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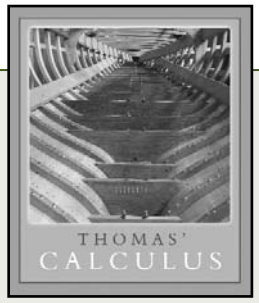

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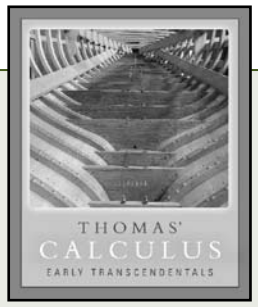

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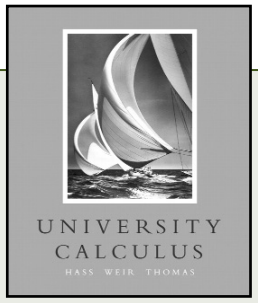

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The calculus in Thomas has not changed. But your students have. Thomas responds to the needs of today's instructors and students through:

- **Clear and precise art that helps students visualize concepts**
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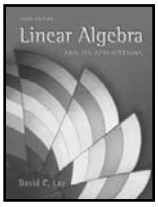
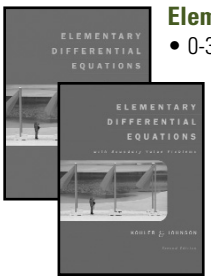


Linear Algebra, 3e Update

Lay • 0-321-28713-4

Lay introduces concepts early in a familiar, concrete Rn setting, develops them gradually, and returns to them repeatedly throughout the text so that finally, when discussed in the abstract, these concepts are more accessible to students. The updated Third Edition includes two new chapters, available on the web, and a system of icons that directs students to additional resources that will help them understand the material.

Kohler/Johnson Differential Equations Series



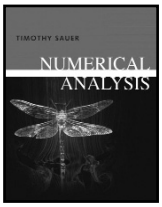
Elementary Differential Equations, 2e

• 0-321-39849-1

Elementary Differential Equations with Boundary Value Problems, 2e

• 0-321-39850-5

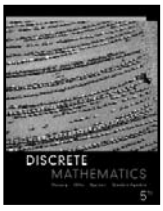
These texts seamlessly integrate the underlying theory, solutions, procedures, and numerical/computational aspects of differential equations providing the necessary framework to understand and solve differential equations.



Numerical Analysis with CD-ROM

Sauer • 0-321-26898-9

Numerical Analysis, helps the student gain a deeper understanding of numerical analysis by highlighting the five major ideas of the course: Convergence, Complexity, Conditioning, Compression, and Orthogonality and connecting back to them throughout the text.



Discrete Mathematics, 5e

Dossey • Otto • Spence • Vanden Eynden • 0-321-30515-9

With a strong algorithmic emphasis, *Discrete Mathematics* helps students tie together seemingly unrelated material under one unifying theme.

For a complete list of titles, please visit **www.aw-bc.com/math**.

If you are interested in a copy of any of these titles, please contact your Addison-Wesley representative or email **exam@aw.com**.

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Letter

Dear Colleagues, Students, and Friends,

Welcome to MathFest 2006! Knoxville is a fabulous setting for MathFest and this year's program is packed with mathematical addresses, and a variety of education and curricular sessions. Your social calendar will be brimming with fun events such as the Tennessee Riverboat Dinner Cruise, the Tour of Cades Cove/Smoky Mountains, and the Appreciation Banquet for Don Albers. MathFest is a casual meeting where you will be able to enjoy your colleagues in a relaxed and informal setting; and you can meet our newest colleagues who have been selected as this year's Project NExT Fellows.

The prestigious Hedrick Lectures will be given by W.T. Gowers, and Francis Edward Su will deliver the James R.C. Leitzel Lecture. Invited Addresses, such as these, are held sequentially in the morning, but in the afternoon you will be in the difficult position of choosing from a variety of Invited Paper Sessions, Contributed Paper Sessions, Minicourses, Special Programs, and Student Activities.

Highlights of the full program for students include the popular PME J. Sutherland Frame Lecture by Donald Saari, and the MAA Student Lecture by Richard Tapia.

In between all the events you'll have plenty of opportunity to talk to colleagues and explore Knoxville and the surrounding areas. Check the registration area for information about local sights and popular restaurants. Don't forget to visit the MathFest Exhibit Hall in the Knoxville Convention Center, which will feature a wide selection of publications and technology in mathematics and related fields.

Our meeting begins at the Opening Banquet on Wednesday, August 9th at 6:30 pm with Art Benjamin as our featured speaker. I hope to see you there!

Warm Regards,

Carl C. Cowen
President
The Mathematical Association of America

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Policy for Recording or Broadcasting of MAA Events

The recording or broadcasting of any MAA sponsored events, including but not limited to proceedings at sectional and national meetings, workshops, mini-courses, short-courses, and colloquia, is strictly forbidden without the explicit written permission of the Mathematical Association of America.

Schedule of Events

MONDAY, AUGUST 7TH

11:00 am – 5:00 pm	**Project NExT Registration**	4th Floor Lobby University of Tennessee Conference Center
1:30 pm – 9:00 pm	**Project NExT Workshop** (for 2006-2007 Fellows)	4th Floor University of Tennessee Conference Center

TUESDAY, AUGUST 8TH

8:00 am – 5:00 pm	**Project NExT Registration**	4th Floor Lobby University of Tennessee Conference Center
8:30 am – 5:25 pm	**Project NExT Workshop** (for 2006-2007 Fellows)	4th Floor University of Tennessee Conference Center
9:00 am – 5:00 pm	**Part 1: Two-Day Short Course** **Environmental Modeling** Ben Fusaro, Florida State University	Sequoyah 3, Hilton

WEDNESDAY, AUGUST 9TH

8:00 am – 5:00 pm	**MAA Board of Governors**	Salon CD&E Hilton
8:00 am – 5:00 pm	**Project NExT Registration**	4th Floor Lobby University of Tennessee Conference Center
8:15 am – 5:30 pm	**Project NExT Workshop** (for 2006-2007 Fellows)	4th Floor University of Tennessee Conference Center
9:00 am – 4:00 pm	**Great Smoky Mountains Arts and Crafts Community Tour**	Cumberland Avenue Entrance Knoxville Convention Center
9:00 am – 5:00 pm	**Part 2: Two-Day Short Course** **Environmental Modeling** Ben Fusaro, Florida State University	Sequoyah 3, Hilton

4:30 pm – 5:30 pm	**MAA/PME Student Reception**	Salon A, Hilton
5:30 pm – 7:15 pm	**Math Jeopardy** John Harris, Furman University	Salon A&B, Hilton
6:30 pm – 7:30 pm	**Opening Reception**	Great Smoky Mountain Center Hilton
7:30 pm – 9:30 pm	**Opening Banquet** Speaker: Arthur Benjamin, Harvey Mudd College Emcee: Edward Burger, Williams College	Salon CD&E, Hilton

THURSDAY, AUGUST 10TH

8:30 am – 9:20 am	**MAA Invited Address** **The Circle (and Knot and Link) of Life: How Topology Untangles Knotty DNA Questions** Dorothy Buck, Imperial College London	Ballroom AB&C Knoxville Convention Center
9:00 am - 5:00 pm	**Exhibits and Book Sales**	Ballroom EF&G Knoxville Convention Center
9:00 am - 5:00 pm	**Student Hospitality Center** Richard and Araceli Neal, American Society for the Communication of Mathematics	Ballroom EF&G Knoxville Convention Center
9:30 am - 10:20 am	**Hedrick Lecture Series** **What is Arithmetic Combinatorics Lecture 1: The Background: Some Theorems and Open Problems in Number Theory, Analysis, and Combinatorics** W.T. Gowers, Cambridge University	Ballroom AB&C Knoxville Convention Center
10:30 am – 11:20 am	**MAA Invited Address** **Some Open Questions About Convex Polyhedra** Jesus A. De Loera, University of California Davis	Ballroom AB&C Knoxville Convention Center
1:00 pm – 1:50 pm	**MAA Student Lecture** **Math at Top Speed: Exploring and Breaking Myths in Drag Racing Folklore** Richard Tapia, Rice University	Ballroom C Knoxville Convention Center
1:00 pm – 2:20 pm	**Panels and Other Sessions** **Geometry in the High School Curriculum** Johnny Lott, University of Montana-Missoula	301 A Knoxville Convention Center
1:00 pm – 2:20 pm	**Panels and Other Sessions** **Making the Connection Between Research and Teaching in Undergraduate Mathematics: A Sample of Chapters from a Forthcoming Book on Mathematics Education Research** Chris Rasmussen, San Diego State University David E. Meel, Bowling Green State University Michael Oehrtman, Arizona State University	Ballroom A Knoxville Convention Center

Schedule of Events

1:00 pm – 2:20 pm

Panels and Other Sessions

Workshop on Training T.A.'s `
David Manderscheid, University of Iowa

301 D
Knoxville Convention Center

1:00 pm – 3:00 pm

Contributed Paper Session

Current Issues in Mathematics Education, Part I
Carol Vobach, University of Houston-Downtown
Nancy Leveille, University of Houston-Downtown

301 C
Knoxville Convention Center

1:00 pm — **Motivating Preservice Teachers Deep Mathematics Understanding**
Tracie Salinas, Appalachian State University

1:15 pm — **Geometric Structures for Elementary Teachers**
Doug Aichele, Oklahoma State University

1:30 pm — **Can Your Students Speak Fractions?**
Andrew Wilson, Austin Peay State University

1:45 pm — **Specialized Understanding of Mathematics**
Meg Moss, Pellissippi State Technical Community College

2:00 pm — **Mathematical Questions From the Classroom**
Wendy Weber, Central College

2:15 pm — **Do Preservice Teachers Know Pre-College Math?**
John Lorch, Ball State University

2:30 pm — **High School Mathematics From a Higher Point of View**
Michel Helfgott, East Tennessee State University

2:45 pm — **Teacher Preparation in a Math Research Department**
Theodore Gamelin, University of California at Los Angeles

1:00 pm – 3:00 pm

Contributed Paper Session

Examples That Use Abstract Algebra in Other Disciplines in Mathematics
Tyler J. Evans, Humboldt State University

300 D
Knoxville Convention Center

1:00 pm — **Check-Digit Schemes and Dihedral Groups**
Thomas Koshy, Framingham State College

1:20 pm — **PascGalois Activities for a Number Theory Class**
Kurt Ludwick, Salisbury University

1:40 pm — **Using Algebra to Enumerate Sudoku Puzzles**
John Lorch, Ball State University
Crystal Lorch, Ball State University

2:00 pm — **Using Magic Squares in Linear and Abstract Algebra**
Victor Terrana, Newberry College

	2:20 pm	**Multiple Harmonic Sums** Jianqiang Zhao, Eckerd College	
	2:40 pm	**All Matrices are Nearly Diagonalizable** Charles Hampton, The College of Wooster	
1:00 pm – 3:00 pm		**Invited Paper Session** **Inquiry Based Learning – The Next Generation** Edward B. Burger, Williams College	**Ballroom B** **Knoxville Convention Center**
	1:00 pm	**Teaching Independent Thinking** Michael Starbird, The University of Texas at Austin	
	1:30 pm	**Inquiry Based Learning at the University of Michigan** Dick Canary, University of Michigan	
	2:00 pm	**Good Questions for Mathematics Education** Maria Terrell, Cornell University	
	2:30 pm	**A Crash Course on How Not to Teach** Edward Burger, Williams College	
1:00 pm – 3:00 pm		**Contributed Paper Session** **Fun and Innovative Techniques For an Abstract Algebra Class, Part I** Sharon M. Clarke, Pepperdine University Andrew Hetzel, Tennessee Technological University	**301 B** **Knoxville Convention Center**
	1:00 pm	**Transposition Musical Chairs** Bill Yankosky, North Carolina Wesleyan College	
	1:25 pm	**Group Theory and "Lights Out"** Darren Parker, University of Dayton	
	1:50 pm	**Social Activities for Groups and Rings** Su Chi Wen, Monmouth University	
	2:15 pm	**Fostering Familiarity With Examples** Karen Aucoin, McNeese State University	
	2:40 pm	**Three Activities in My Abstract Algebra Course** Allen Hibbard, Central College	
1:00 pm – 3:00 pm		**Minicourse #1: Part 1** **Euler** William W. Dunham, Muhlenberg College Edward C. Sandifer, Western Connecticut State University	**300 A** **Knoxville Convention Center**
1:00 pm – 3:00 pm		**Minicourse #2: Part 1** **Infusing Connections into Core Courses for Secondary Teachers** Steve R. Benson, Education Development Center and University of New Hampshire Karen J. Graham, University of New Hampshire	**300 B** **Knoxville Convention Center**

Schedule of Events

THURSDAY, AUGUST 10TH CONTINUED

1:00 pm – 4:40 pm — **Invited Paper Session** — **301 E, Knoxville Convention Center**

Computational Convexity and its Applications
Jesus De Loera, University of California Davis
Tyrrell McAllister, University of California Davis

1:00 pm — **Enumerating Integer-Points in Polytopes: Applications to Number Theory**
Matthias Beck, San Francisco State University

1:45 pm — **Convex Polyhedra and Representation Theory**
Tyrrell McAllister, Univeristy of California Davis

2:30 pm — **Convexity, and Phase Transitions for Detecting Real Roots**
Maurice Rojas, Texas A&M

3:15 pm — **Combinatorial Problems and Computational Convexity**
James Lawrence, George Mason University

4:00 pm — **Projection Functions of Convex Bodies**
Paul Goodey, University of Oklahoma

1:00 pm – 3:00 pm — **General Contributed Paper Session 1** — **300 C, Knoxville Convention Center**

Charles Ashbacher, Kirkwood Community College
Sarah Mabrouk, Framingham State College

1:00 pm — **Roller Coasters and the Mathematics Behind Them**
Meredith Greer, Bates College

1:15 pm — **Math Teaching Efficacy of Future Elem. Teachers**
Kathryn T. Ernie, University of Wisconsin - River Falls

1:30 pm — **Discussing Statistics Online**
Sarah Mabrouk, Framingham State College

1:45 pm — **Are Diagrams Worth a 1000 Words?**
Heather Dye, United States Military Academy

2:00 pm — **Using Labs in Trigonometry**
Michael Dobranski, Morehead State University

2:15 pm — **The Mathematics Major in the U.S., 1945-1995**
Chuck Lindsey, Florida Gulf Coast University

2:30 pm — **Integration Bees: A Team Competition**
Stephanie Edwards, University of Dayton

2:45 pm — **Online Java Package IAPPGA for Graph Algorithms**
Mingshen Wu, University of Wisconsin-Stout

2:00 pm - 4:00 pm	**MAA Student Paper Sessions #1**	**200 A** **Knoxville Convention Center**
2:00 pm - 4:00 pm	**MAA Student Paper Sessions #2**	**200 B** **Knoxville Convention Center**
2:00 pm - 4:00 pm	**MAA Student Paper Sessions #3**	**200 C** **Knoxville Convention Center**
2:00 pm - 4:00 pm	**PME Student Paper Sessions #1**	**200 D** **Knoxville Convention Center**
2:00 pm - 4:00 pm	**PME Student Paper Sessions #2**	**200 E** **Knoxville Convention Center**
2:15 pm – 5:15 pm	**Invited Paper Session** **Isoperimetric Problems** Frank Morgan, Williams College	**Ballroom C** **Knoxville Convention Center**
2:30 pm – 3:50 pm	**Panels and Other Sessions** **Several Perpsectives on Quantitative Literacy in the Undergraduate Program** Caren Diefenderfer, Hollins University	**Ballroom A** **Knoxville Convention Center**
2:30 pm – 5:00 pm	**MAA Section Officers Meeting**	**Salon CD&E, Hilton**
2:30 pm – 5:15 pm	**Contributed Paper Session** **Mathematics and Sports and Games** Howard Penn, U.S. Naval Academy E. Lee May, Salisbury University	**301 A** **Knoxville Convention Center**
2:30 pm	**Which Ballparks are Homer Friendly, Part II** Howard Penn, U.S. Naval Academy	
2:50 pm	**Thoughts on Teaching "Statistics Through Baseball" as a Liberal-Arts Mathematics Topic** E. Lee May, Jr., Salisbury University	
3:10 pm	**Recursive Games in First-Year Discrete Mathematics** Doug Ensley, Shippensburg University of Pennsylvania	
3:30 pm	**Some Mathematical Aspects of the Game of Go** Peter Schumer, Middlebury College	
3:50 pm	**Analyzing Farkel: A Prob & Stat Class Project** Brian Hollenbeck, Emporia State University	
4:10 pm	**A Knight's Tour for all Rectangular Boards with Minimum Square Removal** Joe DeMaio and Thomas Hippchen Kennesaw State University	
4:30 pm	**Modeling Expected Value in Poker Tournaments** George Gilbert, Texas Christian University	
4:50 pm	**Who Wants to Be a Half-Millionaire?** Patrick Headley, Gannon University	

Schedule of Events

THURSDAY, AUGUST 10TH CONTINUED

3:00 pm – 4:30 pm		**Graduate Student Poster Session** James Freeman, Cornell College	301 D Knoxville Convention Center
3:15 pm – 5:15 pm		**Contributed Paper Session** **Promoting Integrative Learning in Mathematics Through Learning Communities** Donna Beers, Simmons College	301 C Knoxville Convention Center
	3:15 pm	**5E As a Tool for Planning a Learning Community** Yolanda Sankey, Pellissippi State Technical Community College	
	3:35 pm	**Tiered Mentoring Program: A Learning Community** Dora Ahmadi, Morehead State University	
	3:55 pm	**Integrating Mathematics in Learning Communities** William Ardis, Collin County Community College District	
	4:15 pm	**Patterns of Life** Dian Calkins, Dominican University of California	
	4:35 pm	**Prospective Teachers Bridge Content and Pedagogy** Donna Beers, Ellen Davidson, Simmons College	
3: 15 pm – 5:15 pm		**General Contributed Paper Session 2** Charles Ashbacher, Kirkwood Community College Sarah Mabrouk, Framingham State College	300 C Knoxville Convention Center
	3:15 pm	**A Modified Hill Cipher** William P. Wardlaw, U.S. Naval Academy Jody M. Lockhart, U.S. Naval Academy	
	3:30 pm	**Decompositions of Group Actions on Tensors** Scott Greenleaf, University of New England	
	3:45 pm	**A New Distance Between Galois Orbits over a Number Field** Boris Petracovici, Western Illinois University Lia Petracovici, Western Illinois University Alexandru Zaharescu, University of Illinois at Urbana Champaign	
	4:00 pm	**Counting Zero-Divisors (and other adventures)** Shane Redmond, Eastern Kentucky University	
	4:15 pm	**Metric Regularity for Variational Systems** Wondi Geremew, The Richard Stockton College of New Jersey	
	4:30 pm	**Moore's Law and Semilog Plots** Joe Harris, St. Andrews Presbyterian College	
	4:45 pm	**Issues with Integrals** Paul Schuette, Meredith College	
	5:00 pm	**Analyzing the Mathematics TAKS Results** Kumer Pial Das, Lamar University	

3:30 pm – 5:30 pm	**Minicourse #3: Part 1** **Contemporary College Algebra:** **A Refocused College Algebra Course** Laurette Foster, Prairie View A&M University Alex Fluellen, Clark Atlanta University Don Small, U.S. Military Academy	300 A Knoxville Convention Center
3:30 pm – 5:30 pm	**Minicourse #4: Part 1** **Fair Division:** **From Cake-Cutting to Dispute Resolution** Steven J. Brams, New York University	300 B Knoxville Convention Center
4:00 pm – 5:30 pm	**SIGMAA on Environmental Mathematics Guest Lecture** **Saving the California Condor** Thomas O'Neil, California Polytech State University	Ballroom A Knoxville Convention Center
4:15 pm - 6:15 pm	MAA Student Paper Sessions #4	200 A Knoxville Convention Center
4:15 pm - 6:15 pm	MAA Student Paper Sessions #5	200 B Knoxville Convention Center
4:15 pm - 6:15 pm	MAA Student Paper Sessions #6	200 C Knoxville Convention Center
4:15 pm - 6:15 pm	PME Student Paper Sessions #3	200 D Knoxville Convention Center
4:15 pm - 6:15 pm	PME Student Paper Sessions #4	200 E Knoxville Convention Center
5:00 pm – 6:00 pm	**Graduate Student Reception**	Great Smoky Mountain Center Hilton
6:15 pm - 9:00 pm	**Tennessee Riverboat Dinner Cruise**	Cumberland Avenue Entrance Knoxville Convention Center

FRIDAY, AUGUST 11TH

8:30 am – 9:20 am	**Invited Address** **NAM David Blackwell Lecture** **Public Health and Mathematics: Some Emerging Challenges and Paradigms at the Interface** Dominic P. Clemence, North Carolina A&T State University	Ballroom AB&C Knoxville Convention Center
9:00 am - 5:00 pm	**Exhibits and Book Sales**	Ballroom EF&G Knoxville Convention Center
9:00 am - 5:00 pm	**Student Hospitality Center** Richard and Araceli Neal, American Society for the Communication of Mathematics	Ballroom EF&G Knoxville Convention Center

Schedule of Events

FRIDAY, AUGUST 11TH CONTINUED

9:30 am – 10:20 am	**Hedrick Lecture Series** **What is Arithmetic Combinatorics?** **Lecture 2: Discrete Fourier Analysis: Its Power and Its Limitations** W.T. Gowers, Cambridge University	Ballroom AB&C Knoxville Convention Center
10:30 am – 11:20 am	**MAA Invited Address** **James R. Leitzel Lecture** **Teaching Research: Encouraging Discoveries** Francis Edward Su, Harvey Mudd College	Ballroom AB&C Knoxville Convention Center
11:30 am – Noon	**MAA Prize Session**	Ballroom AB&C Knoxville Convention Center
1:00 pm – 1:50 pm	**MAA Undergraduate Student Activities Session** **Weird Multiplication and Weird Ways to Multiply** James Tanton, St. Mark's Institute of Mathematics/St. Mark's School	Ballroom C Knoxville Convention Center
1:00 pm – 2:20 pm	**Panels and Other Sessions** **Gödel's Contributions to the Foundation of Mathematics** Ron Barnes, University of Houston-Downtown Linda Becerra, University of Houston-Downtown	Ballroom B Knoxville Convention Center
1:00 pm – 2:30 pm	**General Contributed Paper Session 3** Charles Ashbacher, Kirkwood Community College Sarah Mabrouk, Framingham State College	301 E Knoxville Convention Center
1:00 pm	**How Do We Combat Math Anxiety?** Sarah Ann Stewart, Belmont University	
1:15 pm	**Math for K-6 Preservice Teachers and the Standards** Judith Hector, The University of Tennessee	
1:30 pm	**Integrating Math into Introductory Science Labs** Jenna Carpenter, Louisiana Tech University Danny Eddy, Louisiana Tech University Jay White, Louisiana Tech University Pedro Derosa, Louisiana Tech University	
1:45 pm	**Enhancing Student Motivation through Software** Christopher Schroeder, Morehead State University Kendra Schroeder, Morehead State University	
2:00 pm	**"Popular" Mathematicians in an Honors Course** Mike Pinter, Belmont University	
2:15 pm	**Cost Thresholds for Dynamic Resource Location** D. Jacob Wildstrom, University of California, San Diego	

1:00 pm – 2:40 pm

Contributed Paper Session

301 B
Knoxville Convention Center

What Can We Do to Help Our Freshmen See That There is More to Mathematics Than Calculus?
Richard J. Maher, Loyola University Chicago

1:00 pm — **Number Theory; A Freshman Experience**
Agnes Rash, St. Joseph's University

1:20 pm — **"Modern"-izing Class at Slippery Rock University**
Robert Vallin, Slippery Rock University

1:40 pm — **Mathematics Abroad**
Connie Campbell, Millsaps College

2:00 pm — **Mathematical Inquiry**
Mary Goodloe, Belmont University

2:20 pm — **Culture Points**
Michael Fraboni, Moravian College

1:00 pm – 3:00 pm

Contributed Paper Session

301 C
Knoxville Convention Center

Current Issues in Mathematics Education, Part II
Carol Vobach, University of Houston-Downtown
Nancy Leveille, University of Houston-Downtown

1:00 pm — **Calculators, Number Sense, and Preservice Elementary Teachers**
Stuart Moskowitz, Humboldt State University

1:15 pm — **Technology in Mathematics Teacher Preparation**
Mary Ann Connors, Westfield State College

1:30 pm — **A Little Moore Probability**
Jeff Johannes, State University of New York

1:45 pm — **ASU'S Summer Certification Institute**
Glenn Hurlbert, Arizona State University

2:00 pm — **Teach 21 Project**
Monika Vo, Saint Leo University

2:15 pm — **Voices of Mathematics Teachers of ELL Students**
Sandra Richardson, Lamar University

2:30 pm — **A Cross Border Plan for Second Language Learners**
Joyce Fischer, Texas State University-San Marcos

2:45 pm — **Connecting Abstract Algebra to Secondary Curriculum**
Janet McShane, Northern Arizona University

1:00 pm – 3:00 pm

Invited Paper Session

Ballroom A
Knoxville Convention Center

Gems of Recreational Mathematics
Arthur T. Benjamin, Harvey Mudd College
Ezra A. Brown, Virginia Polytechnic Institute and State University

Schedule of Events

FRIDAY, AUGUST 11TH CONTINUED

1:00 pm	**Weird Dice** Joe Gallian, University of Minnesota, Duluth	
1:30 pm	**Fast-Growing Sequences** Dan Velleman, Amherst College	
2:00 pm	**Sudoku Variations and Research** Laura Taalman, James Madison University	
2:30 pm	**Three Gems We All Know (Don't We?)** Richard Guy, University of Calgary	
1:00 pm – 3:00 pm	**Invited Paper Session** **Pointing the Way to Proof** Diane Herrmann, University of Chicago Carol Schumacher, Kenyon College	**301 D** **Knoxville Convention Center**
1:00 pm	**Inquiry Based Learning Method for Teaching Proofs** Michael Starbird, University of Texas at Austin	
1:30 pm	**Why Proof?** James Morrow, Mount Holyoke College	
2:00 pm	**Proof Resources for Getting to Proof** Don Albers, MAA	
1:00 pm – 3:00 pm	**Minicourse #1: Part 2** **Euler** William W. Dunham, Muhlenberg College Edward C. Sandifer, Western Connecticut State University	**300 A** **Knoxville Convention Center**
1:00 pm – 3:00 pm	**Minicourse #2: Part 2** **Infusing Connections into Core Courses for Secondary Teachers** Steve R. Benson, Education Development Center and University of New Hampshire Karen J. Graham, University of New Hampshire	**300 B** **Knoxville Convention Center**
1:00 pm – 3:00 pm	**General Contributed Paper Session 4** Charles Ashbacher, Kirkwood Community College Sarah Mabrouk, Framingham State College	**300 C, Knoxville Convention Center**
1:00 pm	**College Algebra in the Context of Real-World Data** Michael Catalano, Dakota Wesleyan University	
1:15 pm	**Arithmetic from an Algebraic Point of View** Steven R. Lay, Lee University	
1:30 pm	**Teaching the Big Picture in Calculus** Jason Molitierno, Sacred Heart University	
1:45 pm	**A Discovery-Based Curriculum for Advanced Calculus** Jonathan K. Hodge, Grand Valley State University	

	2:00 pm	**Limits of Functions of Two Variables** Ollie Nanyes, Bradley University	
	2:15 pm	**Vector Fields in the Linear Algebra Classroom** Randall Helmstutler, University of Mary Washington	
	2:30 pm	**Calculus-based Physics at West Point** Ray Nelson, United States Military Academy	
	2:45 pm	**Math Thread in USMA's Advanced Physics Program** Michael Jaye, United States Military Academy	
1:00 pm – 4:30 pm		**Invited Paper Session** **Chaotic Dynamics and Fractal Geometry** Mario Martelli, Claremont McKenna College	**301 A** **Knoxville Convention Center**
	1:00 pm	**Optimal Control Applied to a CPR Model** Suzanne Lenhart, University of Tennessee, Knoxville	
	1:30 pm	**Markov Partitions From Two-Piece Eventually Expanding Maps** Choi Youngna, Montclair State University	
	2:00 pm	**The Mean-Median Map** Marc Chamberland, Grinnell College	
	2:30 pm	**Intermission**	
	3:00 pm	**The Mathematics of Fat** Diana Thomas, Montclair State University	
	3:30 pm	**The Fibonacci Harp and Subshifts of Finite Type** Annalisa Crannel, Franklin & Marshall College	
	4:00 pm	**Chaos: The Viewpoints of Analysis, Measure Theory, and Topology** Mario Martelli, Claremont McKenna College Jake Wildstrom, University of California, San Diego	
2:00 pm – 5:00 pm		**MAA Student Paper Sessions #7**	**200 A** **Knoxville Convention Center**
2:00 pm – 5:00 pm		**MAA Student Paper Sessions #8**	**200 B** **Knoxville Convention Center**
2:00 pm – 5:00 pm		**MAA Student Paper Sessions #9**	**200 C** **Knoxville Convention Center**
2:00 pm – 5:00 pm		**PME Student Paper Sessions #5**	**200 D** **Knoxville Convention Center**
2:00 pm – 5:00 pm		**PME Student Paper Sessions #6**	**200 E** **Knoxville Convention Center**

Schedule of Events

FRIDAY, AUGUST 11TH CONTINUED

2:30 pm – 3:50 pm		**SIGMAA on Statistics Education Panel** **Enhancing the Teaching of Advanced Placement Statistics** Murray H. Siegel South Carolina Governor's School for Science and Mathematics	Ballroom B Knoxville Convention Center
2:30 pm – 3:50 pm		**Graduate Student Activities** **Applying for Your First Job** David Manderscheid, University of Iowa	300 D Knoxville Convention Center
3:00 pm – 4:00 pm		**Exhibit Hall Reception** Sponsored by Addison Wesley	Ballroom EF&G Knoxville Convention Center
3:00 pm – 4:30 pm		**MAA Alder Awards Session** Carl Cowen, President	Ballroom C Knoxville Convention Center
	3:00 pm	**Active Learning in the Non-Calculus Classroom: My Favorite Activities** Christopher N. Swanson, Ashland University	
	3:30 pm	**Using Technology to Help Teach Mathematics** Garikai Campbell, Swarthmore College	
3:15 pm – 4:15 pm		**Contributed Paper Session** **Mathematics and Popular Culture, Part I** Sarah J. Greenwald, Appalachian State University Christopher Goff, University of the Pacific	301 B, Knoxville Convention Center
	3:15 pm	**Viagra, the Pill, and the Patch, Oh My!** Sarah Mabrouk, Framingham State College	
	3:35 pm	**Proportions in the Music of Mozart** Jihwa Noh, Soo Hostetler, and Kui-Im Lee University of Northern Iowa	
	3:55 pm	**"The New Math" in Popular Culture** Christopher Barat, Villa Julie College	
3:15 pm – 5:15 pm		**Contributed Paper Session** **Attracting and Retaining Students to Mathematics Programs Via Outreach** Sangeeta Gad, University of Houston-Downtown	301 C Knoxville Convention Center
	3:15 pm	**Attracting and Retaining Students to Math Program at UHD** Sangeeta Gad, University of Houston-Downtown	
	3:40 pm	**Texas A&M Enrichment for Middle School Students** Philip Yasskin, Texas A&M University	
	4:05 pm	**The MAA Student Research Programs** Bill Hawkins, University of District of Columbia	

	4:30 pm	**Accelerated Math for Engineering Students** Lois Knouse, LeTourneau University	
	4:55 pm	**The Summer Science Programs at Metro State College** Larry Johnson, Metro State College	
3:15 pm – 5:15 pm		**General Contributed Paper Session 5** Charles Ashbacher, Kirkwood Community College Sarah Mabrouk, Framingham State College	300 C, Knoxville Convention Center
	3:15 pm	**Getting Students to Read the Text Before Class** Michael Brilleslyper, United States Airforce Academy Bradley Warner, United States Airforce Academy	
	3:30 pm	**Teaching the Derivative One Rule at a Time** Laura Taalman, James Madison University	
	3:45 pm	**The Curricula of Church Schools in the Qin Dynasty** Annie Han, Borough of Manhattan Community College, The City University of New York	
	4:00 pm	**Variations on a Theme of Sierpinski** Lenny Jones, Shippensburg University	
	4:15 pm	**Look for Mathematical Properties of Hexaflexagons** Susan Wildstrom, Walt Whitman High School	
	4:30 pm	**Bifurcations in a Mammalian Cell Cycle Model** Edwin Tecarro, University of Houston-Downtown	
	4:45 pm	**Ellipses of Maximal or Minimal Arc Length** Alan Horwitz, Pennsylvania State University	
	5:00 pm	**Extension of Mean Value Theorem to Space Curves** Ranja Roy, New York Institute of Technology	
3:15 pm – 5:15 pm		**Invited Paper Session** **Physical Knots** Dorothy Buck, Imperial College London	Ballroom A Knoxville Convention Center
	3:15 pm	**Macromolecular Knots in Equilibrium** Kenneth Millett, UC Santa Barbara	
	3:45 pm	**Knots and Collapsing Tangles** Louis Kauffman, University of Illinois at Chicago	
	4:15 pm	**Piecewise Circular Space Curves** Thomas Banchoff, Brown University	
	4:45 pm	**Tight Knots and Links** Eric Rawdon, University of St. Thomas	
3:30 pm – 5:30 pm		**Minicourse #5: Part 1** **Combinatorially Thinking** Arthur T. Benjamin, Harvey Mudd College Jennifer J. Quinn Association for Women in Mathematics	300 A Knoxville Convention Center

Schedule of Events

FRIDAY, AUGUST 11TH CONTINUED

3:30 pm – 5:30 pm	**Minicourse #6: Part 1** **Teaching a Proof-Based Course as the Gateway to the Mathematics Major** James Sandefur, Georgetown University	300 B Knoxville Convention Center
4:45 pm – 6:15 pm	**SIGMAA on the Philosphy of Mathematics Guest Lecture** **Some Problems and Solutions in Contemporary Philosophy of Mathematics** Michael D. Resnik, University of North Carolina	Ballroom C Knoxville Convention Center
5:00 pm – 6:30 pm	**SIGMAA on Teaching Advanced High School Mathematics** **Annual Business Meeting and Reception** Dan Teague, North Carolina School of Science and Mathematics	Salon E, Hilton
6:00 pm – 8:00 pm	**Don Albers: An Appreciation Banquet**	Great Smoky Mountain Center Hilton
6:15 pm – 7:45 pm	**MAA/PME Student Banquet and Awards Ceremony**	Salon A&B, Hilton
8:00 pm – 9:00 pm	**Invited Address** **PME J. Sutherland Frame Lecture** **Ellipses and Circles? To Understand Voting Problems??!** Donald Saari, University of California Irvine	Salon CD&E, Hilton
9:00 pm –11:00 pm	**AWM/MAA Reception**	Great Smoky Mountain Center, Hilton

SATURDAY AUGUST 12TH

8:30 am – 9:20 am	**Invited Address** **AWM/MAA Etta Z. Falconer Lecture** **Cancer Modeling: From the Classical to the Contemporary** Trachette Jackson, University of Michigan	Ballroom AB&C Knoxville Convention Center
8:30 am – 10:30 am	**Contributed Paper Session** **Mathematics and Popular Culture, Part II** Sarah J. Greenwald, Appalachian State University Christopher Goff, University of the Pacific	301 A, Knoxville Convention Center
8:30 am	**Putting a Spring in Yoda's Step** Tim Chartier, Davidson College	
8:50 am	**The Role of Mathematics in "The DaVinci Code"** Laura Harrington, Asbury College	

	9:10 am	**"NUMB3RS": From TV to the Classroom** Dan Kennedy, Baylor School	
	9:30 am	**Movie Math: Mathematical Talent = Mental Illness** Christopher Goff, University of the Pacific	
	9:50 am	**rdrr: Math Comedy from "The Simpsons" & "Futurama"** Sarah J Greenwald, Appalachian State University	
	10:10 am	**Subtracting Gender: Math in Popular Culture** Leigh Edwards, Florida State University	
9:00 am - 2:00 pm		**Exhibits and Book Sales**	**Ballroom EF&G** **Knoxville Convention Center**
9:00 am - 2:00 pm		**Student Hospitality Center** Richard and Araceli Neal, American Society for the Communication of Mathematics	**Ballroom EF&G** **Knoxville Convention Center**
9:30 am – 10:20 am		**Hedrick Lecture Series** **What is Arithmetic Combinatorics?** **Lecture 3: Freiman's Theorem and Arithmetic Progressions of Length 4** W.T. Gowers, Cambridge University	**Ballroom AB&C** **Knoxville Convention Center**
10:30 am – 11:20 am		**MAA Invited Address** **Stories From the History of Mathematics** David Bressoud, Macalester College	**Ballroom AB&C** **Knoxville Convention Center**
11:30 am - Noon		**MAA Business Meeting** This session will be moderated by Martha J. Siegel, Towson University, MAA Secretary.	**Ballroom AB&C** **Knoxville Convention Center**
1:00 pm – 2:00 pm		**General Contributed Paper Session 6** Charles Ashbacher, Kirkwood Community College Sarah Mabrouk, Framingham State College	**200 E** **Knoxville Convention Center**
	1:00 pm	**Exponents in Arithmetic Progression in Polynomials** Carrie Finch, University of South Carolina	
	1:15 pm	**Bisections and reflections** Ron Taylor, Berry College Jorgen Berglund, California State University	
	1:30 pm	**Linear Optimization: the Simplex Workbook** Glenn Hurlbert, Arizona State University	
	1:45 pm	**Rings and Things** Jeff Dodd, Jacksonville State University	
1:00 pm – 2:15 pm		**Student Problem Solving Competition** Richard Neal, American Society for the Communication of Mathematics	**301 A** **Knoxville Convention Center**
1:00 pm – 2:20 pm		**Panels and Other Sessions** **Graduation is Coming: Now What?** Sarah Ann Stewart, Belmont University Joshua Laison, Colorado College	**301 C** **Knoxville Convention Center**

Schedule of Events

1:00 pm – 2:20 pm

SIGMAA on Teaching Advanced High School Mathematics Town Hall Meeting

Ballroom B
Knoxville Convention Center

What Should Future Math Majors Learn About Proof in High School
Dan Teague, North Carolina School of Science and Mathematics

1:00 pm – 2:45 pm

General Contributed Paper Session 7

300 C
Knoxville Convention Center

Charles Ashbacher, Kirkwood Community College
Sarah Mabrouk, Framingham State College

1:00 pm — **Popular Math Talks For Bright Students And Others**
Peter Ross, Santa Clara University
Tatiana Shubin, San Jose State University

1:15 pm — **A Comparison of Performance Between Biocalculus and Traditional Calculus Students**
Timothy Comar, Benedictine University

1:30 pm — **Nurturing Young Mathematicians at a Local Level**
Matt Sunderland, Hunter College High School
The City University of New York

1:45 pm — **Assessment of the Mathematics Program at a Small Liberal Arts College**
Lisa Rome, College of Mount St. Joseph

2:00 pm — **Faculty Perspective on American Diploma Project**
Linda Braddy, East Central University

2:15 pm — **A Mean Value Theorem for a Number Field**
Behailu Mammo, Hofstra Univeristy

2:30 pm — **Describing the Accuracy of Ptolemy's Models**
Sandra M. Caravella, New Jersey City University

1:00 pm – 2:50 pm

Panels and Other Sessions

Ballroom A
Knoxville Convention Center

How to Get Published in MAA Journals
Don Albers, MAA Director of Publications

1:00 pm – 3:00 pm

Contributed Paper Session

301 E
Knoxville Convention Center

Advances in Recreational Mathematics
Paul R. Coe, Dominican University
William T. Butterworth, DePaul University

1:00 pm — **A General Sudoku Probelm Solving Program**
Charles Ashbacher, Mount Mercy College

1:15 pm — **On a General Josephus Problem**
Doug Ensley and Jeff Becker, Shippensburg University

1:30 pm — **Separating Queens on the Chessboard**
R. Chatham, et. al., Morehead State University

	1:45 pm	**Wazir Circuits, Pick's Theorem, and Parity** Irl Bivens, Davidson College	
	2:00 pm	**The Locker Problem** Bruce Torrence, Randolph-Macon College	
	2:15 pm	**Stupid Divisibility Tricks** Marc Renault, Shippensburg University	
	2:30 pm	**Recurrent Sequences Based on the Greatest Prime Factor Function** Mihai Caragiu, Ohio Northern University	
	2:45 pm	**A Geometric Proof That *e* is Irrational** Jonathan Sondow, New York City	
1:00 pm – 3:00 pm		**Contributed Paper Session** **Fun and Innovative Techniques For an Abstract Algebra Class, Part II** Sharon M. Clarke, Pepperdine University Andrew Hetzel, Tennessee Technological University	**301 B** **Knoxville Convention Center**
	1:00 pm	**Group Tables and Subgroup Diagrams for Everyone** John Jones, Arizona State University	
	1:25 pm	**Substitution Groups and Remarkable Subgroups** Matt Lunsford, Union University	
	1:50 pm	**Does AB=BA?** Thomas Langley, California Lutheran University	
	2:15 pm	**A Discovery Laboratory for Group Concepts Using CA** James Uebelacker, University of New Haven	
	2:40 pm	**Using Technology to Explore the Dihedral Group** James Hamblin, Shippensburg University	
1:00 pm – 3:00 pm		**Minicourse #3: Part 2** **Contemporary College Algebra: A Refocused College Algebra Course** Laurette Foster, Prairie View A&M University Alex Fluellen, Clark Atlanta University Don Small, U.S. Military Academy	**300 A** **Knoxville Convention Center**
1:00 pm – 3:00 pm		**Minicourse #4: Part 2** **Fair Division: From Cake-Cutting to Dispute Resolution** Steven J. Brams, New York University	**300 B** **Knoxville Convention Center**
1:00 pm – 3:00 pm		**Invited Paper Session** **Stories From the History of Mathematics as a Tool for Teaching** David Bressoud, Macalester College	**Ballroom C** **Knoxville Convention Center**
	1:00 pm	**Some Tested Examples for Using History in Your Classroom** Fred Rickey, USMA at West Point	

Schedule of Events

	1:30 pm	**Theorem First, or Example First: Newton vs Leibniz Again** Ed Sandifer, Western Connecticut State University	
	2:00 pm	**Euler's Easy Solutions to Difficult Geometric Problems** John McCleary, Vassar College	
	2:30 pm	**From e^{π} to $2^{\sqrt{2}}$, Motivating the Solution to Hilbert's 7th Problem** Rob Tubbs, University of Colorado, Boulder	
1:00 pm – 3:40 pm		**Contributed Paper Session** **The Best Approximation of a Good Numerical Methods Course** Kyle Riley, South Dakota School of Mines and Technology	**301 D** **Knoxville Convention Center**
	1:00 pm	**Numerical Methods: Minimizing the Error(s)** Betty Mayfield, Hood College	
	1:20 pm	**Stepping to Success in Numerical Analysis** Anthony Tongen, James Madison University	
	1:40 pm	**Electronic Materials for Numerical Methods** Cynthia Wyels, California State University Channel Islands	
	2:00 pm	**The JW2 Computer & An Illusive 3x3 Linear System** Joan Weiss, Fairfield University	
	2:20 pm	**A Discovery-Based Interpolation Assignment** Michelle Ghrist and Jim Rolf, United States Air Force Academy	
	2:40 pm	**Automatic Differentiation, MATLAB and OOP** Richard Neidinger, Davidson College	
	3:00 pm	**Finite Difference Methods for Boundary Value Problems** David Coulliette, Asbury College	
	3:20 pm	**Introduction to Cellular Automata** Kyle Riley, South Dakota School of Mines & Technology	
1:00 pm – 4:00 pm		**Panels and Other Sessions** **WEBWORK, A Web Based Interactive Homework System** Michael E. Gage, University of Rochester Arnold K. Pizer, University of Rochester Vicki Roth, University of Rochester	**200 A** **Knoxville Convention Center**
1:00 pm – 5:00 pm		**Panels and Other Sessions** **Preliminary Report on NSF-Supported MAA Research Project on Modeling-Based College Algebra** Bill Haver, Virginia Commonwealth University Norma Agras, Miami Dade College Barbara Edwards, Oregon State University	**Sequoyah 3, Hilton**

2:30 pm – 3:00 pm	**Student Activities** **Math Horizons Special Session** Arthur T. Benjamin, Harvey Mudd College Jennifer J. Quinn, Association for Women in Mathematics	**301 A** **Knoxville Convention Center**
2:30 pm – 3:50 pm	**Panels and Other Sessions** **Organizing MAA Sessions** Douglas Ensley, Shippensburg University	**301 C** **Knoxville Convention Center**
3:00 pm – 4:20 pm	**Panels and Other Sessions** **Supporting Beginning Mathematics Teacher Educators: What and How** Gail Burrill, Michigan State University	**Ballroom A** **Knoxville Convention Center**
3:00 pm – 5:00 pm	**SIGMAA on Teaching Advanced High School Mathematics Workshop** **Teaching Continuity and Differentiability for Functions of One and Two Variables** Dan Teague, North Carolina School of Science and Mathematics Stephen Davis, Davidson College	**Ballroom B** **Knoxville Convention Center**
3:15 pm - 4:30 pm	**MAA Mathematical Contest in Modeling (MCM) Winners** Ben Fusaro, Florida State University	**301 A** **Knoxville Convention Center**
3:15 pm – 5:15 pm	**Contributed Paper Session** **Research into Practice: The Teaching and Learning of Undergraduate Mathematics** William Martin, North Dakota State University Chris Rasmussen, San Diego State University Michael Oehrtman, Arizona State University	**301 B** **Knoxville Convention Center**
3:15 pm	**The "Perfect" Related Rates Lesson** Joy Becker, University of Wisconsin-Stout	
3:35 pm	**Maplets for Calculus** Philip Yasskin, Texas A&M University Douglas Meade, University of South Carolina	
3:55 pm	**Geometry on a HubCap!** David Ewing, Central Missouri State University	
4:15 pm	**Student Success Using My MathLab in Finite Math** Jacci White, Saint Leo University	
4:35 pm	**Evaluation of Elementary Preservice Mathematics** Jim Gleason and Cecelia Laurie, The University of Alabama	
4:55 pm	**Evaluating Students' Abstract Algebra Knowledge** Hortensia Soto-Johnson, University of Northern Colorado	

Schedule of Events

SATURDAY, AUGUST 12TH CONTINUED

3:15 pm – 5:45 pm — **Contributed Paper Session** — **301 E, Knoxville Convention Center**

Mathematical Modeling, Projects, and Demonstrations That Enhance a Differential Equations Course
William P. Fox, Francis Marion University

3:15 pm — **Modeling the War of Nieberian Aggression**
Jim Rolf, U.S. Air Force Academy

3:30 pm — **A Least-Squares Approach to Modeling**
Joe Harris, St. Andrews Presbyterian College

3:45 pm — **Games for Review in Differential Equations Course**
Olga Brezhneva, Miami University (Ohio)

4:00 pm — **An Analytical Approach to the Bio-economic Dynamics of a Fishery, Which Includes Simultaneous Harvesting of Other Species**
David Torain, Virginia Union University

4:15 pm — **Modeling the Spread of Gonorreha**
Talethia Washington, University of Evansville

4:30 pm — **Radioactivity as Motivation**
Kenneth Stolarsky, University of Illinois at Urbana-Champaign

4:45 pm — **Modeling Aircraft Longitudinal Motion**
Catherine Cavagnaro, Sewanee University

5:00 pm — **Surgical Solutions in Differential Equations**
Charles R. Hampton, Wooster College

5:15 pm — **Mathematical Modeling Projects of System of ODES With Numerical and Qualitative Approaches**
Bill Fox, Naval Postgraduate School

5:30 pm — **A MATLAB-Based 3D Vector Flows Visualization Tool**
Michelle Ghrist, U.S. Air Force Academy

3:15 pm – 5:15 pm — **Invited Paper Session** — **Ballroom C, Knoxville Convention Center**

Graph Theory Ideas for Undergraduate Research
Aparna Higgins, University of Dayton

3:15 pm — **Graphs: Graceful, Equitable and Distance Labelings**
Cindy Wyels, California State University Channel Islands

3:45 pm — **Graph Pebbling**
Glenn Hurlbert, Arizona State University

4:15 pm — **Using Graffitti.PC for Undergraduate Research**
Ermelinda DeLaVina, University of Houston - Downtown

4:45 pm — **Intersecting and Related Set Systems**
Anant Godbole, East Tennessee State University

3:15 pm – 5:15 pm		**General Contributed Paper Session 8** Charles Ashbacher, Kirkwood Community College Sarah Mabrouk, Framingham State College	**300 C** **Knoxville Convention Center**
	3:15 pm	**Deranged Socks** Sally Cockburn, Hamilton College Joshua Lesperance, Franklin & Marshall College	
	3:30 pm	**Kaleidoscope** Jeff Johannes, State University of New York, Geneseo	
	3:45 pm	**Higher Order Sufficient Optimality Conditions** Elena Constantin, University of Pittsburgh-Johnstown	
	4:00 pm	**Linking Exponential and Geometric Distributions** Richard Stephens, Tennessee Wesleyan College	
	4:15 pm	**A Survey Of Collatz K-Tuples Employing Mathematica** Jay L. Schiffman, Rowan University	
	4:30 pm	**Discovering the Cauchy-Riemann equations** David Austin, Grand Valley State University	
	4:45 pm	**Minnesota Standards; My Involvement and Views** Bert Fristedt, The University of Minnesota	
	5:00 pm	**Quality Adjusted Lifetime Hazard Function** Mahmoud Almanassra, University of Wisconsin-Marinette	
3:30 pm – 5:30 pm		**Minicourse #5: Part 2** **Combinatorially Thinking** Arthur T. Benjamin, Harvey Mudd College Jennifer J. Quinn Association for Women in Mathematics	**300 A** **Knoxville Convention Center**
3:30 pm – 5:30 pm		**Minicourse #6: Part 2** **Teaching a Proof-Based Course as the Gateway to the Mathematics Major** James Sandefur, Georgetown University	**300 B** **Knoxville Convention Center**
6:00 pm - 9:00 pm		**MAA Silver and Gold Banquet** Speaker: Carl Pomerance, Dartmouth College Emcee: Lida Barrett, University of Tennessee (Ret.)	**Salon D&E** **Hilton**

SUNDAY AUGUST 13TH

9:00 am - 4:00 pm		**Tour of Caves Cove/Smoky Mountains**	**Cumberland Avenue Entrance** **Knoxville Convention Center**

Invited Addresses

Several Invited Addresses are offered during MathFest. Speakers are chosen for their expertise in their fields. Besides pure and applied mathematics, topics normally include mathematics education and the history of mathematics.

EARLE RAYMOND HEDRICK LECTURE SERIES

WHAT IS ARITHMETIC COMBINATORICS?

W.T. Gowers, Cambridge University

Some mathematical problems and results belong to areas of mathematics with well-established names such as functional analysis or algebraic geometry. Others are harder to categorize. In recent years increasing numbers of mathematicians have found themselves using techniques from number theory, analysis, and combinatorics, which leaves them unable to answer what for most mathematicians is a simple question: "What area of mathematics do you work in?" However, this social disadvantage may soon be a thing of the past because some fascinating common themes are emerging, enough for the area to deserve its own name. And there is even a name that people seem to be happy with: arithmetic combinatorics. In these talks, I shall introduce some of the main results and open problems of arithmetic combinatorics, give some ideas of how they are proved, and explain some of the surprising connections between them.

LECTURE 1: THE BACKGROUND: SOME THEOREMS AND OPEN PROBLEMS IN NUMBER THEORY, ANALYSIS, AND COMBINATORICS

Thursday, August 10, 9:30 am - 10:20 am
Ballroom AB&C, Knoxville Convention Center

This lecture will set the scene for additive combinatorics by discussing several famous theorems and problems that predate it. Amongst them are van der Waerden's theorem on arithmetic progressions, Goldbach's conjecture, the Kakeya problem, some deceptively simple problems of Paul Erdös and a recent breakthrough of Ben Green and Terrance Tao. They have in common that they are easy to state, but hard to solve. Deeper similarities between them will be explored in subsequent lectures.

LECTURE 2: DISCRETE FOURIER ANALYSIS: ITS POWER AND ITS LIMITATIONS

Friday, August 11, 9:30 am – 10:20 am
Ballroom AB&C, Knoxville Convention Center

Fourier analysis is concerned with the splitting up of a signal, such as a sound wave, into simple parts, such as pure sine waves. Its first cousin, discrete Fourier analysis, is an extremely useful tool for thinking about a certain kind of problem in number theory. I shall explain why this might be and then give examples of how Fourier analysis can be used to solve, or at least begin to attack, some of the problems mentioned in the first lecture. Oddly enough, the *failure* of Fourier analysis to solve some of those problems is almost more interesting than its successes, because it raises the possibility that arithmetic combinatorics can repay some of the debt it owes to analysis. The difficulties one encounters when one tries to improve the best known results about arithmetic progressions are genuine ones, and it looks likely that, in order for them to be overcome, it will be necessary to develop a new, more powerful version of Fourier analysis, which would almost certainly have applications beyond arithmetic combinatorics.

LECTURE 3: FREIMAN'S THEOREM AND ARITHMETIC PROGRESSIONS OF LENGTH 4

Saturday, August 12, 9:30 am – 10:20 am
Ballroom AB&C, Knoxville Convention Center

Some of the most interesting problems in arithmetic combinatorics concern arithmetic progressions, that is sequences like 5,11,17,23,29, where each number is obtained from the previous one by adding some fixed amount (in this case 6). Fourier analysis is very useful for analyzing progressions of length 3, but runs into difficulties for longer progressions. However, ways have been found for getting around some of these difficulties, and these are leading to a new and more powerful theory of "quadratic" Fourier analysis. I shall explain in very broad terms what this means and why it is still by no means fully understood. A central role in this development is played by a fascinating result known as Freiman's theorem. Once again, the theorem is much easier to state than it is to prove, but it is possible to describe some of the ideas from a beautiful proof due to Imre Ruzsa. There are some questions that Ruzsa's techniques are not strong enough to answer, and a central problem in arithmetic combinatorics is to strengthen them. This could have profound consequences: the solution of several problems, the development of a new form of "linear" Fourier analysis, and a significant increase in the cohesion and maturity of arithmetic combinatorics.

MAA INVITED ADDRESS

THE CIRCLE (AND KNOT AND LINK) OF LIFE: HOW TOPOLOGY UNTANGLES KNOTTY DNA QUESTIONS

Dorothy Buck, Imperial College London

Thursday, August 10, 8:30 am – 9:20 am
Ballroom AB&C, Knoxville Convention Center

DNA is often referred to as 'the staff of life', as it is the blueprint for all hereditary traits and diseases, as well as the template for all proteins. But the structure of DNA structure is often more complicated than a straight 'staff.' DNA molecules can have a circular (e.g. bacterial), or topologically constrained (e.g. human), central axis. The axis can even be knotted or linked! We'll discuss how the topology of this axis affects important biological processes – both local (e.g. which proteins attach to DNA) and global (e.g. how a cell divides). We'll conclude with some examples of how topology (knot theory) has helped our understanding of these processes.

MAA INVITED ADDRESS

STORIES FROM THE HISTORY OF MATHEMATICS

David Bressoud, Macalester College

Saturday, August 12, 10:30 am – 11:20 am
Ballroom AB&C, Knoxville Convention Center

This is a collection of some of my favorite stories from the history of mathematics, stories that I use in my classes to illustrate what it really means to "do" mathematics.

MAA INVITED ADDRESS

SOME OPEN QUESTIONS ABOUT CONVEX POLYHEDRA

Jesus A. De Loera , University of California Davis
Thursday, August 10, 10:30 am – 11:20 am
Ballroom AB&C, Knoxville Convention Center

Convex polyhedra are familiar objects since our childhood. Indeed, cubes, pyramids, and triangles are common staples in all kindergartens! Unknown to most people, polyhedra, in their high-dimensional version, are also widely used in applied mathematics (e.g. operations research, finances, computer networks, and more). Their beauty and simplicity appeal to all, but very few people know of the many easy-to-state difficult unsolved mathematical problems that hide behind their beauty. The purpose of this lecture is to introduce an audience without prior background to some of these open questions.

MAA STUDENT LECTURE

MATH AT TOP SPEED: EXPLORING AND BREAKING MYTHS IN DRAG RACING FOLKLORE

Richard Tapia, Rice University
Thursday, August 10, 1:00 pm – 1:50 pm
Ballroom AB&C, Knoxville Convention Center

Either as participant, support individual, or involved spectator, Richard Tapia has been involved throughout his life in drag racing, and has witnessed the birth and growth of many myths concerning dragster speed and acceleration. In this talk, he will use mathematics to identify frameworks for the study of a particular popular belief and then apply mathematics to better understand the belief at hand. Some myths will be explained and validated, while others will be destroyed. Included will be attempts to determine how fast dragsters are really going as well as the maximum acceleration achieved by today's dragsters. He will explain why dragster acceleration is greater than the acceleration due to gravity, an age-old inconsistency. The talk will also include an historical account of the development of the sport of drag racing and lively videos.

He will also share relevant formative experiences encountered along his life's journey as a publicly educated first-generation Mexican American from the barrios of Los Angeles to a Rice University Mathematics Professor and President Clinton Appointee to the National Science Board. As the director of the mathematical and engineering sciences program at Rice, a program recognized for its production of minority PhDs, he will describe the challenges, successes, and lessons learned along the way.

NAM DAVID BLACKWELL LECTURE

PUBLIC HEALTH AND MATHEMATICS: SOME EMERGING CHALLENGES AND PARADIGMS AT THE INTERFACE

Dominic P. Clemence, North Carolina A&T State University
Friday, August 11, 8:30 am – 9:20 am
Ballroom AB&C, Knoxville Convention Center

Public health issues concern us all: just a few include emerging and re-emerging diseases, the shrinking global neighborhood, health disparities, deliberately released infectious agents, and natural disasters. While in the past mathematics has played a significant role in addressing some public health concerns, one cannot but wonder, 'can more be done?' and in particular, 'in what ways can mathematicians contribute more?' when one looks at the status of public health world-wide. We share a mathematician's perspective on a few of these issues, and highlight some paradigms and challenges emerging at the public health-mathematics interface.

JAMES R. LEITZEL LECTURE

TEACHING RESEARCH: ENCOURAGING DISCOVERIES

Francis Edward Su, Harvey Mudd College
Friday, August 11, 10:30 am – 11:20 am
Ballroom AB&C, Knoxville Convention Center

What does it take to turn a learner into a discoverer? Or to turn a teacher into a coadventurer? I will describe a handful of experiences, from teaching a middle-school math class to doing research with undergraduates, that have changed the way that I would answer these questions. Some of the lessons I've learned have surprised me.

PME J. SUTHERLAND FRAME LECTURE

ELLIPSES AND CIRCLES? TO UNDERSTAND VOTING PROBLEMS??!

Donald Saari, University of California Irvine
Friday, August 11, 8:00 pm – 9:00 pm
Salon CD&E, Hilton

Why is it that whenever we put forth a carefully considered proposal, somebody can put forth an "improvement?" Yet, attend any meeting, even the MAA business meetings, and it happens on a regular basis. Why? Insight is possible by using just the geometry of circles. And then, to introduce a new game theoretic solution concept, I will use the geometry of ellipses.

AWM-MAA ETTA Z. FALCONER LECTURE

CANCER MODELING: FROM THE CLASSICAL TO THE CONTEMPORARY

Trachette Jackson, University of Michigan
Saturday, August 12, 8:30 am – 9:20 am
Ballroom AB&C, Knoxville Convention Center

Cancer is one of the leading causes of death in the world today, and an abundance of research is being conducted in order to better understand tumor development, to evolve existing cancer therapies, and to discover new approaches to combat the disease at the cellular and molecular levels. Mathematical modeling, aided by computational tools and combined with the experimental data, have the potential to facilitate a deeper and broader understanding of the cellular and molecular interactions associated with tumor initiation, progression, and treatment, and can guide experimental design and interpretation. Many of the challenges cancer researchers are facing lie at the intersection of the mathematical and biomedical sciences and in this talk I will review the progress that has been made in modeling the various aspects of avascular and vascular tumor growth.

Invited Paper Sessions

Invited Paper Sessions are focused on a particular topic normally in pure or applied mathematics. The speakers, chosen by the organizers, are invited for their expertise on the subject.

INQUIRY BASED LEARNING – THE NEXT GENERATION

Edward B. Burger, Williams College
Thursday, August 10, 1:00 pm – 3:00 pm
Ballroom B, Knoxville Convention Center
Speakers in the session will include Michael Starbird, University of Texas at Austin, "Teaching independent thinking"; Dick Canary, University of Michigan, "Inquiry based learning at the University of Michigan"; Maria Terrell, Cornell University, "Good questions for mathematics education"; and Edward Burger, Williams College, "A crash course on how not to teach."

COMPUTATIONAL CONVEXITY AND ITS APPLICATIONS

Jesus De Loera, University of California Davis
Tyrrell McAllister, University of California Davis
Thursday, August 10, 1:00 pm – 4:40 pm
301 E, Knoxville Convention Center
Methods from computational convexity are finding more and more applications in such diverse fields as optimization, representation theory, algebraic geometry, number theory, and theoretical computer science. In this session, researchers in these fields will report on the remarkable advances made in recent years using the tools of computational convexity. Speakers will include Matthias Beck, San Francisco State University, "Enumerating integer-points in polytopes: applications to number theory"; Tyrrell McAllister, UC Davis, "Convex polyhedra and representation theory"; Maurice Rojas, Texas A&M, "Convexity, and phase transitions for detecting real roots"; James Lawrence, George Mason University, "Combinatorial problems and computational convexity"; Paul Goodey, University of Oklahoma, "Projection functions of convex bodies."

ISOPERIMETRIC PROBLEMS

Frank Morgan, Williams College
Thursday, August 10, 2:15 pm – 5:15 pm
Ballroom C, Knoxville Convention Center
Members and alums of the Williams College NSF SMALL Undergraduate Research Geometry Group and perhaps others will report on work on isoperimetric problems and open questions in various settings, including Riemannian manifolds and manifolds with density, such as Gauss space.

GEMS OF RECREATIONAL MATHEMATICS

Arthur T. Benjamin, Harvey Mudd College
Ezra A. Brown, Virginia Polytechnic Institute and State University
Friday, August 11, 1:00 pm – 3:00 pm
Ballroom A, Knoxville Convention Center
Our speakers are Joe Gallian, University of Minnesota at Duluth, "Weird dice"; Richard Guy, University of Calgary, "Three gems we all know (don't we?)"; Laura Taalman, James Madison University, "Sudoku variations and research"; and Daniel Velleman, Amherst College, "Fast growing sequences."

CHAOTIC DYNAMICS AND FRACTAL GEOMETRY

Mario Martelli, Claremont McKenna College
Friday, August 11, 1:00 pm – 4:30 pm
301 A, Knoxville Convention Center
Speakers include Jim Yorke, Kathleen Alligood, Elena Nusse, Celso Grebogi, Ethan Akin, Tim Sauer, Carlos Castillo-Chavez, and John Guckeneimer.

PHYSICAL KNOTS

Dorothy Buck, Imperial College London
Friday, August 11, 3:15 pm – 5:15 pm
Ballroom A, Knoxville Convention Center
Louis Kauffman, University of Illinois at Chicago; Ken Millett, UC Santa Barbara; Eric Rawdon, Duquesne University; Thomas Banchoff, Brown University.

POINTING THE WAY TO PROOF

Diane Herrmann, University of Chicago
Carol Schumacher, Kenyon College
Friday, August 11, 1:00 pm – 3:00 pm
301 D, Knoxville Convention Center
Speakers will include: Michael Starbird, University of Texas - Austin; James Morrow, Mt. Holyoke College; Chris Stevens, St. Louis University; and Don Albers, MAA.

STORIES FROM THE HISTORY OF MATHEMATICS AS A TOOL FOR TEACHING

David Bressoud, Macalester College
Saturday, August 12, 1:00 pm – 3:00 pm
Ballroom C, Knoxville Convention Center
Speakers will include John McCleary, Vassar College,"Euler's easy solutions to difficult geometric problems"; Rob Tubbs, University of Colorado, Boulder, "From e^{π} to $2^{\sqrt{2}}$, motivating the solution to Hilbert's 7th problem"; Fred Rickey, U.S. Military Academy at West Point; "Some tested examples for using history in your classroom"; and Ed Sandifer, Western Connecticut State University, "Theorem first, or Example first: Newton vs Leibniz again."

GRAPH THEORY IDEAS FOR UNDERGRADUATE RESEARCH

Aparna Higgins, University of Dayton
Saturday, August 12, 3:15 pm – 5:15 pm
Ballroom C, Knoxville Convention Center
This session will highlight some topics in graph theory that are intriguing to undergraduate researchers. The speakers, all of whom have successfully guided undergraduate students in research, will present areas such as graph labeling, fixing numbers of automorphism groups of graphs, the Erdös-Ko-Rado theorem and Kneser's conjecture, graph pebbling, and using Graffiti.pc for generating conjectures. The speakers have directed undergraduate research in intensive summer experiences and in undergraduate thesis activities. The session will provide insight into what makes a topic in graph theory suitable for investigations by undergraduates, and will provide additional avenues of research. The speakers are Ermelinda Delavina of University of Houston - Downtown; Anant Godbole of East Tennessee State University; Glenn Hurlbert of Arizona State University and Cynthia Wyels of California State University Channel Islands.

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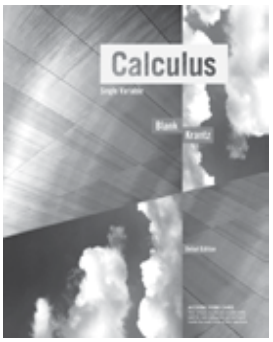
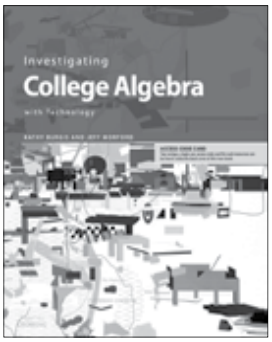
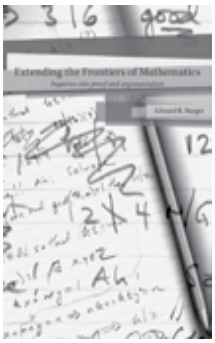






CONTENT on DEMAND™

COMPLETE, TEXTBOOK-FREE ONLINE MATHEMATICS COURSES

Contributed Paper Sessions

MAA Contributed Paper Sessions are normally organized around a predetermined topic. Presenters are selected by the paper organizers after reviewing responses to a call for papers.

CURRENT ISSUES IN MATHEMATICS EDUCATION

Carol Vobach, University of Houston-Downtown
Nancy Leveille, University of Houston-Downtown
Part 1: Thursday, August 10, 1:00 pm – 3:00 pm
Part 2: Friday, August 11, 1:00 pm – 3:00 pm
301 C, Knoxville Convention Center
This session focuses on papers that explore mathematics education courses for pre-service or in-service teachers.

EXAMPLES THAT USE ABSTRACT ALGEBRA IN OTHER DISCIPLINES IN MATHEMATICS

Tyler J. Evans, Humboldt State University
Thursday, August 10, 1:00 pm – 3:00 pm
300 D, Knoxville Convention Center
The interplay between the various branches of mathematics is arguably one of the most appealing aspects of the profession, and can also serve as a powerful teaching tool. The history of mathematics is replete with examples of this interplay, each of which has helped mathematicians achieve a deeper perspective on their work. This session focuses on papers in which ideas from group theory, or more generally abstract algebra, are used to establish results that do not necessarily belong to the subject of algebra itself.

MATHEMATICS AND SPORTS AND GAMES

Howard Penn, U.S. Naval Academy
E. Lee May, Salisbury University
Thursday, August 10, 2:30 pm – 5:15 pm
301 A, Knoxville Convention Center
Mathematics has long been used to study various sports. Likewise, various games such as Bridge, Chess and Poker make extensive use of mathematics. This session focuses on applications from these fields which present interesting examples that can be used in teaching calculus, probability, statistics, differential equations and other courses.

PROMOTING INTEGRATIVE LEARNING IN MATHEMATICS THROUGH LEARNING COMMUNITIES

Donna Beers, Simmons College
Thursday, August 10, 3:15 pm – 5:15 pm
301 C, Knoxville Convention Center
This session focuses on contributions to the scholarship of teaching and learning in mathematics by sharing their experiences in initiating a learning community (LC) during the last three years.

WHAT CAN WE DO TO HELP OUR FRESHMEN SEE THAT THERE IS MORE TO MATHEMATICS THAN CALCULUS?

Richard J. Maher, Loyola University Chicago
Friday, August 11, 1:00 pm – 2:40 pm
301 B, Knoxville Convention Center
A large part of any new college freshman class has been calculused to death. This session provides faculty whose departments have had success in presenting "something different" to first year students with an opportunity to share what they have done with their colleagues.

FUN AND INNOVATIVE TECHNIQUES FOR AN ABSTRACT ALGEBRA CLASS

Sharon M. Clarke, Pepperdine University
Andrew Hetzel, Tennessee Technological University
Part 1: Thursday, August 10, 1:00 pm – 3:00 pm
Part 2: Saturday, August 12, 1:00 pm – 3:00 pm
301 B, Knoxville Convention Center
Abstract algebra is, in many cases, one of the first "rigorous proofs" courses that an undergraduate student will take. This session will focus on fun and innovative ways of teaching some of the topics in an abstract algebra course.

ATTRACTING AND RETAINING STUDENTS TO MATHEMATICS PROGRAMS VIA OUTREACH

Sangeeta Gad, University of Houston-Downtown
Friday, August 11, 3:15 pm – 5:15 pm
301 C, Knoxville Convention Center
The migration away from the science, technology, engineering and mathematics (STEM) fields starts in middle school and continues through the undergraduate years. This session will highlight innovative outreach programs from the higher education institutes to stir interest in mathematics as well ast STEM fields and innovative programs to retain students in mathematics programs.

MATHEMATICS AND POPULAR CULTURE

Sarah J. Greenwald, Appalachian State University
Christopher Goff, University of the Pacific
Part 1: Friday, August 11, 3:15 pm – 4:15 pm
301 B, Knoxville Convention Center
Part 2: Saturday, August 12, 8:30 am – 10:30 am
301 A, Knoxville Convention Center
References to mathematics in popular culture can reveal, reflect, and even shape how society views mathematics. This session will focus on how student enjoyment of popular culture can alleviate math anxiety, energize shy and quiet students, and provide a creative introduction to an in depth study of the related mathematics.

ADVANCES IN RECREATIONAL MATHEMATICS

Paul R. Coe, Dominican University
William T. Butterworth, DePaul University
Saturday, August 12, 1:00 pm – 3:00 pm
301 E, Knoxville Convention Center
There have been many recent advances in recreational mathematics, some of which have involved the use of computers. This session is designed to give members an opportunity to explain their recent work in the field.

THE BEST APPROXIMATION OF A GOOD NUMERICAL METHODS COURSE

Kyle Riley, South Dakota School of Mines and Technology
Saturday, August 12, 1:00 pm – 3:40 pm
301 D, Knoxville Convention Center
A good numerical methods course walks a fine line in covering

numerical methods in enough detail to give students an appreciation of the strengths and weaknesses associated with a numerical method without a formal treatment of numerical analysis. This session will focus on materials and modules that illustrate the grand benefits, or the serious pitfalls, when one employs numerical methods.

RESEARCH INTO PRACTICE: THE TEACHING AND LEARNING OF UNDERGRADUATE MATHEMATICS

William Martin, North Dakota State University
Chris Rasmussen, San Diego State University
Michael Oehrtman, Arizona State University
Saturday, August 12, 3:15 pm – 5:15 pm
301 B, Knoxville Convention Center

The SIGMAA on RUME sponsors this session that relates to research issues concerning the teaching and learning of undergraduate mathematics. The session is devoted to expositions of research results and uses of research (RUME) and teaching.

MATHEMATICAL MODELING, PROJECTS, AND DEMONSTRATIONS THAT ENHANCE A DIFFERENTIAL EQUATIONS COURSE

William P. Fox, Francis Marion University
Saturday, August 12, 3:15 pm – 5:45 pm
301 E, Knoxville Convention Center

Differential equations is a diverse mathematical field that affords educators a great deal of flexibility in terms of content. The course can be highly theoretical, applied, or a combination of each. This session focuses on novel projects, labs, or class demonstrations that enhance a differential equations course either through the facilitation of mathematical theory or exposure to interdisciplinary fields.

GENERAL CONTRIBUTED PAPER SESSION

Charles Ashbacher, Kirkwood Community College
Sarah J. Mabrouk, Framingham State College

Part 1 & 2: Thursday, August 10, 1:00 pm – 5:15 pm
300 C, Knoxville Convention Center

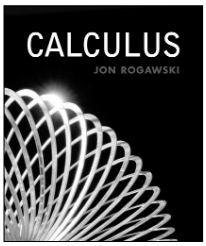
Part 3: Friday, August 11, 1:00 pm – 2:30 pm
301 E, Knoxville Convention Center

Part 4 & 5: Friday, August 11, 1:00 pm – 5:15 pm
300 C, Knoxville Convention Center

Part 6: Saturday, August 12, 1:00 pm – 2:00 pm
200 E, Knoxville Convention Center

Part 7 & 8: Saturday, August 12, 1:00 pm – 5:15 pm
300 C, Knoxville Convention Center

NEW FROM W. H. FREEMAN



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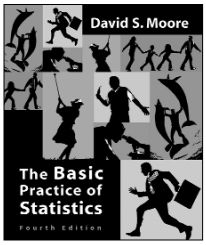

New!
The Basic Practice of Statistics, Fourth Edition
David S. Moore • Purdue University
The new edition of the bestselling one-term data analysis textbook features almost 50% new exercises, a new 4-step problem solving process, a new commentary on data ethics, updated examples, and accessible technology, including NEW CrunchIt! Output screens in the Using Technology sections.

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NEW for Fall 2006, StatsPortal for *The Basic Practice of Statistics* is an online Course Management and Homework System which integrates a rich suite of assessment, diagnostic, tutorial, and enrichment features.

Also from W. H. Freeman Mathematics and Statistics:
For All Practical Purposes, Seventh Edition
Consortium for Mathematics and its Applications (COMAP), Inc.

Mathematical Structures for Computer Science, Sixth Edition
Judith L. Gersting • University of Hawaii-Hilo

Introduction to the Practice of Statistics, Fifth Edition
David S. Moore and George P. McCabe • both at Purdue University

Statistics: Concepts and Controversies, Sixth Edition
David S. Moore • Purdue University
William Notz • Ohio State University

Coming soon!
Reconceptualizing Mathematics
Judith Sowder, Larry Sowder, and Susan Nickerson
all at San Diego State University
This exciting forthcoming text helps the future educator understand mathematics deeply enough to discuss it intelligently in the classroom, and to teach it effectively to students who often learn math in different ways.

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  (Time on tutorial: (5-10) % of the grade)
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Panels and Other Sessions

Panels and Other Sessions feature presentations and panel discussions. The speakers are selected and invited by the organizers because of their expertise and accomplishments in the focal area of the session.

WORKSHOP ON TRAINING T.A.'s

David Manderscheid, University of Iowa
Thursday, August 10, 1:00 pm – 2:20 pm
301 D, Knoxville Convention Center

How are T.A. training sessions set up? What are the similarities and differences between such sessions? How can case studies be used to support T.A. training? How might T.A. training compare with preparing your faculty? These issues and others will be discussed. Participants should bring T.A. training materials they might have to this interactive workshop. The session will be moderated by Diane Herrmann, University of Chicago, and Eileen Shugart, Virginia Polytechnic Institute and State University. This session is aimed at PhD students and at recent PhDs. An overview of the employment process will be given with ample opportunity for participants to ask questions. Questions that will be addressed include: How do you find which jobs are available? How do you choose which jobs you want to apply for? What are academic and other employers looking for in the materials that you send? What should you be doing now? How do schools conduct interviews? How can you best prepare for these interviews? How do employers choose to whom they will make offers? Panelists will include Sharon Clarke, Pepperdine University; James Freeman, Cornell College; David Manderscheid, University of Iowa; and John Vano, University of Wisconsin. The session is co-sponsored by the MAA Committee on Graduate Students and The Young Mathematicians Network.

MAKING THE CONNECTION BETWEEN RESEARCH AND TEACHING IN UNDERGRADUATE MATHEMATICS: A SAMPLE OF CHAPTERS FROM A FORTHCOMING BOOK ON MATHEMATICS EDUCATION RESEARCH

Chris Rasmussen, San Diego State University
David E. Meel, Bowling Green State University
Michael Oehrtman, Arizona State University
Thursday, August 10, 1:00 pm – 2:20 pm
Ballroom A, Knoxville Convention Center

Barbara Edwards, Oregon State University, and Teri Jo Murphy, University of Oklahoma, will discuss several chapters from a forthcoming book on research in undergraduate mathematics education, with emphasis on the implications of that research in the teaching of undergraduate mathematics courses. Chapters from the forthcoming volume include papers written by mathematics education researchers and by mathematicians discussing topics in the undergraduate curriculum as well as overarching issues in undergraduate mathematics education.

GEOMETRY IN THE HIGH SCHOOL CURRICULUM

Johnny Lott, University of Montana-Missoula
Thursday, August 10, 1:00 pm - 2:20 pm
301 A, Knoxville Convention Center

Many mathematicians have fond memories of a one-year, proof-based course in Euclidean geometry. Did it ever exist and for how many students? Does that course still exist today and for how many students? What is the nature of the geometry courses offered today? The panelists will provide research-based information about how the high school geometry course has evolved over the years, what high school students have learned in that course, and how colleges and universities follow up on the high school geometry course. This will not be a session about what the high school geometry course ought to be, but rather evidence-based information for mathematicians involved in high school mathematics education. The panelists and their topics are as follows: Sharon Senk, Michigan State University, "How the high school course has evolved over the years"; Sharon Soucy McCrone, Illinois State University, "Research on what high school students take away from the course"; Eileen Donoghue, City University of New York, "How colleges and universities follow up on the high school geometry course"; and James King, University of Washington, "New directions in the course, such as use of software."

SEVERAL PERSPECTIVES ON QUANTITATIVE LITERACY IN THE UNDERGRADUATE PROGRAM

Caren Diefenderfer, Hollins University
Thursday, August 10, 2:30 pm – 3:50 pm
Ballroom A, Knoxville Convention Center

There is a growing interest in Quantitative Literacy (QL) and Quantitative Reasoning (QR) at many levels of undergraduate education. Some institutions have opted to include QL/QR requirements in their general education requirements, others have embedded QL/QR requirements in major requirements and many others are trying to decide how to address the QL/QR needs of undergraduate students. Three different professional groups have been working with these ideas over the past 20 years. This panel will compare how summer PREP programs, the QL SIGMAA, the National Numeracy Network (NNN) and NSF funded Mathematics Across the Curriculum projects have each addressed QL/QR in the undergraduate program.

MAA SECTION OFFICERS MEETING

Thursday, August 10, 2:30 pm – 5:00 pm
Salon CD&E, Hilton

This meeting will be moderated by Nancy L. Hagelgans, Ursinus College, Chair of the MAA Committee on Sections.

SIGMAA ON ENVIRONMENTAL MATHEMATICS INVITED ADDRESS

Thomas O'Neil, California Polytech State University
Thursday, August 10, 4:00 pm – 5:30 pm
Ballroom A, Knoxville Convention Center

"Saving the California Condor."

MAA PRIZE SESSION

Friday, August 11, 11:30 am – Noon
Ballroom AB&C, Knoxville Convention Center

This session will be moderated by Martha J. Siegel, Towson University, MAA Secretary.

Panels and Other Sessions

GÖDEL'S CONTRIBUTIONS TO THE FOUNDATION OF MATHEMATICS

Ron Barnes, University of Houston-Downtown
Linda Becerra, University of Houston-Downtown
Friday, August 11, 1:00 pm - 2:20 pm
Ballroom B, Knoxville Convention Center

This session is offered in recognition of the 100th anniversary of his birth. Panel participants will discuss: (1) an outline of the situation of the foundations of mathematics before Gödel's results; (2) Gödel's results and their interpretations and applications in mathematics; (3) an outline of their implications in computer science and other areas; (4) a summary list of what has evolved since Gödel's time; and (5) a consideration of what questions in the foundations of mathematics have not yet been resolved. A summary listing of results already proven or decided in the foundations of mathematics along with a companion listing of conjectures not yet resolved will be provided to the session attendees. After short presentations of the above considerations, questions from the floor will be entertained by the panelists.

ENHANCING THE TEACHING OF ADVANCED PLACEMENT STATISTICS

Murray H. Siegel, South Carolina Governor's School for Science and Mathematics
Friday, August 11, 2:30 pm – 3:50 pm
Ballroom B, Knoxville Convention Center

The number of students taking Advanced Placement Statistics continues to grow. Many high school mathematics teachers who teach AP Statistics were trained to teach calculus and may not have the background required to be an effective statistics teacher. This panel provides insights into activities, use of software and alternate methods of assessment that will be useful to AP Statistics teachers at all levels of experience. In addition, lessons to be learned from the 2006 AP Statistics exam will be examined.

MAA ALDER AWARDS SESSION

Friday, August 11, 3:00 pm – 4:30 pm
Ballroom C, Knoxville Convention Center

Presentations will be given by the 2006 Alder Award recipients. The session will be moderated by Carl Cowen, IUPUI, MAA President. Presentations will be given by the 2006 Alder Award recipients. Christopher N. Swanson, Ashland University; Garikai Campbell, Swarthmore College; and Lesley Ward, Harvey Mudd College.

SIGMAA ON THE PHILOSOPHY OF MATHEMATICS INVITED ADDRESS

Martin Flashman, Humboldt State University
Bonnie Gold, Monmouth University
Friday, August 11, 4:45 pm – 6:15 pm
Ballroom C, Knoxville Convention Center

Michael D. Resnik, of the Department of Philosophy at the University of North Carolina, Chapel Hill, will speak on "Some problems and solutions in contemporary philosophy of mathematics." This talk will begin by surveying some of the major problems and positions in contemporary philosophy of mathematics. This will provide the background for sketching his own approach to these problems—mathematical structuralism—and some of the important objections to his view.

MAA BUSINESS MEETING

Saturday, August 12, 11:30 am - Noon
Ballroom AB&C, Knoxville Convention Center

This session will be moderated by Martha J. Siegel, Towson University, MAA Secretary.

TOWN HALL MEETING: WHAT SHOULD FUTURE MATH MAJORS LEARN ABOUT PROOF IN HIGH SCHOOL?

Dan Teague, North Carolina School of Science and Mathematics
Saturday, August 12, 1:00 pm – 2:20 pm
Ballroom B, Knoxville Convention Center

This session, sponsored by SIGMAA TAHSM, will be organized as a town hall meeting. The intent is to have an open discussion between university faculty and high school teachers of advanced mathematics on the kinds of experiences and understanding about proof that future math majors should have as a part of their high school program. Many (perhaps most) future mathematics majors will have completed AP Calculus in high school. Some will have taken courses beyond that. Where and in what ways should proof be introduced to these students? Panelists will include Tom Banchoff, Brown University and Dan Teague.

GRADUATION IS COMING: NOW WHAT?

Sarah Ann Stewart, Belmont University
Saturday, August 12, 1:00 pm – 2:20 pm
301 C, Knoxville Convention Center

Aimed at undergraduates, this panel session will provide information regarding career options for students with a Bachelor's degree in mathematics. This will include a discussion of careers that do not require graduate degrees, as well as a discussion of when and why to apply to graduate school. We will try to indicate what grad school is like, what courses one should have before going, what the GRE is and the importance of the subject test, what the different kinds of schools are, etc. The session is sponsored by the Young Mathematician's Network.

HOW TO GET PUBLISHED IN MAA JOURNALS

Don Albers, MAA Director of Publications
Saturday, August 12, 1:00 pm – 2:50 pm
Ballroom A, Knoxville Convention Center

Editors of MAA journals will provide advice on what to write and how to write for MAA journals. Panelists will include Lowell Beineke, the *College Mathematics Journal* Editor; Allen Schwenk *Mathematics Magazine* Editor; Kyle Siegrist, *Journal of Online Mathematics and its Applications* Editor; and Dan Velleman, *The American Mathematical Monthly* Editor-elect. The panel will be moderated by Bruce Palka.

WEBWORK, A WEB BASED INTERACTIVE HOMEWORK SYSTEM

Michael E. Gage, University of Rochester
Arnold K. Pizer, University of Rochester
Vicki Roth, University of Rochester
Saturday, August 12, 1:00 pm – 4:00 pm
200 A, Knoxville Convention Center

WeBWorK is a program which allows students to do their math-

ematical homework interactively over the web. It is currently being used by over 100 colleges, universities and high schools in courses such as college algebra, pre-calculus to vector calculus, differential equations, linear algebra and statistics. WeBWorK can handle most homework problems typically used in such courses and is distributed with an extensive library of problems. The purpose of this session is to bring together instructors who are currently using or thinking about using WeBWorK. Several topics will be covered. There will be an introduction to WeBWorK for those unfamiliar with the system. Assessment issues (e.g. "does WeBWorK improve learning") will be addressed. Finally we will discuss more general topics such as (1) the status of the national library of WeBWorK problems, (2) the introduction of new components such as Michigan's Gateway Testing and (3) innovative educational uses of WeBWorK. Further information on WeBWorK and this session can be found at http://webwork.rochester.edu.

PRELIMINARY REPORT ON NSF-SUPPORTED MAA RESEARCH PROJECT ON MODELING-BASED COLLEGE ALGEBRA

Bill Haver, Virginia Commonwealth University
Norma Agras, Miami Dade College
Barbara Edwards, Oregon State University
Saturday, August 12, 1:00 pm – 5:00 pm
Sequoyah 3, Hilton

With support from the National Science Foundation, MAA and CRAFTY are conducting a research study on the impact of modeling based College Algebra courses. Faculty from the eleven participating institutions attended a workshop in August 2005 and are offering modeling based college algebra courses as a part of this research study. Each institution is offering at least 3 pilot and 3 control sections in Spring 2006 and again in Fall 2006. Barbara Edwards has designed the research study and the institutions have agreed to provide extensive quantitative data as well as to arrange for researchers to conduct focus group discussions with their students. The study will contain comparative information concerning persistence in the courses, performance on common exam questions, retention in future courses, grades in future courses and student perceptions. Representatives from the participating institutions will report on what occurred during the first semester of this pilot project. Panelists will include Elias Toubassi, University of Arizona; Donna Flint, Becky Hunter and Dan Kemp, South Dakota State University; Mary Ellen O'Leary and Debra Geddings, University of South Carolina; Susan Serrano, Florida Southern College; Christopher Yarrish and Daniel Fahringer, Harrisburg Area Community College.

ORGANIZING MAA SESSIONS

Douglas Ensley, Shippensburg University
Saturday, August 12, 2:30 pm – 3:50 pm
301 C, Knoxville Convention Center

This panel will discuss the procedures that are needed to submit a proposal to organize a contributed paper session, a minicourse or a panel session. We will discuss the deadlines for each type of session and who the proposal should be sent to. The differences between the sessions will be discussed. The session will also talk about the selection criteria for each type of session. The panelists will include: Jimmy Buchanan, Hiram University; Sarah Mabrouk, Framingham State College; Howard Penn, U.S. Naval Academy; and Jim Tattersall, Providence College. The panel is sponsored by the MAA Coordinating Council on Meetings.

SUPPORTING BEGINNING MATHEMATICS TEACHER EDUCATORS: WHAT AND HOW

Gail Burrill, Michigan State University
Saturday, August 12, 3:00 pm – 4:20 pm
Ballroom A, Knoxville Convention Center

Preparing preservice teachers and providing professional development for those already in schools are central elements in the efforts to improve mathematics teaching and learning in the United States. The panel will consider issues and challenges beginning mathematics teacher educators face as they bridge the worlds of mathematics and education and universities and K-12 classrooms. What can the mathematics community, working with the Association of Mathematics Educators through MAA, do to support these educators as they prepare K-12 mathematics teachers? Suggestions might include developing a cadre of mentors, identifying appropriate resources, or helping build a network of colleagues who share their ideas. The goal is to create an action plan to make this or other creative suggestions happen, and input and advice from those participating in the session will help ensure that the direction we take will be successful. Panelists will include: Tim Hendrix, Meredith College; Judy Covington, Lousiana State University; Chris Rasmussen, San Diego State University; and Viji Sundar, California State University Stanislaus. The session is sponsored by the Association of Mathematics Teacher Educators (AMTE).

TEACHING CONTINUITY AND DIFFERENTIABILITY FOR FUNCTIONS OF ONE AND TWO VARIABLES

Dan Teague, North Carolina School of Science and Mathematics
Stephen Davis, Davidson College
Saturday, August 12, 3:00 pm – 5:00 pm
Ballroom B, Knoxville Convention Center

This workshop is designed for AP teachers and others teaching an introductory course in calculus. The session will consider what teachers should know about continuity and differentiability for functions of two (and more) variables that should inform their instruction in the introductory single variable course. For example, in the first course in calculus, is being differentiable different than simply having a derivative? Because of the relative simplicity of the single variable setting, are we giving students a false impression that will create problems for them later?

EMAIL LAB INFO

Knoxville Convention Center in the Exhibit Hall

Thursday, August 10th:	**9:00 am – 5:00 pm**
Friday, August 11th:	**9:00 am – 5:00 pm**
Saturday, August 12th:	**9:00 am – 2:00 pm**

Graduate Student Program

MathFest provides an abundant number of activities to appeal to graduate students throughout the program. The following sessions are intended specifically for the graduate student attendees. They are designed to better prepare students for life during and after graduate school.

GRADUATE STUDENT POSTER SESSION

James Freeman, Cornell College
Thursday, August 10, 3:00 pm – 4:30 pm
Room 301 D, Knoxville Convention Center
This session is organized by the MAA Committee on Graduate Students and The Young Mathematicians Network.

GRADUATE STUDENT RECEPTION

Thursday, August 10, 5:00 pm – 6:00 pm
Great Smoky Mountain Center, Hilton
This activity for graduate students is sponsored by the Committee on Graduate Students chaired by David Manderscheid, University of Iowa. Complimentary food and beverage will be served while participants socialize in an informal atmosphere.

APPLYING FOR YOUR FIRST JOB

David Manderscheid, University of Iowa
Friday, August 11, 2:30 pm – 3:50 pm
Room 300 D, Knoxville Convention Center
This session is aimed at PhD students and at recent PhDs. An overview of the employment process will be given with ample opportunity for participants to ask questions. Questions that will be addressed include: How do you find which jobs are available? How do you choose which jobs you want to apply for? What are academic and other employers looking for in the materials that you send? What should you be doing now? How do schools conduct interviews? How can you best prepare for these interviews? How do employers choose to whom they will make offers? Panelists will include Sharon Clarke, Pepperdine University; James Freeman, Cornell College; and David Manderscheid, University of Iowa. The session is co-sponsored by the MAA Committee on Graduate Students and The Young Mathematicians Network.

Undergraduate Student Activities

MathFest includes a rich array of activities for students. Both students and faculty will be interested in presentations of student work and the invited lectures developed with students in mind.

MAA/PME STUDENT RECEPTION

Wednesday, August 9, 4:30 pm – 5:30 pm
Salon A, Hilton

MATH JEOPARDY

John Harris, Furman University
Wednesday, August 9, 5:30 pm – 7:15 pm
Salon A&B, Hilton
Answer: An undergraduate team competition, it is a mathematical version of a popular television game show.
Question: What is Mathematics Jeopardy?
Come and watch an entertaining round of answers and questions encompassing calculus, linear algebra, differential equations, discrete mathematics, and mathematical events.

STUDENT HOSPITALITY CENTER

Richard and Araceli Neal, American Society for the Communication of Mathematics
Thursday, August 10, 9:00 am - 5:00 pm
Friday, August 11, 9:00 am - 5:00 pm
Saturday, August 12, 9:00 am - 2:00 pm
Ballroom EF&G, Knoxville Convention Center
The Student Hospitality Center (SHC) provides a place for students and other MathFest attendees to meet for informal conversation, refreshments, and mathematical diversions. The SHC also provides programs for the MAA and PME student paper sessions, packets for the MAA student presenters, and information on MathFest activities of interest to students.

MAA STUDENT LECTURE

Richard Tapia, Rice University
Thursday, August 10, 1:00 pm – 1:50 pm
Ballroom C, Knoxville Convention Center
See the Invited Address section for details.

MAA STUDENT PAPER SESSIONS

Edward C. Keppelmann, University of Nevada
J. Lyn Miller, Slippery Rock University
Thursday, August 10, 2:00 pm - 6:15 pm
Friday, August 11, 2:00 pm – 5:00 pm
200 AB&C, Knoxville Convention Center

PME STUDENT PAPER SESSIONS

Angela Spalsbury, Youngstown State University
Thursday, August 10, 2:00 pm - 6:15 pm
Friday, August 11, 2:00 pm – 5:00 pm
200 D&E, Knoxville Convention Center

MAA UNDERGRADUATE STUDENT ACTIVITIES SESSION

WEIRD MULTIPLICATION AND WEIRD WAYS TO MULTIPLY

James Tanton, St. Mark's Institute of Mathematics/ St. Mark's School
Friday, August 11, 1:00 pm – 1:50 pm
Ballroom C, Knoxville Convention Center
What's four times three? Twelve you might think – but no more! In a new fun-filled action-packed system of arithmetic worthy of much mathematical investigation four times three is eighteen, the square root of 100 is six, and two times five is ten. (Hang on. That's not weird!) Let's spend an hour working out 5716 x 8945 together five different ways. What could be more fun?

PME/MAA STUDENT BANQUET AND AWARDS CEREMONY

Friday, August 11, 6:15 pm - 7:45 pm
Salon A&B, Hilton
All undergraduate students and their mentors are welcome. See the registration form for more information on this ticketed event.

PME J. SUTHERLAND FRAME LECTURE

ELLIPSES AND CIRCLES? TO UNDERSTAND VOTING PROBLEMS??!

Donald Saari, University of California at Irvine
Friday, August 11, 8:00 pm – 9:00 pm
Salon CD&E, Hilton
See the Invited Address section for details.

STUDENT PROBLEM SOLVING COMPETITION

Richard Neal, American Society for the Communication of Mathematics
Saturday, August 12, 1:00 pm – 2:15 pm
301 A, Knoxville Convention Center
This is the finals of the Problem Solving Competition. Universities and colleges that participate monthly on their own campuses by holding problem solving contests are invited to send two contestants. Each contestant will be required to solve a series of mathematical problems. Based upon the outcome a champion and a runner up will be named.

MATH HORIZONS SPECIAL SESSION

Arthur T. Benjamin, Harvey Mudd College
Jennifer J. Quinn, Association for Women in Mathematics
Saturday, August 12, 2:30 pm – 3:00 pm
301 A, Knoxville Convention Center
Meet the editors of *Math Horizons*. It is the MAA's magazine for students, filled with intriguing articles, profiles, problems, humor, and contests. We are interested in your suggestions and we will be looking for students to join our Student Advisory Group.

MAA MATHEMATICAL CONTEST IN MODELING (MCM) WINNERS

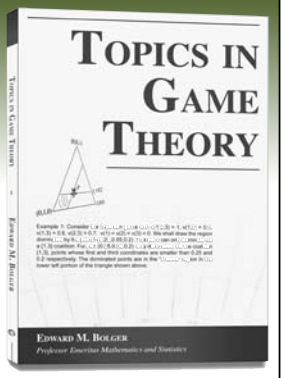
Ben Fusaro, Florida State University
Saturday, August 12, 3:15 pm - 4:30 pm
301 A, Knoxville Convention Center

About 450 teams, each consisting of three undergraduates, took part in the 2006 MCM in February. The contest consists of two real(istic) scenarios (one discrete, one continuous) that call for analysis and resolution. The teams have four days to deal with the challenge during which time they may use or consult anything inanimate — computers, libraries, the Web, etc. MAA judges choose one continuous and one discrete winner from the top contenders. The MAA subsidizes the teams' travel to MathFest, where they will present the results of their four-day challenge.

Topics in Game Theory

Ed Bolger
Miami University

Based on a set of course notes used by the author in his Game Theory course at Miami University. Intended for a junior/senior level course in game theory.



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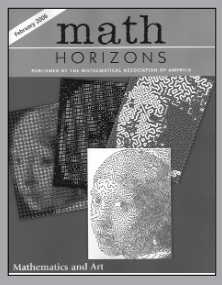

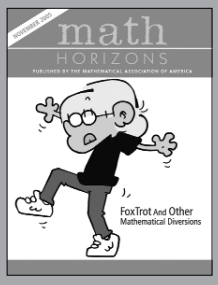

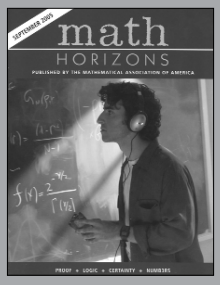

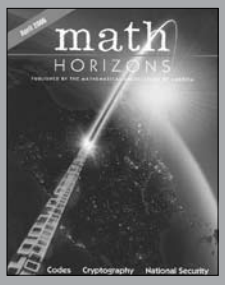

Are you receiving your issue of the Mathematical Association of America's magazine for students?

Stop by the MAA Publications booth and receive a complimentary copy of Math Horizons and learn how to subscribe to this great magazine for yourself or for your school

Minicourses

Minicourses offer four hours of focused instruction. The Knoxville minicourses were coordinated by Joe Straight, SUNY, Fredonia. Enrollment is limited and a separate registration fee is required. On-site registration inquiries may be made at the MathFest Registration Desk.

MINICOURSE #1

EULER

William W. Dunham, Muhlenberg College
Edward C. Sandifer, Western Connecticut State University
Part 1: Thursday, August 10, 1:00 pm – 3:00 pm
Part 2: Friday, August 11, 1:00 pm – 3:00 pm
300 A, Knoxville Convention Center

Euler wrote and published over 850 books and papers. They form the basis for huge segments of modern mathematics. We will survey his many contributions and take a close look at a few of them. We will demonstrate how to use Euler's 18th century mathematics in a 21st century environment, and we will show by example why Laplace was giving good advice when he said, "Read Euler, read Euler. He is the master of us all."

MINICOURSE #2

INFUSING CONNECTIONS INTO CORE COURSES FOR SECONDARY TEACHERS

Steve R. Benson, Education Development Center and University of New Hampshire
Karen J. Graham, University of New Hampshire
Part 1: Thursday, August 10, 1:00 pm – 3:00 pm
Part 2: Friday, August 11, 1:00 pm – 3:00 pm
Room 300 B, Knoxville Convention Center

National recommendations call for content courses for prospective teachers that make explicit connections between the mathematics that teachers learn and the mathematics they will use as teachers. Most content courses for preservice secondary teachers are core courses for the mathematics major and texts for these courses do not typically address these connections. Minicourse participants will work with materials that contain the mathematical rigor of an upper division course and help prospective teachers build connections to secondary mathematics, discuss implementation issues with colleagues who have used such materials, and begin to adapt these materials for the courses they teach.

MINICOURSE #3

CONTEMPORARY COLLEGE ALGEBRA: A REFOCUSED COLLEGE ALGEBRA COURSE

Laurette Foster, Prairie View A&M University
Alex Fluellen, Clark Atlanta University
Don Small, U.S. Military Academy
Part 1: Thursday, August 10, 3:30 pm – 5:30 pm
Part 2: Saturday, August 12, 1:00 pm – 3:00 pm
300 A, Knoxville Convention Center

This minicourse will take participants on a typical journey through a refocused college algebra program. The trip will include small-group project presentations, assignments requiring the use of a graphing calculator, writing assignments, and assessment techniques. Participants will receive a collection of existing small-group projects and will create at least one new one during the minicourse. Familiarity with a graphing calculator will be helpful but is not a prerequisite.

MINICOURSE #4

FAIR DIVISION: FROM CAKE-CUTTING TO DISPUTE RESOLUTION

Steven J. Brams, New York University
Part 1: Thursday, August 10, 3:30 pm – 5:30 pm
Part 2: Saturday, August 12, 1:00 pm – 3:00 pm
300 B, Knoxville Convention Center

Cutting a cake, dividing up property in an estate, determining the borders in an international dispute – such problems of fair division are ubiquitous. Rigorous procedures for allocating goods (or "bads," like chores), or deciding who wins on what issues in disputes, will be analyzed, starting with the well-known cake-cutting procedure of "I cut, you choose." Particular attention will be given to procedures that produce "envy-free" allocations, in which everybody thinks he or she received the largest portion and hence does not envy anybody else. Results obtained in the last five years will be highlighted. Applications to real-life conflicts, from interpersonal to international, will be discussed.

MINICOURSE #5

COMBINATORIALLY THINKING

Arthur T. Benjamin, Harvey Mudd College
Jennifer J. Quinn, Association for Women in Mathematics
Part 1: Friday, August 11, 3:30 pm – 5:30 pm
Part 2: Saturday, August 12, 3:30 pm – 5:30 pm
300 A, Knoxville Convention Center

Faced with an identity, how do you create a combinatorial proof? This hands-on minicourse will provide 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 add to the excitement.

MINICOURSE #6

TEACHING A PROOF-BASED COURSE AS THE GATEWAY TO THE MATHEMATICS MAJOR

James Sandefur, Georgetown University
Part 1: Friday, August 11, 3:30 pm – 5:30 pm
Part 2: Saturday, August 12, 3:30 pm – 5:30 pm
300 B, Knoxville Convention Center

Many colleges and universities have a gateway course to help mathematics students make the transition to more theoretical courses, with a goal of helping students learn how to understand and construct proofs. The organizer of this course, guided by 5 years of videotaping his students doing their homework for a proof-based course, will lead participants in an exploration of effective approaches to teaching "proof." We will discuss appropriate types of problems, the wording of problems, effective hints and prompts, and a variety of pedagogical approaches. Suggestions and questions from participants will be encouraged.

Short Course

Short Courses are organized around themes and will be held immediately preceeding the public sessions of MathFest.

TWO-DAY SHORT COURSE

ENVIRONMENTAL MODELING

The MAA MathFest Short Course is presented in honor of William F. Lucas.

Ben Fusaro, Florida State University
Part 1: Tuesday, August 8, 9:00 am – 5:00 pm
Part 2: Wednesday, August 9, 9:00 am – 5:00 pm
Sequoyah 3, Hilton

The goal of this two-day course is to introduce college teachers to a variety of topics in environmental mathematics and to the opportunities that this emerging field provides to interact with the larger society. Ben Fusaro has been active in lecturing, writing, and organizing activities in environmental mathematics since 1984. He will do the introduction and wrap-up.

LECTURE 1

Measuring Pollution
Fred S. Roberts, DIMACS Center, Rutgers University

Finding simple ways to measure the amount of pollution in the air we breathe, the water we drink, or the sounds we hear, has long been a goal of environmental scientists. We will discuss pollution indices in the context of a more general discussion of the theory of meaningful and meaningless statements and scales of measurement. A statement involving scales of measurement is called meaningless if its truth or falsity can depend on the particular versions of scales which are used in the statement. We will develop the theory and apply it to measurement of air, water, and noise pollution. We will discuss the possibility of averaging different measures of pollution in a meaningful way, or of combining different measures of pollution to get a consensus measure. We will also describe the use of expert judgments to assess pollution levels and describe ways to combine these judgments in the context of mathematical models of the level of air pollution and energy use in cities.

LECTURE 2

Optimal Control of Environmental Models
Suzanne Lenhart, University of Tennessee – Knoxville

This is an introduction to optimal control of systems of ordinary differential equations that model environmental processes. Examples will be taken from population, disease and the bacterial control of pollutants.

LECTURE 3

Modeling Oil Reserves
Catherine A. Roberts, College of the Holy Cross

The challenge of modeling oil supply and production is interdisciplinary, calling upon geology and environmental science, as well as mathematics. The issue is also laced with political and philosophical perspectives on the nature of our relationship with the planet. This talk will introduce this topic at a level suitable for a liberal arts course in mathematical modeling or environmental science. Models that provide insight into how oil production schemes impact this natural resource will be developed and discussed. As a specific example, the speaker will describe a model tied to oil drilling in the Arctic National Wildlife Refuge.

LECTURE 4

A Mathematical Look at Extinction
Roland H. Lamberson, Humboldt State University

We will explore some mathematical models in ecology with particular interest in the probability of extinction. We will look at measures of vulnerability, risky management strategies and how reliably models can predict the viability of a species. Species of interest will include blue whales, northern spotted owls and Pacific salmon.

LECTURE 5

Clutching for Survival: The California Condor Restoration Project
Thomas O'Neil
California Polytechnic State University - San Luis Obispo

Since 1999, several Cal Poly students and I have been providing support to the Ventana Wilderness Society in their effort to establish a flock of California condors in the Big Sur area. A good recovery strategy requires an accurate population projection program. Unfortunately, there are several condor traits that make construction of such a program difficult. We will discuss these traits and how we have overcome many of the problems. Additionally, there is a lack of data. Critical to any population projection program is the survival rate data. There are estimates that can be used for first approximations but these data are based on observations of small populations of wild condors. Little was known of how the captive bred and reared birds will fare in the wild. To help in this area, we created a database of every California condor in captivity or in the wild, living or dead since 1987, the year the last wild condor was brought into captivity. We will discuss the problems encountered in creating this database and getting it into a format that has made it a useful tool for the biologists in the condor recovery project.

LECTURE 6

From Mathematics to Environmental Consulting
Charles Hadlock, Bentley College

Environmental consulting includes the use of modeling and encompasses a considerable range of activities depending on both the nature of the client organization and the objective of the investigation. For example, regulatory and legal cases might be conducted very differently from scientific and engineering investigations. The speaker will discuss his experience in a wide range of consulting assignments and will also suggest ways that mathematicians can involve themselves in this kind of work.

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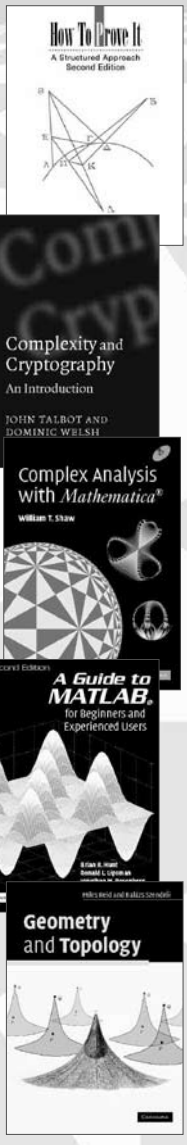

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R. Douglas Gregory

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Alina Carmen Cojocaru and M. Ram Murty

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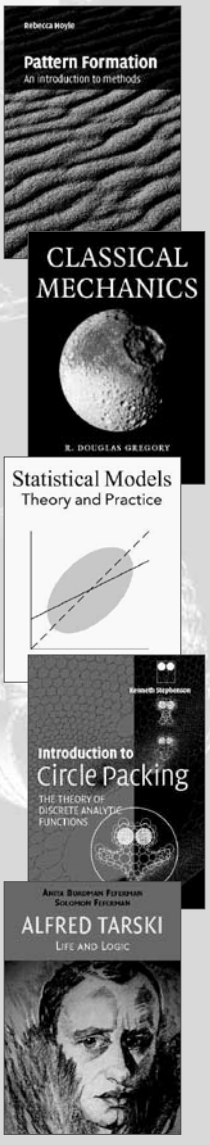
David Freedman

Introduction to Circle Packing
The Theory of Discrete Analytic Functions
Kenneth Stephenson

Alfred Tarski
Life and Logic
Anita Burdman Feferman and Solomon Feferman

Introductory Algebraic Number Theory
Saban Alaca and Kenneth S. Williams

Analysis
An Introduction
Richard Beals



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SIGMAA Sessions

SIGMAAs provide MAA members who share specific mathematical interests with opportunities to organize and interact professionally. Some of their activities include meetings, e-mail discussion lists, and facilitating research.

SIGMAA ON QUANTITATIVE LITERACY PANEL
SEVERAL PERSPECTIVES ON QUANTITATIVE LITERACY IN THE UNDERGRADUATE PROGRAM

Caren Diefenderfer, Hollins University
Thursday, August 10, 2:30 pm – 3:50 pm
Ballroom A, Knoxville Convention Center
See Panels and Other Sessions for more details.

SIGMAA ON ENVIRONMENTAL MATHEMATICS GUEST LECTURE

Ben Fusaro, Florida State University
Thursday, August 10, 4:00 pm – 5:30 pm
Ballroom A, Knoxville Convention Center
Tom O'Neil, California Polytech State University will speak on "Arithmetic, population and energy sustainability." Dr. Bartlett's talk will be followed by a SIGMAA EM business meeting.

SIGMAA ON STATISTICS EDUCATION PANEL

ENHANCING THE TEACHING OF ADVANCED PLACEMENT STATISTICS

Murray H. Siegel, South Carolina Governor's School for Science and Mathematics
Friday, August 11, 2:30 pm – 3:50 pm
Ballroom B, Knoxville Convention Center
See Panels and Other Sessions for more details.

SIGMAA ON THE PHILOSOPHY OF MATHEMATICS GUEST LECTURE

Martin Flashman, Humboldt State University
Bonnie Gold, Monmouth University
Friday, August 11, 4:45 pm – 6:15 pm
Ballroom C, Knoxville Convention Center
See Panels and Other Sessions for more details.

SIGMAA ON TEACHING ADVANCED HIGH SCHOOL MATHEMATICS ANNUAL BUSINESS MEETING AND RECEPTION

Dan Teague, North Carolina School of Science and Mathematics
Friday, August 11, 5:00 pm – 6:30 pm
Salon E, Hilton
SIGMAA TAHSM will hold in its annual business meeting at MathFest 2006. We will have an open discussion with the membership on the desired activities of the SIGMAA at MAA and Sectional meetings, the content of the web-page, and areas of mutual concern that the SIGMAA could address. There will be a reception for SIGMAA members at the conclusion of the Business Meeting.

SIGMAA ON TEACHING ADVANCED HIGH SCHOOL MATHEMATICS TOWN HALL MEETING

WHAT SHOULD FUTURE MATH MAJORS LEARN ABOUT PROOF IN HIGH SCHOOL?

Dan Teague, North Carolina School of Science and Mathematics
Saturday, August 12, 1:00 pm – 2:20 pm
Ballroom B, Knoxville Convention Center
See Panels and Other Sessions for more details.

SIGMAA ON ENVIRONMENTAL MATHEMATICS GEOLOGY TRIP

Ben Fusaro, Florida State University
Saturday, August 12, 1:30 pm – 5:30 pm
Gareth Davies, Cambrian Groundwater Co., Oak Ridge, Tennessee will conduct the field trip. Environmental Math SIGMAA will sponsor a trip to Oak Ridge on Saturday afternoon. Geologist Gareth Davies will tell us about the Ridge-and-Valley Appalachians, with stops to examine geological features. In Oak Ridge-the secret city-we will visit the American Museum of Science and Energy, as well as "K-25", a 40-acre building that separated fissionable U-235 from U-238 during the Cold War.

Our van will leave from the front of the Hilton at 1:30 pm, and we will be back at 5:30 pm. The cost is $20, which includes admission to the museum. Please register with Hal Nesbitt (HNesbitt@maa.org). For more information, write Ben Fusaro (fusaro@math.fsu.edu).

SIGMAA ON TEACHING ADVANCED HIGH SCHOOL MATHEMATICS WORKSHOP

TEACHING CONTINUITY AND DIFFERENTIABILITY FOR FUNCTIONS OF ONE AND TWO VARIABLES

Dan Teague, North Carolina School of Science and Mathematics
Stephen Davis, Davidson College
Saturday, August 12, 3:00 pm – 5:00 pm
Ballroom B, Knoxville Convention Center
See Panels and Other Sessions for more details.

SIGMAA ON RESEARCH IN MATHEMATICS EDUCATION CONTRIBUTED PAPER SESSION

RESEARCH INTO PRACTICE: THE TEACHING AND LEARNING OF UNDERGRADUATE MATHEMATICS

William Martin, North Dakota State University
Chris Rasmussen, San Diego State University
Michael Oehrtman, Arizona State University
Saturday, August 12, 3:15 pm – 5:15 pm
301 B, Knoxville Convention Center
See Contributed Paper Sessions for more details.

Social Events

There are social events planned for every evening of MathFest for all to enjoy. Participants and their guests are welcome to take part in one or all. Some events have tickets which were only available through advance registration.

GREAT SMOKY MOUNTAINS ARTS AND CRAFTS COMMUNITY TOUR

Wednesday, August 9, 9:00 am – 4:00 pm
Cumberland Avenue Entrance, Knoxville Convention Center
Beneath the natural beauty of Gatlinburg and the Great Smoky Mountains lies the colorful lore of Tennessee history and times gone by, dating back to even before the founding of our country. Many of the specialty shops that you will visit on this tour cling to that heritage in the utilitarian craftsmanship and artistic renderings of their wares. Stop and browse through the shops at Glades Village, Clift Dwellers, Morning Mist and the Glades Art & Craft Center. You'll leave with a newfound appreciation for the assemblage of fine art available in the Smokies.

Lunch will be on your own at one of the many restaurants at Walden's Landing featuring Calhoun's Restaurant, Atlanta Bread Company and the Smoky Mountain Brewery. Attendees, guests and spouses will have a shopping experience like no other. This tour includes an expert tour guide. *Tickets are $45 per person.*

OPENING RECEPTION

Wednesday, August 9, 6:30 pm – 7:30 pm
Great Smoky Mountain Center, Hilton
The Association is pleased to hold a reception with a cash bar for all MathFest participants prior to the Opening Banquet.

OPENING BANQUET

Wednesday, August 9, 7:30 pm – 9:30 pm
Salon CD&E, Hilton
Serving as Master of Ceremonies will be Ed Burger of Williams College. Continue the exciting evening by joining new and long-time friends and colleagues for a banquet dinner. There will be an after-dinner presentation by Art Benjamin of Harvey Mudd College entitled "Mathemagics!" Art is a mathematician and a magician. In this performance, he will demonstrate and explain how to mentally multiply numbers faster than a calculator, how to memorize pi to 100 places, how to calculate the day of the week of any date in history, and other amazing feats of mind. He has presented his mixture of math and magic to audiences all over the world. A limited number of tickets will be available onsite. *Tickets are $35 per person.*

GRADUATE STUDENT RECEPTION

Thursday, August 10, 5:00 pm – 6:00 pm
Great Smoky Mountain Center, Hilton
This activity for graduate students is sponsored by the Committee on Graduate Students chaired by David Manderscheid, University of Iowa. Complimentary food and beverage will be served while participants socialize in an informal atmosphere.

TENNESSEE RIVERBOAT DINNER CRUISE

Thursday, August 10, 6:15 pm - 9:00 pm
Cumberland Avenue Entrance, Knoxville Convention Center
Join us aboard the Star of Knoxville for a festive and entertaining dinner cruise! This authentic, Mississippi-style paddle wheeler will carry you down the Tennessee River, offering a climate controlled main deck and an open-air upper deck for enjoying the scenic Tennessee River. Dinner will be served and a cash bar will be provided. After dinner, sit back and enjoy the view or dance the night away to a local Bluegrass Band. *Tickets are $45 per person.*

EXHIBIT HALL RECEPTION

Friday, August 11, 3:00 pm – 4:00 pm
Ballroom EF&G, Knoxville Convention Center
Visit the exhibit hall for a complimentary food and beverage reception sponsored by Addison-Wesley.

PME/MAA STUDENT BANQUET AND AWARDS CEREMONY

Friday, August 11, 6:15 pm - 7:45 pm
Salon A&B, Hilton
Tickets are $20 per person for Undergraduate Students and Student Paper Presenters; and $25 per person for all others. Only a limited number of tickets will be available onsite.

After the banquet, at 8:00 pm, attend the popular PME J. Sutherland Frame lecture, given this year by Donald Saari, University of California Irvine, on "Ellipses and Circles? To Understand Voting Problems??!"

DON ALBERS: AN APPRECIATION BANQUET

Friday, August 11, 6:00 pm - 8:00 pm
Great Smoky Mountain Center, Hilton
Join the mathematical community in congratulating Don Albers, Associate Executive Director, and Director of Publications. Don is stepping down from his current position to become the first ever Senior Acquisitions Editor for the MAA. Don has served the MAA for over 25 years: as editor of the *College Mathematics Journal*, as founding editor of *Math Horizons*, as Chair of the Committee on Publications, and since 1991, as Director of Publications and Associate Executive Director. A cash bar will be available. *Tickets are $35 per person.*

AWM/MAA RECEPTION

Friday, August 11, 9:00 pm - 11:00 pm
Great Smoky Mountain Center, Hilton
Plan to attend this joint reception with the Association for Women in Mathematics following the PME J. Sutherland Frame Lecture. All supporters of women in mathematics are encouraged to attend and meet AWM members.

MAA SILVER AND GOLD BANQUET

Saturday, August 12, 6:00 pm - 9:00 pm
Salon D&E, Hilton
At this annual banquet the MAA recognizes individuals who have been long-time members of the Association, with special honors

for 25-and 50-year members. All members are welcome to attend. The emcee will be Lida Barrett, University of Tennessee (ret.). Carl Pomerance, MAA Vice-President from Dartmouth College will speak on "Primal Screens." There will be a cash-bar reception beginning at 6:00 pm with the banquet following at 6:30 pm. A limited number of tickets will be available onsite. *Tickets are $42 per person.*

TOUR OF CADES COVE/SMOKY MOUNTAINS

Sunday, August 12, 9:00 am – 4:00 pm
Cumberland Avenue Entrance, Knoxville Convention Center

The 11-mile Cades Cove loop features magnificent vistas of the Smoky Mountains. Following the grades and turns of the old wagon roads, and fording a stream now and then, you will explore homesteads, churches and graveyards of early pioneers in the 1800s who settled this land. Along the way you are likely to see wildlife such as deer and wild turkey that inhabit the cove year-round.

Approximately mid-way through the tour there will be a scheduled stop for lunch at the Cable Mill and Farmhouse. **A limited number of tickets may be available onsite.** *Tickets are $49 per person.*

Need a Lunch Break?

Visit the Exhibit Hall in Ballroom EF&G, Knoxville Convention Center for a Hot Food and Salad Buffet Bar.

Hours

Thursday, August 10th:	**9:00 am – 5:00 pm**
Friday, August 11th:	**9:00 am – 5:00 pm**
Saturday, August 12th:	**9:00 am – 2:00 pm**

A lounge area is available for your extended breaks.

Photo courtesy of Richard Weisser and SmokyPhotos.com

Exhibit Hall

Exhibit Hall Information

Schedule time to browse through the new titles premiering this year in the Exhibit Hall. Shop for new publications and products and revisit your old favorites at the MathFest 2006 Exhibit Hall. This is your opportunity to review the latest books, test innovative calculators, and preview software. Meet company representatives and receive feedback that will assist you in making purchasing decisions.

Scavenger Hunt
Complete the scavenger hunt form found in your registration packet to become eligible to win great prizes. The drawings will be held in the exhibit hall. Check the MAA Membership Booth for specific drawing times.

Exhibit Hall Lunch Break
Featured in the Exhibit Hall is a hot buffet and salad bar, lounge area, email lab, and the Student Hospitality Center. Take that needed break, pick up lunch, and check your email while visiting the Exhibit Hall.

Exhibit Hall Reception
Join us for a special reception sponsored by Addison-Wesley on Friday, August 11th.

LOCATION:
Knoxville Convention Center, Ballroom EF&G

EXHIBIT HOURS:

Thursday, August 10, 2006	**9:00 am – 5:00 pm**
Friday, August 11, 2006	**9:00 am – 5:00 pm**
Saturday, August 12, 2006	**9:00 am – 2:00 pm**

Exhibitors

American Mathematical Society
Addison-Wesley **Sponsor**
A K Peters, Ltd.
Birkhauser
Brooks/Cole, Thomson
Cambridge University Press
Casio, Inc.
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Mathematical Association of America - Development
Mathematical Association of America - Membership
Mathematical Association of America – Publications
Navajo Jewelry
Prentice Hall
Robert Carden Art
Springer
Texas Instruments, Inc.
WebAssign
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Wiley
Marsh Affinity **Sponsor**

General Information

REGISTRATION INFORMATION

REGISTRATION DESK:

The registration desk will be located in the Cumberland Lobby of the Knoxville Convention Center outside Ballroom E. It will be open Wednesday, August 9 from noon to 7:00 PM, Thursday, August 10 and Friday, August 11 from 8:00 AM to 4:00 PM, and Saturday, August 12 from 8:00 AM to 2:00 PM. You may pick up your registration materials, register on-site, and purchase event tickets, when available, at this location.

MATHFEST HOUSING:

Headquarters Hotel: The Hilton Knoxville

1-800-HILTONS
865-523-2300
501 W. Church Ave.
Knoxville, Tennessee 37902

The newly-renovated Hilton Knoxville hotel is situated in the heart of downtown, the gateway to scenic East Tennessee. With a covered sky bridge to the Knoxville Convention Center, a short walk to the University of Tennessee campus, views of the Tennessee River and Neyland Stadium, and perfectly situated in the downtown business district, the Hilton Knoxville hotel is convenient to it all. To better serve the needs of guests, the Hilton Knoxville hotel offers complimentary high-speed wireless internet access in all hotel guest rooms and public space, a new business center, recently-expanded exercise facility, executive level, Starbucks® coffee shop in the hotel lobby, access to the neighboring YMCA, and much more.

Parking

Daily Self Parking Fee: $6.00 (USD)

Daily Valet Parking Fee: $10.00 (USD)

In and out privileges available.

The Holiday Inn Select Downtown

1-800-HOLIDAY
865-522-2800
525 Henley Street
Knoxville, TN 37902

Parking

Daily Parking Fee: $6.00 (USD)

Above ground parking is available for vans, SUV's and other large vehicles. In and out privileges available.

DRIVING DIRECTIONS:

From McGhee Tyson Airport

To: Knoxville Convention Center north on Highway 129 (Alcoa Highway) approximately 15 miles until the connection with I-40 East, merge onto I-40 East and exit immediately at exit 388/Henley Street. Move into the left lane and follow exit marked Henley Street.

To: Holiday Inn Select Downtown north on Highway 129 (Alcoa Highway) approximately 15 miles until the connection with I-40 East, merge onto I-40 East and exit immediately at exit 388/Henley Street. Move into the right lane and turn right on Clinch Avenue to enter the hotel.

To: Hilton Knoxville north on Highway 129 (Alcoa Highway) approximately 15 miles until the connection with I-40 East, merge onto I-40 East and exit immediately at exit 388A/Henley Street. Move into the far left lane and at the second stop light turn left onto West Church Avenue–hotel will be one block ahead on Walnut Street.

CAR RENTAL INFORMATION:

Avis and Budget have been selected as the official car rental companies for MathFest 2006. When making your reservations you must use Avis Meeting Discount Number K019303 or Budget Meeting Discount Number X914201 for the discounted meeting rate. Rates are available from August 7, 2006 to August 15, 2006. Reservations can be made by telephone (877) 289-2611 for AVIS or 1-800-214-6092 for Budget.

SHUTTLE INFORMATION:

No daily shuttle will be required for MathFest 2006. The location of the Hilton Knoxville, Knoxville Convention Center and the University of Tennessee Conference Center are within a two block radius of each other. However, the Knoxville Tourism & Sports Corporation, Gentry-Trailways and Simon Properties will sponsor a free shuttle to a local shopping mall.

A shuttle bus will be traveling between the Knoxville Convention Center and the West Town Mall. Busses will begin operating on Wednesday, August 9th at 11:00 AM. They will depart from the Convention Center on the hour and the West Town Mall on the half hour.

PUBLIC TRANSPORTATION:

Knoxville Area Transit (KAT) city bus service 865-215-7800. Printable schedules are available at http://www.ci.knoxville.tn.us/kat.

KAT provides regular, fixed route bus service throughout the City of Knoxville and portions of Knox County.

Hours of operation (including Night Rider / Sunday Rider service)

Monday - Friday: 5:30 am - 12:30 am

Saturday: 6:30 am - 12:30 am

Sunday: 11:00 am - 7:00 pm

Knoxville Trolley Lines, a FREE downtown trolley service, provides a convenient way to see all the attractions in the downtown area.

The trolley service also connects to the (KAT) for trips outside of the downtown area, including malls, parks and other attractions.

Hours of operation: Monday - Friday: 7:00 am to 6:00 pm

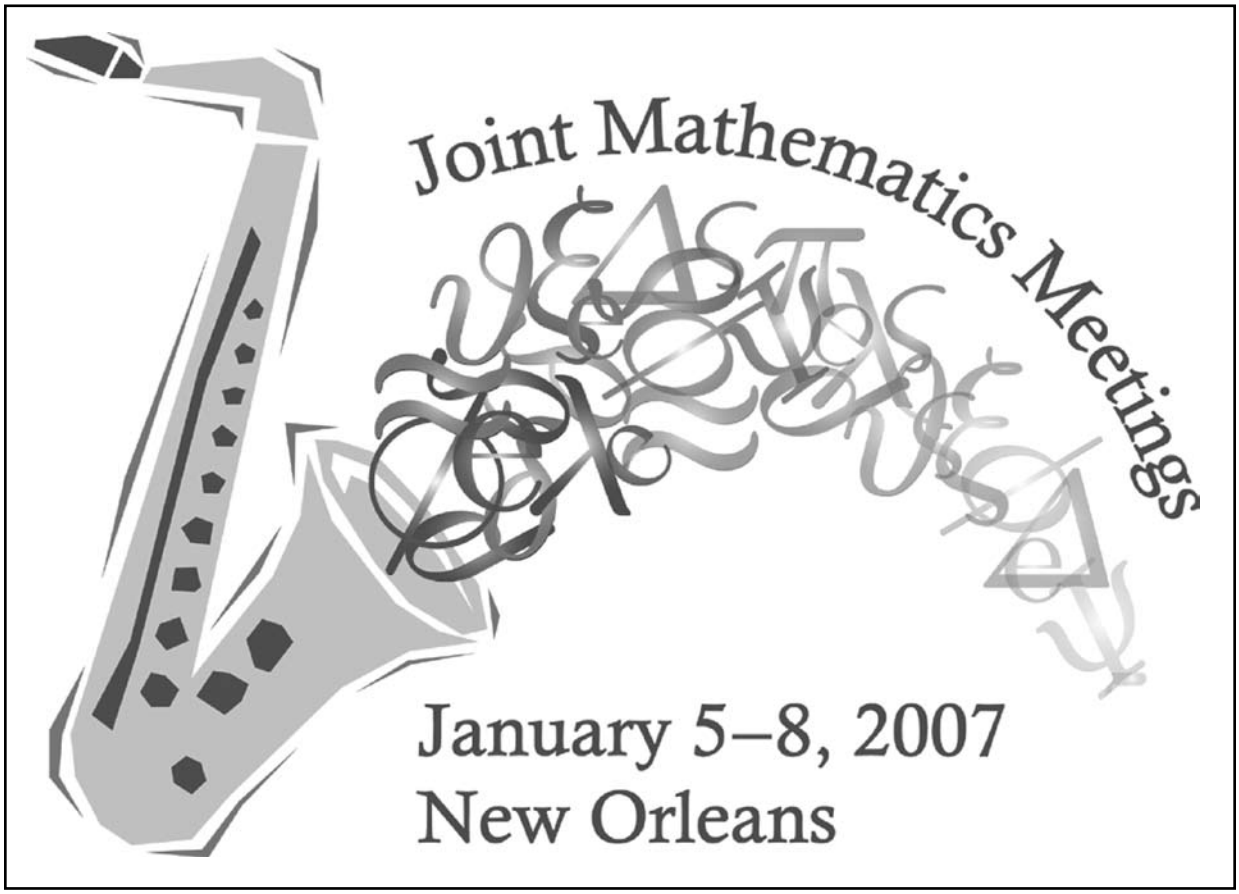
In addition, a Late Line Trolley operates every 15 minutes on Friday and Saturday nights (8:00 pm - 2:00 am) with service to Knoxville's historic Old City, the Knoxville Convention Center and other entertainment spots. A Trolley map can be found at http://www.ci.knoxville.tn.us/kat/web%20pages/trolley/Trolley_Map.asp.

TAXI INFORMATION:

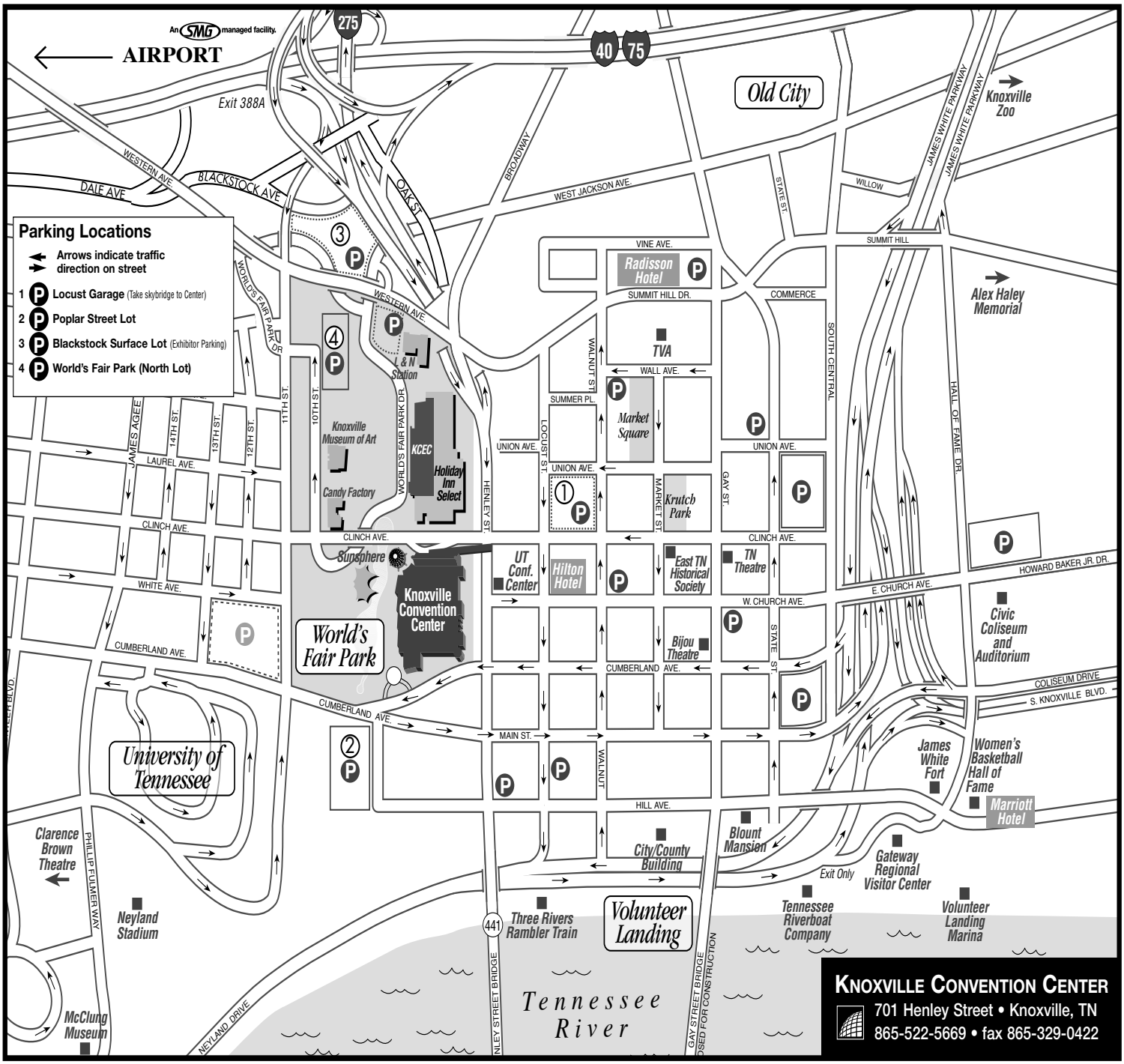
Airport Shuttle & Taxi Service

Chariots of Hire offers scheduled shuttle services to and from the McGhee Tyson Airport for $15/person, one way or $22 round trip. Tickets for the shuttle can be reserved in advance by calling 1-800-287-5934 or by sending an e-mail to cohlimo@chariotsofhire.com. There are regularly scheduled services from the airport and the downtown hotels, starting at 10:00 am, operating in 45 minute intervals, with the last shuttle leaving the airport at 11:30 pm. Shuttles departing from the hotel to the airport will run from 4:00 am to 4:00 pm.

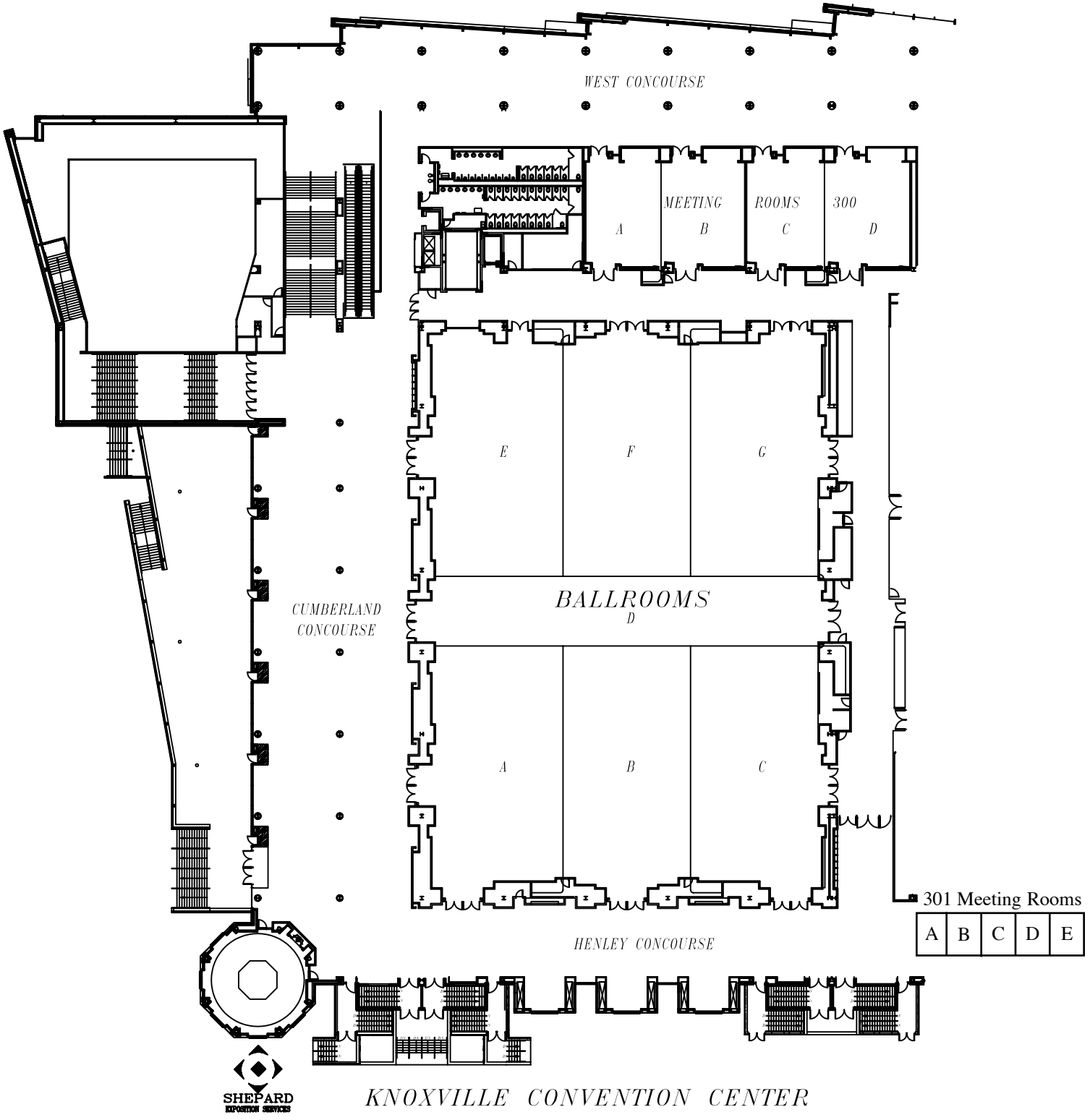
Taxi service is also available. The cost is $25 one-way and $2 for each additional person. Taxi stands can be found outside baggage claim.



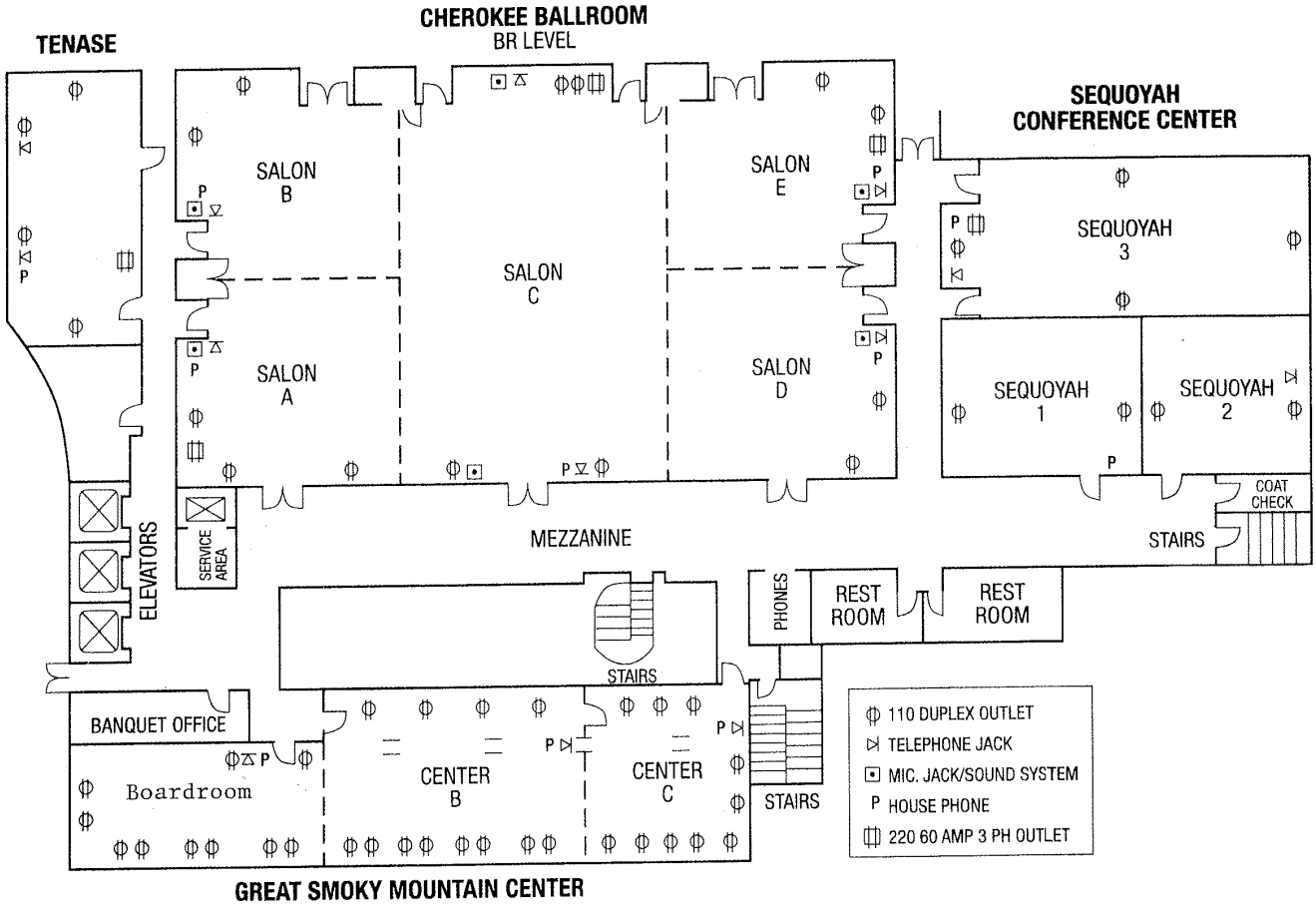
Map Knoxville



Knoxville Convention Center Floor Plan

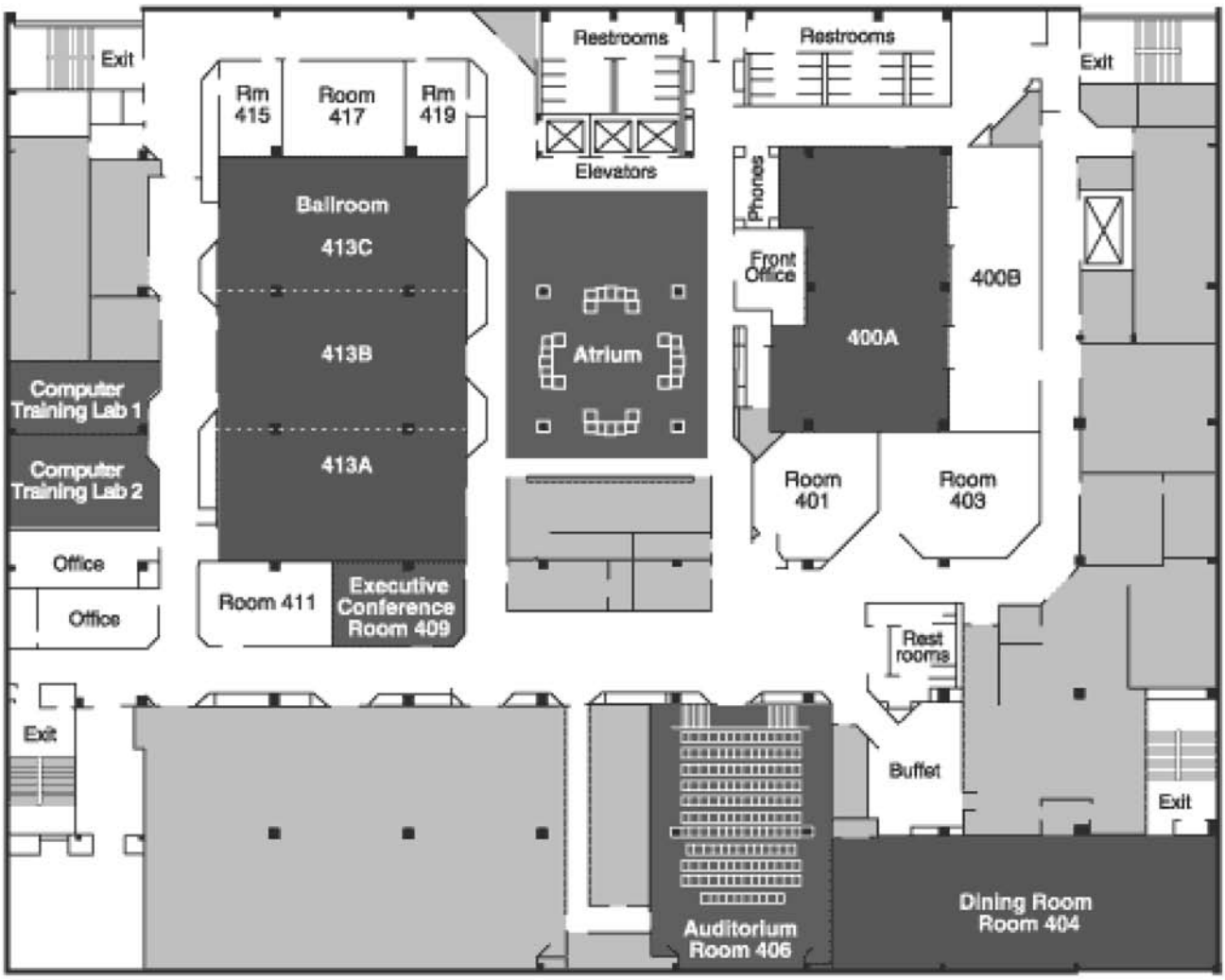


Hilton Hotel Floor Plan



University of Tennessee Conference Center Floor Plan

Floor Plan for Project NExT Sessions



Knoxville Convention Center

Join Us for an Exhibit Hall Reception

Sponsored by Addison-Wesley

ADDISON-WESLEY

Friday August 11th
3:00 pm – 4:30 pm

Ballroom DE&F
Knoxville Convention Center

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The student version of Maple 10 can be packaged with most Thomson Brooks/Cole advanced mathematics and calculus texts at a fraction of the price. Stop by our booth for more information.

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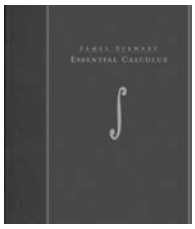

James Stewart
Essential Calculus
0-495-01442-7. ©2007. *Available Now!*

Essential Calculus: Early Transcendentals
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Single Variable Essential Calculus
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***Calculus: Concepts and Contexts*, Third Edition**
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http://www.stewartcalculus.com

COLLEGE ALGEBRA/TRIGONOMETRY

R. David Gustafson and Peter D. Frisk
***College Algebra,* Ninth Edition**
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J. Douglas Faires and James DeFranza
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James Stewart
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David Cohen (with Theodore B. Lee and David Sklar)
***Precalculus with Unit-Circle Trigonometry*, Fourth Edition**
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FINITE MATHEMATICS/APPLIED CALCULUS

Soo T. Tan
***Applied Mathematics for the Managerial, Life, and Social Sciences,* Fourth Edition**
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***Advanced Calculus,* Second Edition**
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David Poole
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TO ORDER A REVIEW COPY:
Phone: 1-800-423-0563. Web: www.thomsonedu.com/mathematics
Source Code: 7TPMA0MF

MathFest August 10-12, 2006 Daily Planner

Thursday August 10, 2006

AM:

NOON:

PM:

Friday August 11, 2006

AM:

NOON:

PM:

Saturday August 12, 2006

AM:

NOON:

PM:

Join Us At...

The San Jose Art Museum

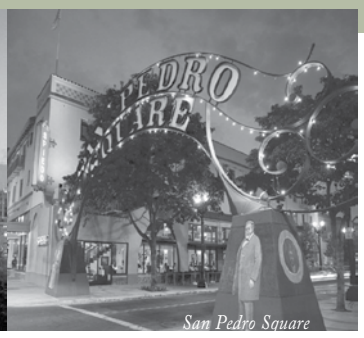
All photos courtesy of the San Jose Convention and Visitor's Bureau

MathFest 2007

August 3-5 • San Jose, California

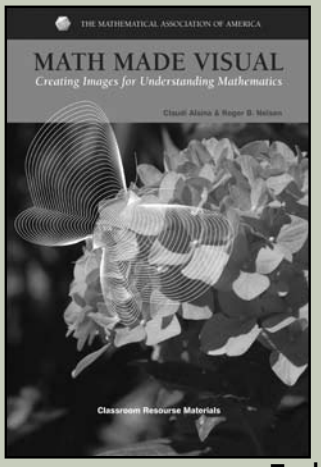
The Annual Summer Meeting of
The Mathematical Association of America

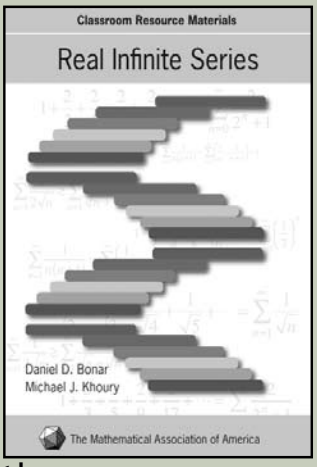
The San Jose Technology Museum



San Pedro Square

All of your favorite MAA books are at the publications booth!
*Stop by and get the special meeting discount of 15% off the Member Price!**





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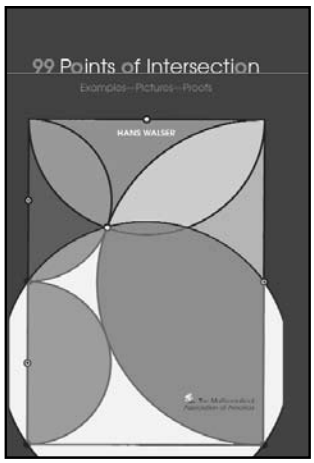
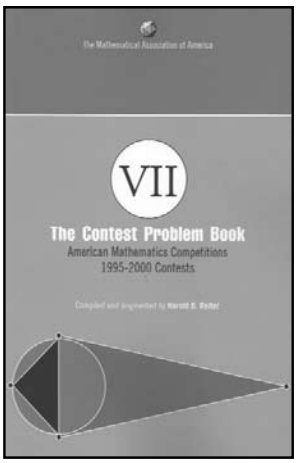
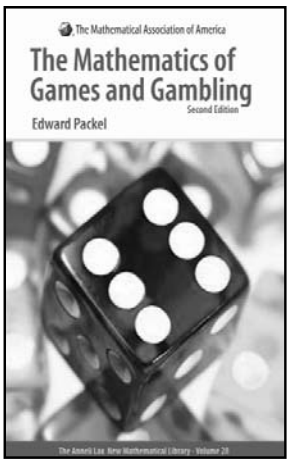


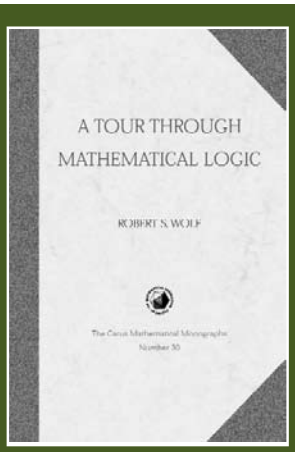
The **Spectrum** Series
A variety of subjects of general mathematical interest



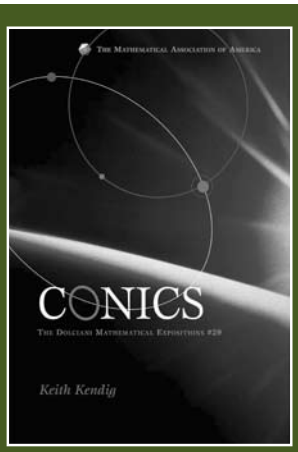
The **Problem Books** Series
A selection of books on the art of problem solving



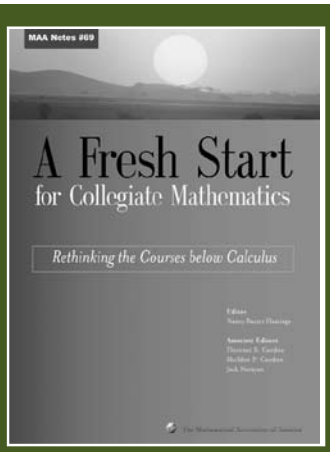
The **Anneli Lax New Mathematical Library** Series
Books suitable for undergraduate students



The **Carus Mathematical Monographs**
Advanced mathematical exposition at its finest



Dolciani Mathematical Expositions
Aimed at a broad audience, this series offers a variety of titles covering problem solving, history of mathematics, geometry, linear algebra, calculus, and much more



MAA Notes
Titles tailored to the needs of the classroom teacher

* Prices only good at 2006 MathFest in Knoxville, TN