 PM	<b>Dance Choreography and Dance</b> Cynthia Lee McGinnis, Northwest Florida State College	The History and Philosophy of Mathematics, and Their Uses in the Classroom Session 1: Friday, August 7, 8:30 – 11:50 am	
03:20 PM-03:35 PM	<b>The Mathfest 2009 Poster Image, Mathematical Art, Design and Education in Second Life</b> Henry Segerman, University of Texas at Austin	08:30 AM-08:45 AM	<b>A Video Introduction to the Epsilon-Delta Definition of the Limit</b> Mike Krebs, California State University, Los Angeles
03:40 PM-03:55 PM	<b>Mathematical Methods for Determining Art Forgeries</b> Susan Kelly, University of Wisconsin-La Crosse	08:50 AM-09:05 AM	<b>History of Mathematics in Art and Design</b> Ruth O'Keefe, Kendall College of Art and Design
04:00 PM-04:15 PM	<b>Polyhedral Thread Balls</b> Carolyn Yackel, Mercer University		
04:20 PM-04:35 PM	<b>Beauty of Surfaces</b> Ivona Grzegorzczuk, California State University Channel Islands		

# Appendix

09:10 AM-09:25 AM	<b>Multiple Integrals Provide an Opportunity to Introduce a Women's History Lesson in a Mathematics Class</b> Susan Kelly, University of Wisconsin-La Crosse	08:30 AM-08:45 AM	<b>Experiences Using a Wiki</b> Tom McNamara, Southwestern Oklahoma State University
09:30 AM-09:45 AM	<b>Teaching Mathematics via a Detour Into Her History</b> Vasos Pavlika, University of Westminster	08:50 AM-09:05 AM	<b>Video Examples of Students Writing Proofs</b> Robert Roe, Missouri University of Science and Technology
09:50 AM-10:05 AM	<b>A Student Reading Guide for Cayley's Paper on the Theory of Groups</b> Carol J. Browning, Drury University	09:10 AM-09:25 AM	<b>How Difficult is Writing in Mathematics?</b> Hossein Behforooz, Utica College
10:10 AM-10:25 AM	<b>Aristarchus: The Man Who Introduced Mathematics to Astronomy</b> Steven Edwards, Southern Polytechnic State University	09:30 AM-09:45 AM	<b>Learning Proof-Writing by Grading Incorrect Proofs</b> Sarah Eichhorn, University of California, Irvine
10:30 AM-10:45 AM	<b>Compound Ratio, Revisited</b> Colin Bryan Powell McKinney, University of Iowa	09:50 AM-10:05 AM	<b>Lurch: Software for Teaching and Writing Mathematical Proofs</b> Nathan Carter, Bentley University; Kenneth Monks, University of Scranton
10:50 AM-11:05 AM	<b>Why the Centroid is the Centroid: An Ode on a Theme by Archimedes</b> William Mercier, Ivy Tech Community College - Lafayette	10:10 AM-10:25 AM	<b>Polishing (Off) Proofs with <math>\LaTeX</math></b> Sam Vandervelde, St. Lawrence University
11:10 AM-11:25 AM	<b>Euler's Lost Solution to Longitude at Sea</b> Mary Lynn Elizabeth Doan, Victor Valley College	10:30 AM-10:45 AM	<b>Proof Across the Major: Curriculum, Assessment and Discussion</b> Doug Ensley, Shippensburg University
11:30 AM-11:45 AM	<b>Leonhard Euler's Contributions to Mathematical Cartography</b> George Heine, US Bureau of Land Management	10:50 AM-11:05 AM	<b>Proof Writing in Abstract Algebra</b> Yun Lu, Kutztown University of Pennsylvania
Session 2: Friday, August 7, 1:00 – 6:20 pm		Session 2: Saturday, August 8, 8:30 – 11:50 am	
01:00 PM-01:15 PM	<b>Which Came First? The Philosophy, the History, or the Mathematics?</b> Martin E. Flashman, Humboldt State University	08:30 AM-08:45 AM	<b>Engaging Students In Critical Thinking About The Proof Writing Process</b> Connie Maude Campbell, Millsaps College; Kay Somers, Moravian College
01:20 PM-01:35 PM	<b>Should My Philosophy of Mathematics Influence My Teaching of Mathematics?</b> Daniel Sloughter, Furman University	08:50 AM-09:05 AM	<b>Proof by Tribal Narrative</b> Tracey McGrail, Marist College
01:40 PM-01:55 PM	<b>Philosophical Questions You DO Take a Stand on When You Teach First-Year Mathematics Courses</b> Bonnie Gold, Monmouth University	09:10 AM-09:25 AM	<b>Proof in Geometry: Euclid and a Class Journal</b> Theron James Hitchman, University of Northern Iowa
02:00 PM-02:15 PM	<b>Using the Philosophy of Intuitionistic Mathematics to Strengthen Proof Skills</b> Jeff Buechner, Rutgers University	09:30 AM-09:45 AM	<b>Proof-Starters</b> Leon Brin, Southern Connecticut State University
02:20 PM-02:35 PM	<b>Context "vs." Notation: Lessons Learned From History and the Classroom</b> Robert Ely, University of Idaho; Kimberly Vincent, Washington State University	09:50 AM-10:05 AM	<b>Teaching an Engaged Analysis Class</b> Erin Terwilleger Mullen, University of Connecticut
02:40 PM-02:55 PM	<b>Defining the Sum of an Infinite Series</b> Tommy Leavelle, Mississippi College	10:10 AM-10:25 AM	<b>Teaching Students the Habit of Using Outlines to Construct Proofs</b> Jason Morris, State University of New York at Brockport
03:00 PM-03:15 PM	<b>The Development of the Irrational Numbers</b> J. Christopher Tweddle, University of Evansville	10:30 AM-10:45 AM	<b>The Natural Role of the Sequences and Series Calculus Course</b> Scott Beaver, Western Oregon University
03:20 PM-03:35 PM	<b>Teaching Geometry from a Historical Point of View</b> Meighan Dillon, Southern Polytechnic State University	10:50 AM-11:05 AM	<b>Writing Proofs Across the Undergraduate Mathematics Curriculum</b> Aloysius Bathi Kasturiarachi, Kent State University
03:40 PM-03:55 PM	<b>A Course on Ancient Greek Mathematics</b> Julius Barbanel, Union College	11:10 AM-11:25 AM	<b>Writing to Understand Mathematical Proofs</b> Mary K. Porter, St. Mary's College
04:00 PM-04:15 PM	<b>Issues of Implementing History Modules into College Algebra</b> Gary W. Hagerty, Black Hills State University	11:30 AM-11:45 AM	<b>Student Experiences in Understanding the Processes and Purposes of Proving</b> Usha Kotelawala, Fordham University; Rommel Fernandes, University of Washington
04:20 PM-04:35 PM	<b>Silk Threads of Many Colors: Teaching Ibn Mun'im's Combinatorics</b> Randy Ken Schwartz, Schoolcraft College		
04:40 PM-04:55 PM	<b>Sharing the History of Mathematics Online</b> Sarah L Mabrouk, Framingham State College	Effective Ways to Teach Upper-Level Mathematics Courses for Secondary Mathematics Education Majors Session 1: Friday, August 7, 1:00 – 3:00 pm	
05:00 PM-05:15 PM	<b>Straight From the Source's Mouth: A Two-Valued Approach to Learning Boolean Algebra and More</b> Janet Heine Barnett, Colorado State University - Pueblo	01:00 PM-01:15 PM	<b>A Calculus Course for Secondary Mathematics Education Majors Without Algebra and Precalculus Prerequisites</b> Patricia Baggett, New Mexico State University; Andrzej Ehrenfeucht, University of Colorado
05:20 PM-05:35 PM	<b>False Position, Double False Position, and Cramer's Rule</b> Eugene Clayton Boman, Pennsylvania State University Harrisburg	01:20 PM-01:35 PM	<b>Empowering Student Learning in Mathematical Analysis</b> Barbara Shipman, University of Texas at Arlington; James Anthony Mendoza Epperson, University of Texas at Arlington
05:40 PM-05:55 PM	<b>Pi, e, and Prime Numbers</b> Joyati Debnath, Winona State University	01:40 PM-01:55 PM	<b>Geometry for Majors and Future Teachers</b> Thomas Q. Sibley, St. John's University
06:00 PM-06:15 PM	<b>The Enigmatic Gerolamo Cardano - Mathematician, Medical Doctor, Inventor, Food Critic, Gambler</b> Una Bray, Skidmore College	02:00 PM-02:15 PM	<b>Making History of Mathematics Relevant to Pre-Service Teachers</b> Angie Hodge, North Dakota State University
Getting Students Involved in Writing Proofs Session 1: Friday, August 7, 8:30 – 11:30 am		02:20 PM-02:35 PM	<b>Introducing Secondary Certification Students to Mathematical Modeling</b> Paul Taylor, Shippensburg University

02:40 PM-02:55 PM	<b>Empowering Secondary Teachers with the Power and Beauty of Mathematics</b> Joyati Debnath, Winona State University	05:30 PM-05:45 PM	<b>One-Room School House Mathematics Class</b> Paul McCreary, Evergreen State College
	Session 2: Saturday, August 8, 8:30 – 11:50 am	05:50 PM-06:05 PM	<b>The Structure of Student Dialogue in a Web-Assisted Mathematics Course</b> Zhongxiao Li, Georgia Gwinnett College
08:30 AM-08:45 AM	<b>Dynamic Visualization Tools for Multivariable Calculus</b> Paul Seeburger, Monroe Community College		Teaching Numerical Methods Friday, August 7, 3:00 – 6:20 pm
08:50 AM-09:05 AM	<b>Making Future Teachers Want to Learn College Mathematics</b> Tamas Szabo, University of Wisconsin - Whitewater	03:00 PM-03:15 PM	<b>Teach III-Conditioning In A Single Lecture!</b> Jeffrey L. Stuart, Pacific Lutheran University
09:10 AM-09:25 AM	<b>Modeling Effective Teaching of Probability and Statistics for Prospective/Current Teachers at Portland State University</b> Jeanette Palmiter, Portland State University; Jennifer Noll, Portland State University	03:20 PM-03:35 PM	<b>Google Power</b> Tim Chartier, Davidson College
09:30 AM-09:45 AM	<b>Some Useful Models to Use in a Euclidean Geometry Course</b> Brian Matthew Loft, Sam Houston State University	03:40 PM-03:55 PM	<b>How Animals Get Their Stripes? An Interdisciplinary Module for Numerical Analysis</b> Kathie Yerion, Gonzaga University
09:50 AM-10:05 AM	<b>Senior Capstone Experience for Mathematics Secondary Education Majors</b> Ernest Boyd, Minnesota State University, Mankato	04:00 PM-04:15 PM	<b>Finding Error Terms for Numerical Integration: Mean Value Theorem vs. Taylor's Theorem</b> Michelle Ghrist, U.S. Air Force Academy
10:10 AM-10:25 AM	<b>Using End of Semester Projects: Students As Teachers</b> Edwin Herman, University of Wisconsin-Stevens Point	04:20 PM-04:35 PM	<b>Numerical Approximation of Taylor Series in the Radius of Convergence</b> Atabong Timothy Agendia, Madonna University;
10:30 AM-10:45 AM	<b>Using Personal Response Systems to Focus Teaching on Representations and Conceptual Understanding of Mathematics</b> Kathryn Ernie, University of Wisconsin-River Falls	04:40 PM-04:55 PM	Ibeabuchi Benjamin B., Madonna University
10:50 AM-11:05 AM	<b>Teaching Abstract Algebra for Secondary Mathematics Education Majors</b> Yun Lu, Kutztown University of Pennsylvania	05:00 PM-05:15 PM	<b>Learning Numerical Methods Through Its History</b> Dick Jardine, Keene State College
11:10 AM-11:25 AM	<b>The Monte Carlo Method as an Educational Tool: Grade School to Graduate School</b> Manan Shah	05:20 PM-05:35 PM	<b>Proof by Computer: Logic and its Role in Numerical Analysis</b> Matthew Glomski, Marist College
11:30 AM-11:45 AM	<b>What is the Prime Factorization of a Factorial?</b> Mu-Ling Chang, University of Wisconsin, Platteville	05:40 PM-05:55 PM	<b>A Natural Derivation of Laguerre's Method</b> Aaron Melman, Santa Clara University
	Active and Innovative Learning Approaches for Pre-Service Mathematics Teachers at the K-12 and University Levels Friday, August 7, 2:30 – 6:10 pm	06:00 PM-06:15 PM	<b>Integrating Some New Methods in a Numerical Analysis Course</b> Adrian Ionescu, Wagner College
02:30 PM-02:45 PM	<b>Mathematics for Middle School Teachers: A Program of Activity-Based Courses</b> Joseph R. Ediger, Portland State University; Eva Thanheiser, Portland State University		<b>Computer Programming in Numerical Analysis</b> Ken Wiggins, Walla Walla University
02:50 PM-03:05 PM	<b>Research Experiences for Secondary Mathematics Teachers</b> Saad El-Zanati, Illinois State University; David Barker, Illinois State University		Biomathematics in the Undergraduate Curriculum Saturday, August 8, 1:00 – 4:20 pm
03:10 PM-03:25 PM	<b>Including Pre-Service Teachers in Mathematics Lesson Study</b> Elizabeth Burroughs, Montana State University; Jennifer Luebeck, Montana State University	01:00 PM-01:15 PM	<b>Integrating Biology into a Math Major Track Calculus 2 Course</b> Steven McKelvey, St. Olaf College
03:30 PM-03:45 PM	<b>Professionalization and the Exemplary Mathematics Teacher: Where's the Connection?</b> Velma Venetta Tyson, University of the Virgin Islands; Vanere Goodwin, University of the Virgin Islands	01:20 PM-01:35 PM	<b>Motivating Mathematical Content in Biocalculus Courses Using Biology</b> Timothy D. Comar, Benedictine University
03:50 PM-04:05 PM	<b>Designing, Implementing, and Evaluating a Teacher Training Workshop for New Graduate Mathematics Teaching Assistants</b> Jerome Trouba, Ferris State University	01:40 PM-01:55 PM	<b>Modeling in the Natural Sciences: Introducing Applied Mathematics at the Sophomore Level</b> Gretchen A. Koch, Goucher College
04:10 PM-04:25 PM	<b>Mathematics for Elementary Teachers: Using Virtual Manipulatives</b> Laurie J. Burton, Western Oregon University	02:00 PM-02:15 PM	<b>Introductory Mathematical Modeling at Humboldt State University</b> Borbala (Bori) Mazzag, Humboldt State University
04:30 PM-04:45 PM	<b>Computational Estimation Focus in a Number Systems Course for Pre-Service Elementary School Teachers</b> Maria Fung, Worcester State College; Christine Latulippe, California Polytechnic State University, Pomona	02:20 PM-02:35 PM	<b>Explorations in Mathematical Models in Biology</b> Mazen Shahin, Delaware State University
04:50 PM-05:05 PM	<b>Mathematics Tasks with Classroom Connections</b> Virginia (Ginny) L. Keen, University of Dayton	02:40 PM-02:55 PM	<b>Novel Pedagogical Resources Based on Protein Structure Analysis</b> Majid Masso, George Mason University
05:10 PM-05:25 PM	<b>Productive Discourse From Rich Tasks: The Example of the Double Spin Game</b> Robert Ely, University of Idaho; Jessica Strowbridge Cohen, University of Idaho	03:00 PM-03:15 PM	<b>Geometry and Biosurveillance</b> Jennifer Marie Franko, University of Scranton; Rachel Schwell, Central Connecticut State University
		03:20 PM-03:35 PM	<b>Real and Generic Population Data Without Best-Fitting Verhulst Growth Curves</b> Yves Nievergelt, Eastern Washington University
		03:40 PM-03:55 PM	<b>A Discussion between Lotka-Volterra Model and Elliptic Regression</b> Daniel Kim, Southern Oregon University
		04:00 PM-04:15 PM	<b>Teaching Bioinformatics/ Biomathematics at the Undergraduate Level</b> Atabong Timothy Agendia, Madonna University; Oyesanya M. O., University of Nigeria
			Graph Theory and Applications Saturday, August 8, 1:00 – 6:40 pm

# Appendix

01:00 PM-01:15 PM	<b>Set Colorings in Graphs</b> Raluca M. Gera, Naval Postgraduate School	09:45 AM-09:55 AM	<b>The Analysis of Casino Blackjack as a Supplement to the Teaching of Calculus</b> Richard Werthamer
01:20 PM-01:35 PM	<b>Maximal Irregular Colorings of Regular Graphs</b> Mark Anderson, Rollins College; Richard Vitray, Rollins College; Jay Yellen, Rollins College	10:00 AM-10:10 AM	<b>Assessing Clicker Examples Versus Board Examples in Calculus</b> Kimberly Anne Roth, Juniata College
01:40 PM-01:55 PM	<b>Evolutionary Games on Graphs</b> Stephen Devlin, University of San Francisco	10:15 AM-10:25 AM	<b>What's on Your Card? Information Students Perceive Will Help Them on a Calculus Exam</b> Ralph Alan Boedigheimer, United States Air Force Academy; Michael Brilleslyper, United States Air Force Academy; Kenneth Horton, United States Air Force Academy; Scott Williams, United States Air Force Academy; Hortensia Soto-Johnson, University of Northern Colorado
02:00 PM-02:15 PM	<b>A Counterexample for a Chromatic Uniqueness Theorem</b> Abdul Jalil M. Khalaf, Universiti Putra Malaysia; Yee-Hock Peng, Universiti Putra Malaysia	GCPS Session 2: Thursday, August 6, 8:30 – 10:30 am Moderators Linda Becerra, University of Houston-Downtown Ronald F. Barnes, University of Houston-Downtown	
02:20 PM-02:35 PM	<b>A Closure for Claw-Free Graphs</b> Bill Linderman, King College	08:30 AM-08:40 AM	<b>Cotton Bolls and Boll Weevils - A Summer Mathematics Institute in the Mississippi Delta</b> Leslie Horton, Delta State University
02:40 PM-02:55 PM	<b>Edge Geodetic Covers in the Cartesian Product of Graphs</b> Rochelleo Esios Mariano, Ateneo de Zamboanga University	08:45 AM-08:55 AM	<b>Technology and the Classroom: Teachers Discover How to Enhance Learning with Strategies</b> Amy Spears, Lindenwood University
03:00 PM-03:15 PM	<b>Turning Lights Out</b> Crista Arangala, Elon University	09:00 AM-09:10 AM	<b>Math, Murder, and Mystery: Mathematics and Detective Fiction</b> Charlotte Ann Knotts-Zides, Wofford College
03:20 PM-03:35 PM	<b>Graph Theory Applications in Code Analyses and Developing Software Test Strategies</b> Vladimir Riabov, Rivier College	09:15 AM-09:25 AM	<b>Mathematics in Movies and Television Shows</b> Elana Epstein, St. Joseph's College
03:40 PM-03:55 PM	<b>Characterizations of Cop-Win Graphs</b> Nancy E. Clarke, Acadia University; Gary MacGillivray, University of Victoria	09:30 AM-09:40 AM	<b>A Perspective on the History of Mathematics</b> Mary B. Walkins, Lee University
04:00 PM-04:15 PM	<b>Considering Symmetries of the Middle Levels: An Interesting Approach to a Special Case</b> Dov Zakis, University of California, San Diego	09:45 AM-09:55 AM	<b>Bounds on the Roots of the Steiner Polynomial</b> Madeleine Jetter, California State University, San Bernardino
04:20 PM-04:35 PM	<b>Extensions of Newman's Conjecture and Applications to Prime Trees</b> Ben Small, Seattle University; Leanne Robertson, Seattle University	10:00 AM-10:10 AM	<b>Did Humidifying the Ball Cut Down on Home Runs at Coors Stadium?</b> Howard Penn, United States Naval Academy
04:40 PM-04:55 PM	<b>Prism Complement Hamiltonian Graphs</b> Jonathan Adler, Worcester Polytechnic Institute; Nicholas LeCompte, Worcester Polytechnic Institute; Peter Christopher, Worcester Polytechnic Institute	10:15 AM-10:25 AM	<b>What Mathematics Should be Taught to Gifted Secondary School Students, and How?</b> Thomas Schroeder, State University of New York at Buffalo
05:00 PM-05:15 PM	<b>The Genus of a Zero-Divisor Graph</b> Cameron Wickham, Missouri State University	GCPS Session 3: Thursday, August 6, 1:00 – 6:30 pm Moderators Madeleine Jetter, California State University, San Bernardino Philip Todd, Saltire Software Erin Skjelstad, Texas Tech University Jerry Dwyer, Texas Tech University Kimberly Anne Roth, Juniata College Monika Vo, Saint Leo University	
05:20 PM-05:35 PM	<b>The Radio Number of Ladder Graphs</b> Josefina Flores	01:00 PM-01:10 PM	<b>Calculus II Students' Motivation and Instructors' Teaching Styles</b> Erin Skjelstad, Texas Tech University; Jerry Dwyer, Texas Tech University
05:40 PM-05:55 PM	<b>Threshold Graphs, Linear Forests, and Hamiltonian Paths</b> Jennifer Gorman, Gannon University	01:15 PM-01:25 PM	<b>Using Toilet Paper to Help Students Make Generalizations</b> Martha Ellen Waggoner, Simpson College
06:00 PM-06:15 PM	<b>A Methodology for Converting a Two-Way Road Network to a One-Way Road Network</b> Sin-Chye Lew, SIM University	01:30 PM-01:40 PM	<b>Primary Trait Analysis to Assess a Learner-Centered, Upper-Level Mathematics Course</b> Salar Alsardary, University of the Sciences in Philadelphia
06:20 PM-06:35 PM	<b>On Groups Admitting a Cayley Prism Mapping</b> Kathryn Weld, Manhattan College	01:45 PM-01:55 PM	<b>Numerical Calculations With Internet Explorer Scripts and Google Flot</b> Thai-Duong Tran, Huston-Tillotson University
<b>General Contributed Paper Sessions</b>		02:00 PM-02:10 PM	<b>An Euler-Cauchy Surprise</b> Doreen De Leon, California State University, Fresno
GCPS Session 1: Thursday, August 6, 8:30 – 10:30 am Moderators Bryan Nankervis, Texas State University - San Marcos John L. Simons, University of Groningen		02:15 PM-02:25 PM	<b>Visual Group Theory</b> Nathan Carter, Bentley University
08:30 AM-08:40 AM	<b>An Investigation into Precalculus Students' Conceptions of Angle Measure and Trigonometric Functions</b> Kevin Charles Moore, Arizona State University	02:30 PM-02:40 PM	<b>Estimating the Hidden Shape</b> Jiyeon Suh, Grand Valley State University
08:45 AM-08:55 AM	<b>AP-Calculus: What College Faculty Need to Know, I</b> Stephen Davis, Davidson College; Michael Boardman, Pacific University		
09:00 AM-09:10 AM	<b>AP-Calculus: What College Faculty Need to Know, II</b> Michael Boardman, Pacific University; Stephen Davis, Davidson College		
09:15 AM-09:25 AM	<b>Find Your Team: Content Team-Forming Activities for Calculus Class</b> Martha Allen, Georgia College and State University; Amy Kelley, Georgia College and State University		
09:30 AM-09:40 AM	<b>Global Warming in Calculus One</b> Jane McDougall, Colorado College		



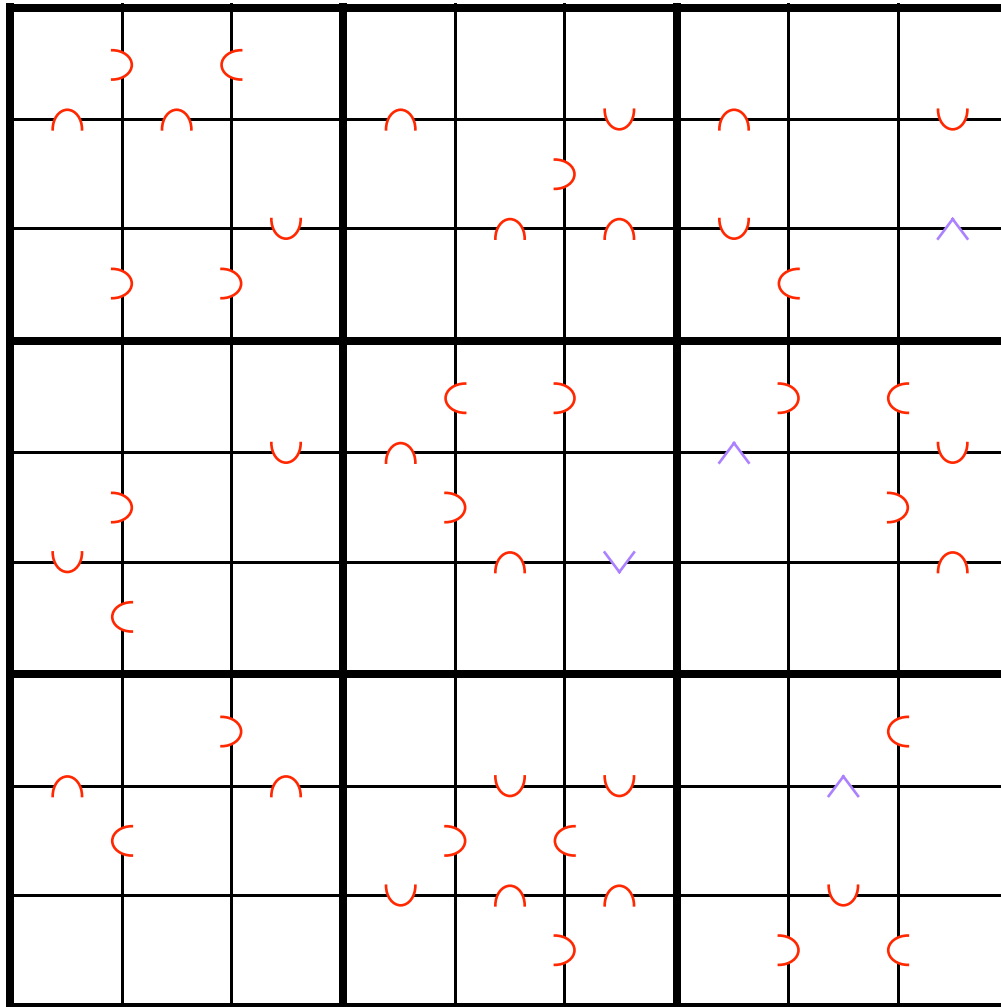
03:00 PM-03:10 PM	<b>Investigating the Parameters <math>\mu(D)</math> and <math>k(D)</math> of Diatance Graph Coloring with Undergraduates</b> Min-Lin Lo, California State University, San Bernardino
03:15 PM-03:25 PM	<b>Lessons Learned from Leading First Undergraduate Research Team in Applied Statistics</b> Sara Crawford, Valparaiso University
03:30 PM-03:40 PM	<b>Elementary Geometry in Parabolic Reflections</b> Alex Michael Turzillo
03:45 PM-03:55 PM	<b>From Inductive Reasoning to Proof by Induction With Geometry Expressions</b> Philip Todd, Saltire Software
04:00 PM-04:10 PM	<b>Ramanujan, Quadratic Forms and the Sum of Three Cubes</b> James Dale Harper, Central Washington University
04:15 PM-04:25 PM	<b>Index Theory and Its Applications</b> Fangyun Yang, University of California, Riverside
04:30 PM-04:40 PM	<b>A Numerical Algorithm for Solving Nonlinear Integral Equations</b> Shishen Sam Xie, University of Houston-Downtown
04:45 PM-04:55 PM	<b>A “No-Go” Theorem for the Existence of a Discrete Action Principle</b> Gianluca Caterina, Endicott College
05:00 PM-05:10 PM	<b>Non-Trivial Motivational Study Cases for the College Courses in Introductory Mathematics</b> Vladimir Riabov, Rivier College
05:15 PM-05:25 PM	<b>An Intuitive Proof of the Singular Value Decomposition of a Matrix</b> Keith James Coates, Drury University Department of Math and Comp. Sci.
05:30 PM-05:40 PM	<b>A Mathematical Model for the Healing Process of Wrist Injuries</b> Joe Latulippe, California Polytechnic State University, Pomona; Randy Sierra, California Polytechnic State University, Pomona
05:45 PM-05:55 PM	<b>Inequalities through Geometry</b> Anand Kumar, Ramanujan School of Mathematics
06:00 PM-06:10 PM	<b>Separating H-sets With Open Sets</b> Mohan Tikoo, Southeast Missouri State University
06:15 PM-06:25 PM	<b>Error Estimators in Solving Systems of Second-Order Hyperbolic Partial Differential Equations by Finite Element Method of Lumped Masses</b> Md. Ziaul Haque, Fisk University
<p>GCPS Session 4: Friday, August 7, 8:30 am – 12:00 pm Moderators Jane McDougall, Colorado College Michael Johnson, Meredith College Kyle Riley, South Dakota School of Mines and Technology Jay Lawrence Schiffman, Rowan University</p>	
08:30 AM-08:40 AM	<b>Set Theory: Cantor’s Creation and Its Ramifications</b> Linda Becerra, University of Houston-Downtown; Ronald F. Barnes, University of Houston-Downtown
08:45 AM-08:55 AM	<b>The Allure of Numerical Methods for PDEs</b> Kyle Riley, South Dakota School of Mines and Technology
09:00 AM-09:10 AM	<b>Lobb’s Generalization of Catalan’s Parenthesization Problem Revisited</b> Thomas Koshy, Framingham State College
09:15 AM-09:25 AM	<b>Divisibility And Periodicity Ideas in the Fibonacci and Lucas Sequences</b> Jay Lawrence Schiffman, Rowan University
09:30 AM-09:40 AM	<b>Incorporating a Functions Approach in a Traditional Freshman Algebra class</b> Gowribalan Vamadeva, University of Cincinnati
09:45 AM-09:55 AM	<b>A Comparative Study of Learning College Algebra in Non-Traditional Higher Education Programs</b> Darcel Ford, Strayer University

10:00 AM-10:10 AM	<b>A Two-Year Case Study of NCAT’s Supplemental Model: Reversing the Pattern of Low Performance in College Algebra Using Modularity and Technology</b> A. Dale Magoun, University of Louisiana at Monroe; Charlotte Owens, University of Louisiana at Monroe; Azime S. Saydam, University of Louisiana at Monroe
10:15 AM-10:25 AM	<b>Methodical Intricacies in Designing Online Courses from Developmental Mathematics to Elementary Statistics</b> A. Dale Magoun, University of Louisiana at Monroe; Charlotte Owens, University of Louisiana at Monroe; Azime S. Saydam, University of Louisiana at Monroe
10:30 AM-10:40 AM	<b>How and Why a History of Mathematics Class Can Work Online?</b> Monika Vo, St. Leo University
10:45 AM-10:55 AM	<b>Utilizing Web-based Statistical Resources in Teaching Nontraditional Undergraduate Students in Online Learning Environments</b> Michael D. Miner, American Public University System
11:00 AM-11:10 AM	<b>Using Multimedia to Gauge Understanding in an On-Line Graduate Course</b> Donna Flint, South Dakota State University
11:15 AM-11:25 AM	<b>Why We Should Not Be Teaching One-Sided Hypothesis Tests in a First Statistics Course</b> Michael Johnson, Meredith College
11:30 AM-11:40 AM	<b>Research Results for Underprepared Students in a Redesigned College Algebra Course</b> Marva Lucas, Middle Tennessee State University; Nancy J. McCormick, Middle Tennessee State University
11:45 AM-11:55 AM	<b>Making Connections Within Mathematics in Finite or Liberal Arts Mathematics Courses</b> Robert F. Fliess, West Liberty University
<p>GCPS Session 5: Friday, August 7, 1:00 – 6:30 pm Moderators Michael D. Miner, American Public University System Darcel Ford, Strayer University Timothy M. Bergquist, Northwest Christian University Mary B. Walkins, Lee University Amy Spears, Lindenwood University Min-Lin Lo, California State University, San Bernardino</p>	
01:00 PM-01:10 PM	<b>Using M&amp;Ms and Excel to Have Fun with Statistics</b> Timothy M. Bergquist, Northwest Christian University
01:15 PM-01:25 PM	<b>Interdisciplinary Research with Undergraduates</b> Borbala (Bori) Mazzag, Humboldt State University
01:30 PM-01:40 PM	<b>Finances 101: Teaching Finances in Mathematics Courses</b> Magdalena Luca, Massachusetts College of Pharmacy and Health Sciences
01:45 PM-01:55 PM	<b>Introducing Pre-Service Elementary Teachers to the Angles of Parallel Lines using Sketchpad</b> Gayle M. Millsaps, Purdue University Calumet
02:00 PM-02:10 PM	<b>Sexy Logic: Running a Math Learning Community</b> Michael Diehl, Endicott College
02:15 PM-02:25 PM	<b>Japan’s Ten Year Experiment: What Can We Learn from It?</b> Kazuko Ito West, Keio Academy of New York
02:30 PM-02:40 PM	<b>Program Assessment in Mathematics and Statistics: Will My Institution Pass an Accreditation Review?</b> Carol Vobach, University of Houston-Downtown; Linda Becerra, University of Houston-Downtown
02:45 PM-02:55 PM	<b>The Theory and Application of Fractional Derivatives</b> Ashley Marie Lorenz, Kent State University; Aloysius Bathi Kasturiarachi, Kent State University
03:00 PM-03:10 PM	<b>Beyond Classic: Unified Law of Conservation of Kinetic Energy and Linear Momentum</b> Roland Shen, Olympia Institute and Gunn High School
03:15 PM-03:25 PM	<b>Cycles of the Generalized Collatz Problem</b> John L. Simons, University of Groningen
03:30 PM-03:40 PM	<b>Using Mathematics to Teach the Art of Argument and Rhetoric</b> Micol Hammack, Virginia Commonwealth University

# Appendix

03:45 PM-03:55 PM	<b>Gender Inequities in University Admissions Due to the Differential Validity of the SAT</b> Bryan Nankervis, Texas State University - San Marcos	11:15 AM-11:25 AM	<b>Balanced Modular Tableaux</b> Kendra Killpatrick, Pepperdine University; Kristina Garrett, St. Olaf College
04:00 PM-04:10 PM	<b>Stability Analysis of Gross Domestic Product</b> Marvin Quenten Jones Jr., North Carolina A&T State University	11:30 AM-11:40 AM	<b>The Mathematical Fiction and Exposition of Rudy Rucker</b> Jeff Johannes, State University of New York at Geneseo
04:15 PM-04:25 PM	<b>Three-Dimensional Rotations: A Mathematical Playground</b> Orlin Stoytchev, American University in Bulgaria	11:45 AM-11:55 AM	<b>Wiki Technology Facilitates Math Writing Course</b> Gene Klotz, Swarthmore College
04:30 PM-04:40 PM	<b>Lagrangian Submanifolds in N-Dimensional Complex Euclidean Spaces</b> Yun Myung Oh, Andrews University	GCPS Session 7: Saturday, August 8, 1:15 – 5:45 pm Moderators Michael Boardman, Pacific University Stephen Davis, Davidson College Donna Flint, South Dakota State University Jim Fulmer, University of Arkansas at Little Rock Jack G. Mealy, Austin College Michael Townsend, University of Washington	
04:45 PM-04:55 PM	<b>Introducing Clickers into Mathematics Classes: A Step Toward More Active Learning</b> Cynthia L. McCabe, University of Wisconsin-Stevens Point	01:15 PM-01:25 PM	<b>Strengthening Mathematics Knowledge with Streaming Video</b> Virginia (Ginny) L. Keen, University of Dayton
05:00 PM-05:10 PM	<b>A Mathematics Program Without a Mathematics Department</b> Jeff Hildebrand, Georgia Gwinnett College	01:30 PM-01:40 PM	<b>A Law-School Quantitative Methods Course</b> Michael Townsend, University of Washington
05:15 PM-05:25 PM	<b>Eigenvalues and Eigenvectors: What Do Students Say About Them?</b> Gulden Karakok, Umea University	01:45 PM-01:55 PM	<b>Creating a Culture of Pedagogical Learning</b> Fumiko Futamura, Southwestern University
05:30 PM-05:40 PM	<b>Number Theory in Sound Diffusion</b> Elizabeth Mathai, Norwich University	02:00 PM-02:10 PM	<b>Cross-Institutional Implementation of Supplemental Instruction (preliminary report)</b> Gabriela Schwab, El Paso Community College; Helmut Knaust, University of Texas at El Paso; Emil Daniel Schwab, University of Texas at El Paso
05:45 PM-05:55 PM	<b>Power Plant System Identification Using Inferential Statistics: Towards Feasible and Efficient Optimization</b> John Doty, University of Dayton	02:15 PM-02:25 PM	<b>Enumeration of the Distinct Shuffles of Permutations</b> Camillia Smith Barnes, Sweet Briar College
06:00 PM-06:10 PM	<b>Teach Concepts First, Then How to Use Them</b> Herman Rubin, Purdue University	02:30 PM-02:40 PM	<b>The Mathematical Uses and Philosophical Aspects of Downward Reflection</b> Sean Cox, University of California, Irvine
06:15 PM-06:25 PM	<b>The Linda Hall Library of Science, Engineering, and Technology: Kansas City's Best Kept Secret</b> Charlie Smith, Park University	02:45 PM-02:55 PM	<b>A Generating Function for Lobb's Double Sequence</b> Mohammad Salmassi, Framingham State College
GCPS Session 6: Saturday, August 8, 8:30 am – 12:00 pm Moderators Charlotte Ann Knotts-Zides, Wofford College Howard Penn, United States Naval Academy Muhammad Usman, University of Dayton Thomas Q. Sibley, St. John's University		03:00 PM-03:10 PM	<b>Generalized Composition of Formal Power Series and Its Applications</b> Xiao-Xiong Gan, Morgan State University
08:30 AM-08:40 AM	<b>Teaching Numerical Methods as Interdisciplinary Subject</b> Muhammad Usman, University of Dayton	03:15 PM-03:25 PM	<b>Knots, Quandles, and the Constraint Satisfaction Problem</b> Robert W McGrail, Bard College
08:45 AM-08:55 AM	<b>Puzzling Groups</b> Thomas Q. Sibley, St. John's University	03:30 PM-03:40 PM	<b>Method for Determining the Minimum Number of Primes Between the Perfect Squares of Consecutive Integers</b> William Oscarson, Aerospace Engineering
09:00 AM-09:10 AM	<b>Discovering the Art of Mathematics</b> Philip Kneil Hotchkiss, Westfield State College; Christine von Renesse, Westfield State College	03:45 PM-03:55 PM	<b>Optical Solitons in a Non-Kerr Law Media with Inter-Modal Dispersion</b> Anjan Biswas, Delaware State University
09:15 AM-09:25 AM	<b>A Japanese Temple Problem</b> David Richeson, Dickinson College	04:00 PM-04:10 PM	<b>Parameter Regions of Interacting Species using Resultant Theory</b> Douglas Magomo, Northland College
09:30 AM-09:40 AM	<b>The ABC's of Problem Solving: A Capstone Course for Pre-Service Elementary Teachers</b> Janet Nichols, Colorado State University-Pueblo; Janet Heine Barnett, Colorado State University-Pueblo	04:15 PM-04:25 PM	<b>Positive Steady State Solutions of General Cooperation or Predator-Prey Biological Model</b> Joon H. Kang, Andrews University
09:45 AM-09:55 AM	<b>Using Proofs without Words to Explore the Pythagorean Theorem</b> Jim Fulmer, University of Arkansas at Little Rock; Thomas McMillan, University of Arkansas at Little Rock	04:30 PM-04:40 PM	<b>Solution of the System of Linear Fredholm Integral Equations of the Second Kind Using Modified Homotopy Perturbation Method</b> Kawa Mustafa Aziz, Salahaddin University
10:00 AM-10:10 AM	<b>Infinite Processes and Sets in the Learner's Mind</b> Robert Ely, University of Idaho; Jodi Frost, University of Idaho	04:45 PM-04:55 PM	<b>The Operator Connecting the SCSV 3-Vertex and the Comma 3-Vertex</b> Abdulmajeed M. Abdurrahman, Shippensburg University; Alan Cresswell, Shippensburg University
10:15 AM-10:25 AM	<b>Area Estimates for Paracycles in Snell Geometries</b> Jack G Mealy, Austin College; Shannon Mulligan, Austin College	05:00 PM-05:10 PM	<b>The Sine of a Single Degree</b> Robert Travis Kowalski, South Dakota School of Mines and Technology
10:30 AM-10:40 AM	<b>A Suspension of the Hénon Map by Periodic Orbits</b> John Starrett, New Mexico Institute of Mining and Technology	05:15 PM-05:25 PM	<b>What is the Mathematically Correct Interpretation of Probability in Quantum Mechanics?</b> Ilhan Michael Izmirli, American University
10:45 AM-10:55 AM	<b>Supplement to Tarski's Collected Papers</b> James Thomas Smith, San Francisco State University	05:30 PM-05:40 PM	<b>The Longitudinal Evaluation Study of National Research Experience for Undergraduates Program (NREUP) and Preliminary Results</b> Gulden Karakok, Umea University; Ching-Chia Ko, Oregon State University
11:00 AM-11:10 AM	<b>Trajectory and Flow Properties: Spheroids in Stokes Flow</b> Terry Jo Leiterman, St. Norbert College		

# MathFest 2009 Sudoku



## Division Sudoku rules

Fill in the grid so that the numbers 1 through 9 each appear exactly once in each row, column, and block. In addition, each time a cell's value divides one of its neighbors within a block, the dividing line is marked with a symbol; "A C B" indicates that the value A evenly divides the value B, or, to put it another way, A goes into B with no remainder. A few "greater than" (>) symbols are also provided.

Puzzle courtesy of Laura Taalman/Brainfreeze Puzzles  
brainfreezepuzzles.com.

*Solution to the puzzle will be available on MAA Online next week.*



# Thank You MathFest Sponsors

The Mathematical Association of America would like to thank our 2009 Sponsors for so generously contributing to the success of MathFest.

## Hawkes Learning Systems

Name Badge Lanyards

Booth #1 and 2



## Maplesoft

2009 Meeting Bags

Booth #3



## Brooks/Cole Cengage Learning

5K Fun Run/Walk

Booth #37



## Texas A&M University

5K Fun Run/Walk

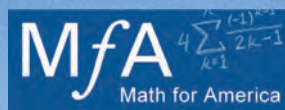
Booth #13



## Math for America

Hotel Keycards

Booth #19



## National Association of Math Circles

Math Jeopardy

Booth #38

