Program of the Sessions

New Orleans, Louisiana, January 5–8, 2007

Wednesday, January 3

AMS Short Course on Aspects of Statistical Learning, I

8:00 AM – 4:45 PM

Organizers: **Cynthia Rudin**, Courant Institute, New York University
Miroslav Dudík, Princeton University

8:00AM Registration.
9:00AM Opening remarks by Cynthia Rudin and Miroslav Dudík.
9:15AM (1) *Machine Learning Algorithms for Classification.*
Robert E. Schapire, Princeton University
10:30AM Break.
11:00AM (2) *Occam's Razor and Generalization Bounds.*
Cynthia Rudin*, Center for Neural Science and Courant Institute, New York University, and **Miroslav Dudík***, Princeton University
2:00PM (3) *Exact Learning of Boolean Functions and Finite Automata with Queries.*
Lisa Hellerstein, Polytechnic University
3:15PM Break.
3:45PM Panel Discussion.

MAA Short Course on Leonhard Euler: Looking Back after 300 Years, I

8:00 AM – 4:45 PM

Organizers: **Ed Sandifer**, Western Connecticut State University
Robert E. Bradley, Adelphi University

8:00AM Registration.
9:00AM Introductions.
9:15AM (4) *A mathematical life in the enlightenment.*
Ronald S. Calinger, Catholic University of America
10:30AM Break.
10:45AM (5) *Euler and number theory: A study in mathematical invention.*
Jeff Suzuki, Brooklyn College
2:00PM (6) *DAlembert, Clairaut and Lagrange: Euler and the French mathematical community.*
Robert E. Bradley, Adelphi University
3:15PM Break.
3:30PM (7) *Enter, stage center: The early drama of hyperbolic functions in the age of Euler.*
Janet Barnett, Colorado State University-Pueblo

Thursday, January 4

MAA Board of Governors

8:00 AM – 5:00 PM

AMS Short Course on Aspects of Statistical Learning, II

9:00 AM – 1:00 PM

Organizers: **Cynthia Rudin**, Courant Institute, New York University
Miroslav Dudík, Princeton University

9:00AM (8) *Online Learning.*
Adam Tauman Kalai, Weizmann Institute of Science and Toyota Technological Institute
10:15AM Break.
10:45AM (9) *Spectral Methods for Visualization and Analysis of High Dimensional Data.*
Lawrence Saul, University of California San Diego
NOON Question and answer session.

MAA Short Course on Leonhard Euler: Looking Back after 300 Years, II

9:00 AM – 5:00 PM

Organizers: **Ed Sandifer**, Western Connecticut State University
Robert E. Bradley, Adelphi University

9:00AM Questions and answers.

The time limit for each AMS contributed paper in the sessions is ten minutes. The time limit for each MAA contributed paper varies. In the Special Sessions the time limit varies from session to session and within sessions. To maintain the schedule, time limits will be strictly enforced.
For papers with more than one author, an asterisk follows the name of the author who plans to present the paper at the meeting.
Papers flagged with a solid triangle (▶) have been designated by the author as being of possible interest to undergraduate students.
Abstracts of papers presented in the sessions at this meeting will be found in Volume 28, Issue 1 of *Abstracts of papers presented to the American Mathematical Society*, ordered according to the numbers in parentheses following the listings.

9:15AM (10) *Euler and classical physics.*
Stacy G. Langton, University of San Diego

10:30AM Break.

10:45AM (11) *Elliptic intergrals, mechanics, and differential equations.*
Lawrence D. D'Antonio, Ramapo College

2:00PM (12) *Euler's great theorems.*
Edward Sandifer, Western Connecticut State University

3:15PM Break.

3:30PM Panel discussion.

AMS Council

1:30 PM – 10:00 PM

Joint Meetings Registration

3:00 PM – 8:00 PM

Full registration will be conducted from 3:00 p.m. to 7:00 p.m. Badge/program pickup for those registered in advance will be open until 8:00 p.m.

Friday, January 5

Joint Meetings Registration

7:30 AM – 6:00 PM

Full registration will be conducted from 7:30 a.m. to 4:00 p.m. Badge/program pickup for those registered in advance will be open until 6:00 p.m.

Employment Center

7:30 AM – 6:00 PM

AMS-MAA Special Session on Math Circles and Similar Programs for Students and Teachers, I

8:00 AM – 10:55 AM

Organizers: **Morris Kalka**, Tulane University
Kathleen O'Hara, Mathematical Sciences Research Institute
Hugo Rossi, Mathematical Sciences Research Institute
Tatiana Shubin, San Jose State University
Zvezdelina E. Stankova, Mills College
Daniel H. Ullman, George Washington University
Paul A. Zeitz, University of San Francisco

8:00AM ► (13) *Backyard Mathematics.*
Mark Saul, Bronxville Schools (ret.) (1023-97-704)

8:30AM ► (14) *The Great Conversation.*
Robert Kaplan* and **Ellen Kaplan**, The Math Circle (1023-97-914)

9:00AM (15) *The San Diego Math Circle.*
David Patrick, Art of Problem Solving (1023-97-325)

9:30AM ► (16) *Mathematical Circles (Silicon Valley Experience).*
Tatiana Shubin, San Jose State University (1023-97-705)

10:00AM ► (17) *University of California, Davis's Explore Math Program: Graduate students bringing cutting-edge research into the classroom to share with undergraduate and high school students.* Preliminary report.
Brandy S. Wiegers*, **Yuan-Juang Yvonne Lai**, **Sarah A. Williams** and **Spyridon Michalakis**, University of California, Davis (1023-97-1723)

10:30AM Discussion.

AMS-ASL Special Session on Logical Methods in Computational Mathematics, I

8:00 AM – 10:55 AM

Organizers: **Saugata Basu**, Georgia Institute of Technology
Charles N. Delzell, Louisiana State University

8:00AM (18) *General logical metatheorems for functional analysis.*
Philipp Gerhardy, Department of Philosophy, Carnegie Mellon University (1023-03-1468)

8:30AM (19) *New effective uniformity results in fixed point theory.*
Ulrich Kohlenbach, Darmstadt University of Technology (1023-03-361)

9:00AM (20) *Proof mining in $CAT(0)$-spaces and $\mathbb{R}$-trees.*
Laurentiu Leustean, TU Darmstadt, Germany and Institute of Mathematics "Simion Stoilow" of the Romanian Academy, Bucharest, Romania (1023-03-1261)

9:30AM (21) *Model elimination and cut elimination.* Preliminary report.
Grigori Mints, Stanford University (1023-03-79)

10:00AM ► (22) *Phase transitions in logic and combinatorics.*
Andreas Weiermann, Ghent University (1023-03-1102)

10:30AM (23) *Primitive Recursive Selection Functions for Provable Existential Assertions over Abstract Algebras.* Preliminary report.
Jeffery Zucker, McMaster University, Hamilton, Canada (1023-03-628)

AMS-AWM Special Session on Geometric Group Theory, I

8:00 AM – 10:55 AM

Organizers: **Ruth M. Charney**, Brandeis University
Karen Vogtmann, Cornell University

8:00AM (24) *Automorphisms of right-angled groups.*
Adam Piggott* and **Mauricio Gutierrez**, Tufts University (1023-20-237)

8:30AM (25) *Quasi-isometric classification of graph manifolds.*
Jason A. Behrstock*, University of Utah, and **Walter D. Neumann**, Barnard College, Columbia University (1023-20-136)

9:00AM ► (26) *Dual presentations for Artin groups.* Preliminary report.
Jon McCammond, U C Santa Barbara (1023-20-476)

9:30AM (27) *Spaces with nonpositive immersions.* Preliminary report.
Robert W Bell, Michigan State University (1023-20-1164)

10:00AM (28) *A geometric perspective on the conjugacy problem in Thompson's group F.* Preliminary report.
Kai-Uwe Bux* and **Dimitriy Sonkin**, University of Virginia (1023-20-1088)

10:30AM ► (29) *Hilbert space compression of groups.* Preliminary report.
Mark Sapir, Vanderbilt University (1023-20-1372)

AMS Special Session on Fixed Point Theory, Dynamics, and Group Theory, I

8:00 AM – 10:55 AM

Organizers: **Michael R. Kelly**, Loyola University
Peter N. Wong, Bates College

8:00AM (30) *The Euler characteristic of the Whitehead automorphism group of a free product.*
Craig A Jensen*, University of New Orleans, **Jon McCammond**, UC Santa Barbara, and **John Meier**, Lafayette College (1023-20-253)

8:30AM (31) *Strong monotonicity for filtered ends of pairs of groups.*
Tom Klein, Binghamton University (1023-20-1244)

9:00AM (32) *Some Topological Invariants of Groups and Actions.*
Nic Koban, University of Maine at Farmington (1023-20-616)

9:30AM (33) *Roots and symetries of pseudo-Anosov.*
Jerome Los*, CNRS, University Aix-Marseille1, and **Jerome Fehrenbach**, University of Toulouse (1023-20-1027)

10:00AM (34) *Fixed points of abelian group actions on surfaces.*
John Franks, Northwestern University, **Michael Handel**, Herbert H Lehman College (CUNY), and **Kamlesh Parwani***, University of Missouri-St. Louis (1023-37-590)

10:30AM (35) *From dynamical systems to surface braid groups.*
Daciberg Lima Goncalves, Universidade de Sao Paulo, and **John Guaschi***, Laboratoire de Mathematiques Emile Picard, UMR CNRS 5580, Universite Toulouse III (1023-20-989)

AMS Special Session on Knots, 3-Manifolds, and Their Invariants, I

8:00 AM – 10:55 AM

Organizers: **Oliver T. Dasbach**, Louisiana State University
Xiao-Song Lin, University of California Riverside

8:00AM (36) *Quantum Teichmuller Theory.* Preliminary report.
Charles D Frohman*, The University of Iowa, and **Adam Sikora**, The State University of New York at Buffalo (1023-57-1745)

8:30AM (37) *Nonalternating knots and the Jones polynomial.*
Neil R. Nicholson, The University of Iowa (1023-54-31)

9:00AM ► (38) *Dessins d'enfant and Link Invariants.* Preliminary report.
Neal W. Stoltzfus*, Louisiana State University, **Xiao-Song Lin**, UC Riverside, **Oliver T. Dasbach**, Louisiana State University, **Efstratia Kalfagianni** and **David Futer**, Michigan State University (1023-57-1148)

9:30AM ► (39) *New Skein modules of three manifolds (with C.Frohman).*
Marta Asaeda*, Univ of California Riverside, and **Charlie Frohman**, University of Iowa (1023-57-1591)

10:00AM (40) *Turaev-Viro Invariants of 3-Manifolds and the Reidemeister torsion.*
Charles D Frohman, The University of Iowa, and **Joanna Kania-Bartoszynska***, National Science Foundation (1023-57-1847)

10:30AM (41) *Khovanov Homology & Reidemeister Torsion.*
Juan Ariel Ortiz-Navarro*, University of Iowa, and **Chris Truman**, University of Maryland (1023-55-1693)

AMS Special Session on Arrangements and Related Topics, I

8:00 AM – 10:50 AM

Organizers: **Daniel C. Cohen**, Louisiana State University
Anne V. Shepler, University of North Texas

8:00AM (42) *A spectral sequence stratification of cohomology jump loci.* Preliminary report.
Hal Schenck*, Texas A&M University, and **Graham Denham**, University of Western Ontario (1023-13-518)

8:30AM (43) *Upper bound on the number of split fibers in a pencil of curves.*
Jorge V Pereira, IMPA, and **Sergey Yuzvinsky***, University of Oregon (1023-14-796)

9:00AM ► (44) *Resonant weights and critical loci of rational functions.* Preliminary report.
Daniel C. Cohen, Lousiana State University, **Graham Denham**, University of Western Ontario, **Michael J. Falk***, Northern Arizona University, and **Alexander N. Varchenko**, University of North Carolina (1023-14-1410)

9:30AM (45) *Resonance: getting past H^1.*
Graham Denham*, University of Western Ontario, and **Hal Schenck**, Texas A&M University (1023-13-1583)

10:00AM (46) *Non-finiteness properties of fundamental groups of smooth projective varieties.*
Alexandru Dimca, Université de Nice Sophia-Antipolis, **Stefan Papadima**, Institute of Mathematics of the Romanian Academy, and **Alexander I Suciu***, Northeastern University (1023-20-712)

10:30AM (47) *Topological invariants of singular complex hypersurfaces.* Preliminary report.
Laurentiu G. Maxim, University of Illinois at Chicago (1023-55-1006)

AMS Special Session on Coding Theory and Its Applications, I

8:00 AM – 10:55 AM

Organizers: **Roxana N. Smarandache**, University of Notre Dame and San Diego State University
Pascal O. Vontobel, Hewlett-Packard Laboratories

8:00AM (48) *Pseudocodeword weights of codes from expander graphs.*
Christine A Kelley, The Fields Institute (1023-94-1500)

8:30AM (49) *LDPC Convolutional Codes: What Are They? How Do They Work? Are They Any Good?*
Daniel J. Costello* and **Ali Emre Pusane**, Univ. of Notre Dame (1023-94-1236)

9:30AM (50) *Towards explaining decoding errors for LDPC codes.*
Lance C. Pérez and **Judy L. Walker***, University of Nebraska (1023-94-1554)

10:00AM (51) *A code decomposition theory.*
Navin Kashyap, Queen's University (1023-68-446)

10:30AM (52) *On the Minimum Achievable Decoding Delay of Maximum Rate Complex Orthogonal Space-Time Block Codes.*
Sarah Spence Adams, Olin College of Engineering (1023-94-218)

AMS Special Session on Cohomology and Representation Theory, I

8:00 AM – 10:50 AM

Organizers: **Jon F. Carlson**, University of Georgia
Daniel K. Nakano, University of Georgia
Julia Pevtsova, University of Washington

8:00AM (53) *The centralizer of a nilpotent section.*
George J. McNinch, Tufts University (1023-22-1152)

8:30AM (54) *On Some Nilpotent Orbits and Desingularizations of Their Closures.* Preliminary report.
Terrell L. Hodge*, Western Michigan University (on sabbatical leave 2006-2007 at the University of Virginia), and **David C. Murphy**, Kalamazoo College (1023-20-884)

9:00AM ► (55) *Quiver representations with bilinear forms and nilpotent orbits of graded classical Lie algebras.* Preliminary report.
Zongzhu Lin*, Kansas State University, and **Bangming Deng**, Beijing Normal University (1023-20-1656)

9:30AM (56) *Quantum Group Cohomology.*
Christopher P. Bendel*, University of Wisconsin-Stout, **Daniel K. Nakano**, University of Georgia, **Brian J. Parshall**, University of Virginia, and **Cornelius Pillen**, University of South Alabama (1023-20-627)

10:00AM (57) *Cohomology formulas, old and new.* Preliminary report.
Brian Parshall* and **Leonard Scott**, University of Virginia (1023-20-904)

10:30AM (58) *Character formulas, old and new.*
Leonard Scott* and **Brian Parshall**, University of Virginia (1023-20-905)

AMS Special Session on Experimental Mathematics in Action, I

8:00 AM – 10:50 AM

Organizers: **Victor H. Moll**, Tulane University
Tewodros Amdeberhan, Tulane University

8:00AM ► (59) *Experimental discovery of Apéry-type identities for even zeta values.*
Jonathan M. Borwein, Dalhousie University (1023-11-65)

8:30AM ► (60) *PSLQ Does Functions Too!* Preliminary report.
Marc Chamberland, Grinnell College (1023-11-222)

9:00AM ► (61) *Isodiametric problems for polygons.*
Michael J. Mossinghoff, Davidson College (1023-52-100)

9:30AM ► (62) *Fixed Points of Maps on the Space of Rational Functions.*
Edward C. Mosteig, Loyola Marymount University (1023-33-963)

10:00AM ► (63) *Disturbing the Dyson Conjecture (in a "GOOD" Way).*
Andrew V. Sills* and **Doron Zeilberger**, Rutgers University (1023-05-207)

10:30AM (64) *Computer Algebra for Special Function Inequalities.*
Manuel Kauers, RISC-Linz (1023-05-217)

AMS Special Session on Financial Mathematics, I

8:00 AM – 10:55 AM

Organizers: **Jean-Pierre Fouque**, University of California Santa Barbara
Craig A. Nolder, Florida State University
Knut Solna, University of California Irvine
Thaleia Zariphopoulou, University of Texas Austin

8:00AM (65) *Indifference prices and convex risk measures in Orlicz spaces.*
Marco Frittelli, Università degli Studi di Milano, Italy (1023-60-614)

9:00AM (66) *Stability of utility maximization.*
Gordan Zitkovic*, University of Texas at Austin, and **Kasper Larsen**, Carnegie Mellon University (1023-91-659)

9:30AM ► (67) *Correspondence between Lifetime Minimum Wealth and Utility of Consumption.*
Erhan Bayraktar, University of Michigan (1023-60-1396)

10:00AM (68) *Asymptotic analysis of utility-based hedging strategies for small number of contingent claims.*
Dmitry Kramkov, Carnegie Mellon University, and **Mihai Sirbu***, Columbia University (1023-90-581)

10:30AM (69) *Dynamic monetary risk measures in discrete time.*
Patrick Cheridito*, Princeton University, and **Michael Kupper**, Technical University Vienna (1023-91-828)

AMS Session on Partial Differential Equations, I

8:00 AM – 10:55 AM

8:00AM (70) *On Fay Identity.*
Iordan P Michev, SUNY, Suffolk CC College (1023-35-1013)

8:15AM (71) *A simple direct approach for constructing single solitons of nonlinear wave equations.* Preliminary report.
Guoping Zhang* and **Zhijun Qiao**, University of Texas-Pan American (1023-35-1316)

8:30AM ► (72) *Mathematical Modeling of Frontal Polymerization with Encapsulated Initiators.* Preliminary report.
Divya E. Vernerey*, Salisbury University (on leave at Northwestern University), **Esteban Urdiales** and **Vladimir A. Volpert**, Northwestern University (1023-35-1329)

8:45AM (73) *On complete rotationally invariant gradient Ricci shrinking solitons.*
Brett L Kotschwar, UC San Diego (1023-35-1330)

9:00AM (74) *The two-point boundary problem for the Euler-Poisson system.*
Wilfrid Gangbo, **Truyen Nguyen** and **Adrian Tudorascu***, Georgia Institute of Technology (1023-35-1333)

9:15AM (75) *Forced Two Layer Beta-Plane Quasi-Geostrophic Flow, Part II: Time and Space Analyticity.*
Constantin Onica*, Indiana University, and **Lee R. Panetta**, Texas A&M University (1023-35-1483)

9:30AM (76) *Nematic liquid crystals and harmonic maps on polyhedral domains: theory and applications.* **A. Majumdar**, University of Oxford, **J. M. Robbins**, University of Bristol, and **Maxim Zyskin***, University of Oxford (1023-35-1517)

9:45AM (77) *A continuous approach to the lightning discharge.* Preliminary report. **Beyza Caliskan Aslan*** and **William W Hager**, University of Florida (1023-35-1521)

10:00AM (78) *Grid transformation numerical methods for laser beam propagation in nonhomogeneous media.* Preliminary report. **James W. Rogers*** and **Qin Sheng**, Baylor University (1023-35-1531)

10:15AM ► (79) *On the use of second order finite difference approximations to determine plate deflections.* **Dawn Alisha Lott*** and **Patrice Danielle Green**, Delaware State University (1023-35-1569)

10:30AM (80) *An application of a critical points theorem.* **Leonard Karshima Shilgba**, Abti-American University of Nigeria, Yola. (1023-35-713)

10:45AM (81) *Motion of a Vortex Line in an Averaged Velocity Field.* Preliminary report. **James P Peirce**, University of Wisconsin - La Crosse (1023-35-827)

AMS Session on Algebra and Number Theory, I

8:00 AM – 10:55 AM

8:00AM (82) *On Quantum Master Equation of Open-Closed String Theory.* Preliminary report. **Eric Harrelson**, **Alexander Voronov** and **J. Javier Zuniga***, University of Minnesota (1023-08-12)

8:15AM (83) *Addition Theorems of Fuzzy Integers of Linear Triangular Types.* Preliminary report. **Chuang Peng**, Morehouse College (1023-08-1896)

8:30AM ► (84) *Interassociates of the Free Commutative Semigroup on n Generators.* **Berit Nilsen Givens***, **Amber Rosin**, **Karen Linton**, Cal Poly Pomona, and **Laurie Dishman**, Cumberland University (1023-08-869)

8:45AM ► (85) *A Class of Interassociates of the Bicyclic Semigroup.* Preliminary report. **Amber Rosin***, **Berit Nilsen Givens** and **Karen Linton**, Cal Poly Pomona (1023-08-872)

9:00AM ► (86) *A New Key Exchange Primitive.* Preliminary report. **Yesem Kurt**, Pomona College (1023-08-928)

9:15AM ► (87) *On novel ways to invert a matrix.* Preliminary report. **Aaron Lauve*** and **Christophe Reutenauer**, LaCIM, University of Quebec at Montreal (1023-08-96)

9:30AM (88) *Summing prime reciprocals in an arithmetic progression.* **Dominic W Klyve**, Dartmouth College (1023-11-1009)

9:45AM (89) *Zeta Functions on Cocompact Arithmetic Subgroups of $SL(3, R)$.* Preliminary report. **Erik R. Tou**, Dartmouth College (1023-11-1036)

10:00AM (90) *Partition Identities Arising from Ramanujan's Modular Equations and Theta Functions.* **Nayandeep Deka Baruah*** and **Bruce C. Berndt**, University of Illinois at Urbana-Champaign (1023-11-1143)

10:15AM (91) *The Breuil Module of a p-Torsion Group Scheme Represented by a Monogenic Hopf Algebra.* Preliminary report. **Alan Koch**, Agnes Scott College (1023-11-1186)

10:30AM (92) *On Selmer groups in a family of elliptic curves with reducible 2- and 3-torsion and 3-ranks of class groups of quadratic number fields.* Preliminary report. **James M. Mailhot**, Columbus, Ohio (1023-11-1291)

10:45AM (93) *A Knapsack Cryptosystem Secure Against Attacks using Basis Reduction and Integer Programming.* **Bala Krishnamoorthy***, **William Webb** and **Nathan Moyer**, Washington State University (1023-68-1853)

AMS Session on Algebra and Group Theory, I

8:00 AM – 10:40 AM

8:00AM ► (94) *Eigenvalue Comparisons for a Class of Boundary Value Problems of Second Order Difference Equations.* Preliminary report. **Jun Ji*** and **Bo Yang**, Kennesaw State University (1023-15-1060)

8:15AM ► (95) *Algorithms for Inverting or LUP-Factoring Matrices over $GF(2)$ in time $O(n^3/\log n)$.* **Gregory V Bard**, University of Maryland at College Park (1023-15-1667)

8:30AM ► (96) *The Minimum Rank Problem Over F_2.* Preliminary report. **Jason Grout***, **Wayne Barrett**, Brigham Young University, and **Raphael Loewy**, Technion-Israel Institute of Technology (1023-15-1710)

8:45AM (97) *The Rank of a Tensor.* Preliminary report. **Carla D Martin***, James Madison University, and **Charles F. Van Loan**, Cornell University (1023-15-224)

9:00AM ► (98) *Estudio Sobre El Proceso De Ortogonalizacion De Grschmidt.* **Rosa M Almonte**, Universidad Autonoma de Santo Domingo (1023-15-345)

9:15AM (99) *Extension and Acceleration of Diagonal Preconditioners.* **Russell L Carden*** and **Pablo Tarazaga**, Texas A&M University-Corpus Christi (1023-15-840)

9:30AM (100) *Noncommutative Vieta's Theorem and Graph Associated Algebras.* **David Nacin**, William Paterson University (1023-16-1274)

9:45AM (101) *Strongly Clean Rings and a Generalized Fitting's Lemma.* **Alexander J. Diesl**, Vassar College (1023-16-1524)

10:00AM (102) *Rings generated by their units.* **Thomas J. Dorsey**, Vassar College (1023-16-1533)

10:15AM (103) *Stable endomorphisms in characteristic two for the symmetric group S_4.* **Giovanna Llosent**, University of Iowa (1023-16-1708)

10:30AM (104) *On pairs of matrices generating matrix rings and their presentations.* **Bogdan Petrenko***, Texas A&M University, and **Said Sidki**, University of Brasilia (1023-16-334)

MAA Session on College Algebra: Concepts, Data, and Models, I

8:00 AM – 10:55 AM

Organizers: **Florence S. Gordon**, New York Institute of Technology
Mary Robinson, University of New Mexico Valencia Campus
Norma Agras, Miami Dade Community College

Laurette Foster, Prairie View A&M University

8:00AM ► (105) *Discrete Dynamical Systems as a College Algebra Thread.*
Rich West, Francis Marion University (1023-F1-781)

8:20AM (106) *An Active Classroom Using Modelng.*
John C Maceli* and **Eric Robinson**, Ithaca College (1023-F1-1607)

8:40AM (107) *CRAFTY's College Algebra: Guidelines for the Nation.*
Norma M Agras, Miami Dade College (1023-F1-1537)

9:00AM ► (108) *Modeling based College Algebra Pilot Study.* Preliminary report.
Bill Haver, Virginia Commonwealth University (1023-F1-1573)

9:20AM ► (109) *Toward a Lean and Lively Algebra.* Preliminary report.
Barry Brunson, Western Kentucky University (1023-F1-1672)

9:40AM ► (110) *Learning About Algebraic Functions Using Data Models.*
Murray H. Siegel, SC GSSM (1023-F1-203)

10:00AM ► (111) *A Departure from College Algebra.*
D. Scott Dillery, Lindsey Wilson College (1023-F1-786)

10:20AM ► (112) *Integrating College Algebra and Statistics to Meet Students' and Other Disciplines' Needs.*
Sheldon P. Gordon, Farmingdale State University of New York (1023-F1-450)

10:40AM ► (113) *A Report on One College's Efforts to re-structure the mathematics courses below Calculus.* Preliminary report.
Mercedes A. McGowen, William Rainey Harper College (1023-F1-1860)

MAA Session on Content Courses for the Mathematical Education of Middle School Teachers, I

8:00 AM – 10:55 AM

Organizers: **Laurie Burton**, Western Oregon University
Maria G. Fung, Western Oregon University
Klay Kruczek, Western Oregon University

8:00AM (114) *What's for Dessert? An Enrichment Course for Prospective Middle School Mathematics Teachers.*
Jerrold W. Grossman, Oakland University, Rochester, Michigan (1023-G1-525)

8:20AM ► (115) *Meeting the Challenge for the Preparation of Preservice Teachers of Middle School Mathematics – The Fayetteville State University (FSU) Answer.*
Genevieve M. Knight and **Kimberly Smith Burton***, Fayetteville State University (1023-G1-576)

8:40AM ► (116) *An Upper Level Series of Mathematics Courses for Prospective Middle School Teachers.*
Herbert E. Kasube, Bradley University (1023-G1-563)

9:00AM ► (117) *Aha! Now I Understand Why! - Creating Self-Reliance in Mathematical Content through a Problem-Centered Course Sequence.* Preliminary report.
Tracie McLemore Salinas* and **Mary Elizabeth Searcy**, Appalachian State University (1023-G1-1598)

9:20AM ► (118) *Making Sense: Developing the Mathematical Understanding of Prospective Middle School Teachers.*
Jennifer J. Kosiak, University of Wisconsin - La Crosse (1023-G1-1413)

9:40AM (119) *A Problem Analysis Course for Middle Grades Teachers.*
Mary Garner, Kennesaw State University (1023-G1-1587)

10:00AM (120) *Four Content Courses and Activity-Based Materials Designed for Preservice Middle School Teachers and Elementary Mathematics Specialists.*
Jen E. Szydlik, University of Wisconsin Oshkosh (1023-G1-429)

10:20AM ► (121) *Teaching Concepts and Problems Solving Skills through Mathematical Stories.* Preliminary report.
Ioana Mihaila* and **Patricia Hale**, Cal Poly Pomona (1023-G1-684)

10:40AM ► (122) *Mathematics Materials for Middle School Teachers.*
Ira J Papick, University of Missouri-Columbia (1023-G1-198)

MAA Session on Euler in the Classroom

8:00 AM – 10:55 AM

Organizers: **Robert E. Bradley**, Adelphi University
Amy Shell-Gellasch, Grafenwoer, Germany

8:00AM ► (123) *Euler Enriches Summer High School Program.* Preliminary report.
Julia Darby Head* and **G. Brock Williams**, Texas Tech University (1023-H5-1721)

8:15AM ► (124) *Mathematics of Euler—Euler Line and Euler's Formula for Polyhedra.*
Jim Fulmer, University of Arkansas at Little Rock (1023-H5-1804)

8:30AM ► (125) *Investigating Euler's Polyhedral Formula Using Original Sources.*
Lee Stemkoski, Adelphi University (1023-H5-1275)

8:45AM ► (126) *Euler and Honors Students.* Preliminary report.
Homer S. White, Georgetown College, Kentucky (1023-H5-877)

9:00AM ► (127) *Jospeh Darbes' 1778 portraits of Euler: their provenance, the method of construction and reproduction.* Preliminary report.
D. Florence Fasanelli, American Association for the Advancment of Science (1023-H5-1888)

9:15AM ► (128) *Napier's e.* Preliminary report.
Amy E Shell-Gellasch, Pacific Lutheran University (1023-H5-913)

9:30AM (129) *E29, or Pell's equation in the number theory classroom.*
Daniel E. Otero, Xavier University (1023-H5-1343)

9:45AM ► (130) *Euler and the Circular Functions in the Classroom.* Preliminary report.
Bruce S Burdick, Roger Williams University (1023-H5-1760)

10:00AM ► (131) *Functions vs. Equations in Euler's Work.*
Robert E. Bradley, Adelphi University (1023-H5-1617)

10:15AM ► (132) *Euler Angles, Rotation Matrices, Euler's Identity and Quaternions.*
Paul R Bouthellier, University of Pittsburgh-Titusville (1023-H5-406)

10:30AM ► (133) *Euler's Method for Differential Equations.*
Dick Jardine, Keene State College (1023-H5-1084)

10:45AM ► (134) *Dances between continuous and discrete: Euler's summation formula in his owns words.*
David J Pengelley, New Mexico State University (1023-H5-282)

MAA Session on Integrating Mathematics and Biology in Undergraduate Education, I

8:00 AM – 10:55 AM

Organizers: **Glenn W. Ledder**, University of Nebraska-Lincoln
Yajun Yang, Farmingdale State University of New York
Jack Bookman, Duke University
James P. Fulton, Suffolk County Community College

8:00AM ► (135) *A Bridge Course to Prepare Students for a Biotechnology Program.* Preliminary report.
Mary R. Parker, Austin Community College (1023-K1-1657)

8:20AM ► (136) *From Edge to Center: Retooling a Math/Bio Course.*
Meredith L. Greer, Bates College (1023-K1-1112)

8:40AM ► (137) *An Integrated Mathematics Course for Biology Students.* Preliminary report.
Patti Frazer Lock*, St. Lawrence University, **Michael Caplan**, Yale Medical School, **Dan Flath**, Macalaster College, and **Jeff Tecosky-Feldman**, Haverford College (1023-K1-1365)

9:00AM ► (138) *Using the Scientific Method to Integrate Biology into a Precalculus Course.*
James P Fulton* and **Linda Sabatino**, Suffolk Community College (1023-K1-1632)

9:20AM ► (139) *Get Rhythm, If You Get to Choose!*
Mike Martin, Johnson County Community College (1023-K1-629)

9:40AM ► (140) *Mathematical Models in Nature - a project-based course in mathematical biology.*
Jennifer Wilson, Eugene Lang College, the New School for Liberal Arts (1023-K1-1665)

10:00AM (141) *An Undergraduate Course in Biomathematics with an Accompanying Textbook.*
Raina S. Robeva*, Sweet Briar College, and **Michael L. Johnson**, University of Virginia School of Medicine (1023-K1-1575)

10:20AM (142) *Biology, Differential Equations, and Learning to Read the Research.*
Thomas W Judson, Harvard University (1023-K1-175)

10:40AM ► (143) *Mathematical Biology in the Short Term: A Mini Course for a Summer Program Angela Gallegos, Occidental College.*
Angela Gallegos, Occidental College, Los Angeles, CA (1023-K1-1875)

MAA Session on Teaching Mathematics Courses Online

8:00 AM – 10:55 AM

Organizers: **Cheryl Olsen**, Shippensburg University
Kate McGivney, Shippensburg University

8:00AM ► (144) *Teaching developmental mathematics with coursecompass.com.* Preliminary report.
Katarzyna Potocka* and **Pangyen Weng**, Ramapo College of New Jersey (1023-Q5-541)

8:20AM ► (145) *On-Line Calculus Courses At Valparaiso University.*
Kenneth H Luther, Valparaiso University (1023-Q5-573)

8:40AM (146) *Investigating Student Success in Virtual Business Calculus: A Mostly Online Course.* Preliminary report.
Brian H Felkel, Appalachian State University (1023-Q5-1215)

9:00AM ► (147) *Evolution of a Long Distance Education Course for In-Service Middle School Math Teachers.* Preliminary report.
Heidi A. Feller, University of Nebraska-Lincoln (1023-Q5-656)

9:20AM (148) *Using Camtasia Studio to Teach Mathematics Online.*
Jason A Aubrey, University of Missouri - Columbia (1023-Q5-1881)

9:40AM ► (149) *Integrating Graphing Calculator Emulator Software into Live Webcasts.*
Chris Oehrlein, Oklahoma City Community College (1023-Q5-1823)

10:00AM ► (150) *Online Class Experience in Mathematics at the University of Mississippi.* Preliminary report.
Semail Ulgen Yildirim*, Grand Valley State University, and **Robert Hunt**, University of Mississippi (1023-Q5-1774)

10:20AM ► (151) *Teaching Mathematics online: The Park University experience.*
Aldo R. Maldonado, Park University (1023-Q5-266)

10:40AM ► (152) *Full Speed Ahead with a Tablet PC.* Preliminary report.
Denise J LeGrand, University of Arkansas at Little Rock (1023-Q5-183)

MAA Session on Use of Technology in Abstract Algebra and Number Theory

8:00 AM – 10:55 AM

Organizers: **Byungchul Cha**, Hendrix College
Bo-Hae Im, Chung-Ang University

8:00AM ► (153) *Laboratory Experiences in Group Theory.*
Ellen J. Maycock, American Mathematical Society (1023-S1-1292)

8:15AM ► (154) *PascGalois JE: Visualizing Group Structures.*
Don Spickler, Salisbury University (1023-S1-1342)

8:30AM ► (155) *Using Pascal's Triangle modulo p to visualize the Lucas Correspondence Theorem.* Preliminary report.
Kurt E Ludwick, Salisbury University (1023-S1-1628)

8:45AM ► (156) *Flash Tools for Finite Groups.*
James E. Hamblin, Shippensburg University (1023-S1-669)

9:00AM (157) *Teaching Abstract Algebra Using the Software GAP.*
Julianne G. Rainbolt, Saint Louis University (1023-S1-867)

9:15AM ► (158) *Using XGAP to explore the structure of groups.*
Russell D. Blyth, Saint Louis University (1023-S1-723)

9:30AM ► (159) *Visualizing Group Theory with Group Explorer.*
Nathan C. Carter, Bentley College (1023-S1-668)

9:45AM (160) *Tell Me What You Can About A Group Of Order n.*
Mike Krebs, Cal State LA (1023-S1-432)

10:00AM (161) *An inquiry-based number theory course.*
John Jones*, Arizona State University, and **Jeff Holt**, University of Virginia (1023-S1-526)

10:15AM ► (162) *Using PARI/GP in a Number Theory Class.*
Benjamin L. Levitt, California State University, Chico (1023-S1-1620)

10:30AM ► (163) *Computational Group Theory and Symmetry.*
Jeffrey W Clark, Elon University (1023-S1-211)

10:45AM ► (164) *Teaching Discovery: Technology and Entrenchment.* Preliminary report.
Chris K. Caldwell, University of Tennessee at Martin (1023-S1-1623)

MAA General Contributed Paper Session, I

8:00 AM – 10:55 AM

Organizers: **Eric S. Marland**, Appalachian State University
Jay A. Malmstrom, Oklahoma City Community College

8:00AM (165) *Mathematical modeling of ferro-antiferromagnet (F-AF) exchange coupled systems.*
Congxiao Liu*, **Min Sun**, Department of Mathematics and MINT Center, The University of Alabama, and **Hideo Fujiwara**, Department of Physics and MINT Center, The University of Alabama (1023-Z1-608)

8:15AM ► (166) *Put-call parity in the classroom.*
Maryam Vulis, Forest Hills, New York (1023-Z1-1017)

8:30AM ► (167) *Labs on Public Key Cryptograph and Subgroups of S_4 using technologies.*
Heakyung Lee, Winthrop University (1023-Z1-940)

8:45AM ► (168) *Using Mapping Software in the Mathematics Classroom.* Preliminary report.
Manuel J. Sanders, University of South Carolina at Beaufort (1023-Z1-831)

9:00AM ► (169) *Some of My Favorite Calculus Homework Problems.*
Fred Worth, Henderson State University (1023-Z1-370)

9:15AM ► (170) *Some Calculus 2 Students Seem to Prefer Procedural Approaches to Exercises over Conceptual Ones.*
Mary D Shepherd, Northwest Missouri State University (1023-Z1-1320)

9:30AM Break.

9:45AM ► (171) *A Method for Generating Integer Solutions to Matrix Equations.* Preliminary report.
Raymond N Greenwell* and **Stanley Kertzner**, Hofstra University (1023-Z1-126)

10:00AM (172) *Innovations in teaching a rings first abstract algebra course.*
M. Chakrabarti, Grand Valley State University (1023-Z1-1821)

10:15AM ► (173) *The review of relevant mathematical content for the teaching of middle and secondary mathematics via a methods course: An integrated approach.* Preliminary report.
Dante A Tawfeeq, Adelphi University (1023-Z1-634)

10:30AM ► (174) *An Experimental Study on the Implementation of Online Resources in Pre-Calculus Algebra.*
Tasha Thrower*, **Jan Case**, **Audria White** and **Fred Kelley**, Jacksonville State University (1023-Z1-482)

10:45AM (175) *Mobile-Technology and the College Math Core Curriculum.*
Marilyn Reba, Clemson University (1023-Z1-358)

SIAM Minisymposium on Phyllotaxis

8:00 AM – 10:55 AM

Organizers: **Pau Atela**, Smith College
Christope Gole, Smith College

8:00AM (176) *Mathematical techniques in Phyllotaxis.*
Scott G. Hotton, Harvard University - Department of Organismic and Evolutionary Biology (1023-92-1347)

8:30AM (177) *Mathematical models of likely mechanisms for phyllotaxis: Polarized auxin transport, cell growth, and dynamic connectivity.*
Eric Mjolsness*, Departments of Computer Science and Mathematics, University of California Irvine, **Marcus Heisler**, Division of Biology, California Institute of Technology, **Henrik Jonsson**, Computational Biology & Biological Physics Group, Lund University, **Elliot Meyerowitz** and **Bruce Shapiro**, Division of Biology, California Institute of Technology (1023-92-1820)

9:00AM (178) *Modeling phyllotaxis: from molecules to patterns.*
Richard S. Smith, University of Calgary, **Soazig Guyomarc'h**, **Therese Mandel**, **Didier Reinhardt**, University of Berne, **Adam Runions**, University of Calgary, **Cris Kuhlemeier**, University of Berne, and **Przemyslaw Prusinkiewicz***, University of Calgary (1023-92-1890)

9:30AM (179) *An Amplitude-Equation Approach to Phyllotaxis.*
Alan C Newell, University of Arizona, and **Patrick D Shipman***, University of Maryland (1023-92-1563)

10:00AM (180) *New Geometric concepts for Phyllotaxis.*
Pau Atela*, Smith College, **Jacques Dumais**, Harvard University, **Christophe Gole**, Smith College, and **Scott Hotton**, Harvard University (1023-92-1269)

10:30AM (181) *A new characteristation of irregular phyllotactic patterns.*
Stephane Douady, Ecole Normale Superieure, Paris (1023-92-1644)

SIAM Minisymposium on Mathematics and Materials Science

8:00 AM – 10:55 AM

Organizer: **Robert P. Lipton**, Louisiana State University

8:00AM (182) *Modeling the Self-Assembly of Quantum Dots in Thin Solid Films.*
Margo S. Levine*, **Alexander A. Golovin**, **Stephen H. Davis**, Northwestern University, and **Peter W Voorhees**, Department of Materials Science, Northwestern University (1023-74-1257)

8:30AM (183) *Phase of biaxial liquid crystal polymers and particle suspensions in simple flows.* Preliminary report.
Sarthok Sircar* and **Qi Wang**, Florida State University (1023-82-1015)

9:00AM (184) *Estimates for the principal Dirichlet eigenvalue of anisotropic elliptic operator on a ball and their applications.*
Steve Rosencrans*, **Xuefeng Wang**, **Bill Winter**, Tulane University, and **Shan Zhao**, University of Alabama (1023-80-1276)

9:30AM (185) *Solute tramsport in porous media.*
Guillermo H Goldsztein, Georgia Tech (1023-35-1376)

10:00AM (186) *Nano-rod composites: a flow strategy to control anisotropic percolation.*
M Gregory Forest*, University of North Carolina at Chapel Hill, **Xiaoyu Zheng**, Kent State University, **Richard Vaia**, Air Force Research Laboratory, **Michael Arlen**, University of North Carolina at Chapel Hill, **Ruhai Zhou**, Old Dominion Uniersity, **Qi Wang**, Florida State University, and **Robert lipton**, Louisiana State University (1023-76-1794)

10:30AM (187) *Stability of the normal state of superconductors in the presence of electric currents.*
Yaniv Almog, Louisiana State University (1023-82-1288)

AMS Special Session on Recent Developments in Analysis and Numerics of Geophysical Fluid Dynamics Problems, I

8:30 AM – 10:55 AM

Organizers: **Jie Shen**, Purdue University
Shouhong Wang, Indiana University

8:30AM (188) *Sediment Transport Models.* Preliminary report.
Jerry L Bona, University of Illinois at Chicago (1023-86-1827)

9:00AM (189) *The 2D surface quasi-geostrophic equation with supercritical dissipation.* Preliminary report.
Ming-Chih Lai, **Yu-Hou Tseng**, National Chiao Tung University, Taiwan, and **Jiahong Wu***, Oklahoma State University (1023-76-639)

9:30AM (190) *Two-dimensional infinite Prandtl number convection : Structure of bifurcated solutions.*
Jungho Park, Indiana University, Bloomington (1023-35-1585)

10:00AM (191) *Modeling and simulation of multiphase incompressible flows using an energetic variational phase field model.*
Jie Shen, Purdue University (1023-76-1549)

10:30AM (192) *Finite-Element-based Faedo-Galerkin weak solutions to the Navier–Stokes equations with Dirichlet boundary conditions are suitable.*
Jean-Luc Guermond, Texas A&M University (1023-65-1919)

MAA Session on Innovative and Effective Ways to Teach Linear Algebra, I

8:40 AM – 10:55 AM

Organizers: **David Strong**, Pepperdine University
Gilbert Strang, Massachusetts Institute of Technology

8:40AM ► (193) *Using Concept Maps to look at linear algebra understandings.*
David E Meel, Bowling Green State University (1023-J1-850)

9:00AM ► (194) *Optimizing Singular Values for Images.* Preliminary report.
Michael Huber, Muhlenberg College (1023-J1-180)

9:20AM Break.

9:40AM (195) *Using DERIVE to Emphasize Understanding in Linear Algebra.*
Lisa Townsley, Benedictine University (1023-J1-389)

10:00AM ► (196) *Using Maple to See the Solution to the Least Squares Problem.* Preliminary report.
Vicky Williams Klima, Appalachian State University (1023-J1-176)

10:20AM (197) *Quantum Mechanics: A Different Spin on Linear Algebra.*
Itai Seggev, University of Mississippi (1023-J1-162)

10:40AM ► (198) *Löwdin Orthogonalization - A Natural Supplement to Gram-Schmidt.*
Scott F Beaver, Western Oregon University (1023-J1-597)

MAA Minicourse #12: Part A

9:00 AM – 11:00 AM

Combinatorially thinking.
Organizers: **Arthur T. Benjamin**, Harvey Mudd College
Jennifer J. Quinn, Association for Women in Mathematics

MAA Minicourse #1: Part A

9:00 AM – 11:00 AM

Introduction to the mathematics of modern cryptography.
Organizers: **Colm K. Mulcahy**, Spelman College
Jeffrey Ehme, Spelman College

MAA Minicourse #7: Part A

9:00 AM – 11:00 AM

Directing undergraduate research.
Organizer: **Aparna W. Higgins**, University of Dayton

AMS Special Presentation

9:30 AM – 10:55 AM

Report on the findings of the 2005 CBMS survey of undergraduate mathematical and statistical sciences in the U.S.
Moderator: **James W. Maxwell**, AMS
Presenters: **David Lutzer**, College of William and Mary
Ellen J. Kirkman, Wake Forest University
Stephen B. Rodi, Austin Community College

MAA-Project NExT-YMN Panel Discussion

9:30 AM – 10:50 AM

Keeping your research alive.
Organizers: **Brian Birgen**, Wartburg College
William M. Higdon, University of Indianapolis
James E. Hamblin, Shippensburg University
Panelists: **Jean Bee Chan**, Sonoma State University
Michael J. Dorff, Brigham Young University
Asamoah Nkwanta, Morgan State University

MAA Special Presentation

9:30 AM – 10:50 AM

National Science Foundation programs supporting learning and teaching in the mathematical sciences.
Organizers: **Camille McKayle**, NSF
Lloyd E. Douglas, NSF
Elizabeth J. Teles, NSF
Lee L. Zia, NSF
David C. Royster, NSF

SIGMAA on the Teaching of Advanced High School Mathematics Panel Discussion

9:30 AM – 10:50 AM

What mathematical content should future mathematics majors learn while in high school?

Organizer: **Daniel J. Teague**, North Carolina School of Science and Mathematics

Panelists: **Benjamin G. Klein**, Davidson College
Susan S. Wildstrom, Walt Whitman High School
Daniel J. Teague

AMS Special Presentation

10:00 AM – 10:55 AM

Who wants to be a mathematician.

Organizers: **Michael A. Breen**, AMS
William T. Butterworth, DePaul University

AMS Invited Address

10:05 AM – 10:55 AM

(199) *Diffraction by edges.*
Andras Vasy, Stanford University (1023-35-05)

AMS-MAA Invited Address

11:10 AM – NOON

(200) *Dynamics of integer sets.*
Bryna R. Kra, Northwestern University (1023-37-13)

Exhibits and Book Sales

12:15 PM – 5:30 PM

AMS Colloquium Lecture: Lecture I

1:00 PM – 2:00 PM

(201) *Limit shapes, real and imagined, I: Random surfaces around us.*
Andrei Okounkov, Princeton University (1023-60-02)

MAA Invited Address

2:15 PM – 3:05 PM

(202) *Forming committees.*
Penny Haxell, University of Waterloo (1023-A0-19)

AMS-MAA Special Session on Math Circles and Similar Programs for Students and Teachers, II

2:15 PM – 7:00 PM

Organizers: **Morris Kalka**, Tulane University
Hugo Rossi, Mathematical Sciences Research Institute
Tatiana Shubin, San Jose State University
Zvezdelina E. Stankova, Mills College
Daniel H. Ullman, George Washington University
Paul A. Zeitz, University of San Francisco

2:15PM (203) *Experience with Teaching Algorithmics in a Public School Setting.*
Anna Charny, Advanced Math and Science Academy Charter School (1023-97-706)

2:40PM ► (204) *The San Francisco Math Circle: A teacher-centered math circle for underrepresented student populations.*
Paul A Zeitz, University of San Francisco (1023-97-1222)

3:05PM ► (205) *Seeking Points of Intersection: High-School Curricula vs. Math Circle Goals.*
James S Tanton, St. Mark's Institute of Mathematics (1023-97-1007)

3:30PM ► (206) *How and Why the Hampshire College Summer Studies in Mathematics Works. YP17.*
David C. Kelly, Hampshire College (1023-97-763)

3:50PM ► (207) *Canada/USA Mathcamp: a summer math program for talented high-school students.*
Mira Bernstein, Wellesley College (1023-97-1178)

4:10PM ► (208) *SEE-Math - Summer Educational Enrichment at Texas A&M for Middle School Students.*
Philip B Yasskin, Texas A&M University (1023-97-235)

4:30PM (209) *Circle in a Box.*
Sam Vandervelde, Stanford University (1023-97-49)

4:55PM ► (210) *A Math Circle sponsored by Brigham Young University.* Preliminary report.
David G. Wright, Brigham Young University (1023-97-185)

5:20PM ► (211) *10 years of the Berkeley Math Circle.*
Zvezdelina Entcheva Stankova, Mills College and UC Berkeley (1023-97-711)

5:45PM ► (212) *Building and Supporting Extracurricular Mathematics in Chicago.* Preliminary report.
Isaac L. Greenspan, Illinois Mathematics and Science Academy (1023-97-791)

6:15PM Panel discussion moderated by Mark Saul.

AMS-ASL Special Session on Logical Methods in Computational Mathematics, II

2:15 PM – 4:40 PM

Organizers: **Saugata Basu**, Georgia Institute of Technology
Charles N. Delzell, Louisiana State University

2:15PM ► (213) *Managing an NP-Complete Problem.*
Andrew G. Borden, St. Mary';s University, San Antonio, Texas (1023-68-321)

2:45PM ► (214) *Computational power of bounded arithmetic from the predicative viewpoint.*
Sam Buss, University of California, San Diego (1023-03-604)

3:15PM (215) *Mystery of Point Charges.*
Andrei Gabrielov*, Purdue University, **Dimitri Novikov**, The Weizmann Institute of Science, and **Boris Shapiro**, Stockholm University (1023-14-756)

3:45PM (216) *Constructing expansions of the real field by restricted transcendental analytic functions with decidable theories.* Preliminary report.
Daniel J. Miller, Emporia State University (1023-03-88)

4:15PM (217) *Quantitative results in o-minimal topology.*
Thierry Zell, Georgia State University (1023-03-153)

AMS-AWM Special Session on Geometric Group Theory, II

2:15 PM – 6:10 PM

Organizers: **Ruth M. Charney**, Brandeis University
Karen Vogtmann, Cornell University

2:15PM ► (218) *Systolic spaces: Minimal surfaces, Flat Torus Theorem and related results, according to Tomasz Elsner.*
Tadeusz Januszkiewicz, Ohio State University (1023-20-297)

2:45PM (219) **$SL_3(\mathbb{Z}[t])$** *is not* FP_2. Preliminary report.
Kai-Uwe Bux, University of Virginia, and **Kevin Wortman***, Yale University (1023-20-1678)

3:15PM (220) *Lattices in automorphism groups of polygonal complexes with symmetric links.*
Anne Thomas, University of Chicago (1023-20-421)

3:45PM (221) *Algebraic finiteness for Kleinian and relatively hyperbolic groups.* Preliminary report.
Ilya Kapovich*, University of Illinois at Urbana-Champaign, and **Richard Weidmann**, Heriott-Watt University (1023-20-442)

4:15PM (222) *Relative hyperbolicity of countable groups.* Preliminary report.
G Christopher Hruska, University of Wisconsin-Milwaukee (1023-20-906)

4:45PM (223) *The Isomorphism Problem for toral relatively hyperbolic groups.*
Daniel P Groves*, California Institute of Technology, and **Francois Dahmani**, Laboratoire Emile Picard, University Paul Sabatier, Toulouse (1023-20-391)

5:15PM (224) *High dimensional isoperimetric functions of groups.*
Noel Brady* and **Max Forester**, University of Oklahoma (1023-20-1530)

5:45PM (225) *High dimensional isoperimetric functions of groups.*
Noel Brady and **Max Forester***, University of Oklahoma (1023-20-1532)

AMS Special Session on Fixed Point Theory, Dynamics, and Group Theory, II

2:15 PM – 6:10 PM

Organizers: **Michael R. Kelly**, Loyola University
Peter N. Wong, Bates College

2:15PM (226) *Self-coincidences of mappings between spheres. Preliminary report.* Preliminary report.
Duane Randall, Loyola University New Orleans (1023-55-1273)

2:45PM (227) *The uniqueness of the coincidence index on orientable differentiable manifolds.*
P. Christopher Staecker, Messiah College (1023-57-1220)

3:15PM (228) *Reidemeister classes for automorphisms of Nilpotent groups and applictions for Fixed Point Theory.* Preliminary report.
Daciberg Lima Goncalves*, University of São Paulo, and **Peter Wong**, Bates College (1023-55-179)

3:45PM (229) *Fixed points on model solvmanifold pairs.*
Aaron A Reite, California State University Fresno (1023-55-870)

4:15PM (230) *Estimating Nielsen numbers on wedge product spaces.*
Nirattaya Khamsemanan*, University of Connecticut, Storrs, and **Seugwon Kim**, University of California, Los Angeles (1023-14-594)

4:45PM (231) *Fixed point bundles of fiber-preserving maps.* Preliminary report.
Christina L Soderlund*, California Lutheran University, and **Robert F Brown**, University of California, Los Angeles (1023-55-1311)

5:15PM (232) *On explosion points and fixed points.*
Mohammad Abry, **Jan J Dijkstra*** and **Jan van Mill**, Vrije Universiteit Amsterdam (1023-54-30)

5:45PM (233) *Antipodal-like theorems and symmetric continua in euclidean spaces.*
Jan P. Boronski*, Auburn University, and **Marian Turzanski**, Cardinal Stefan Wyszynski University (1023-26-484)

AMS Special Session on Knots, 3-Manifolds, and Their Invariants, II

2:15 PM – 6:10 PM

Organizers: **Oliver T. Dasbach**, Louisiana State University
Xiao-Song Lin, University of California Riverside

2:15PM (234) *Generalizations of Gropes.* Preliminary report.
Tim D Cochran*, Rice University, **Carol Gee**, St. Edwards University, **Shelly L Harvey**, Rice University, and **Constance Leidy**, University of Pennsylvania and Wesleyan University (1023-57-1010)

2:45PM (235) *Volume, twist number, and Jones polynomial of hyperbolic links I.*
David Futer*, **Efstratia Kalfagianni**, Michigan State University, and **Jessica S. Purcell**, University of Texas at Austin (1023-57-1047)

3:15PM (236) *Volume, twist number and Jones polynomial of hyperbolic links, II.* Preliminary report.
D. Futer, **E. Kalfagianni***, Michigan State University, and **J. Purcell**, University of Texas, Austin (1023-57-1044)

3:45PM ► (237) *Spanning tree filtration on the reduced Khovanov complex and the associated spectral sequence.*
Abhijit Champanerkar*, University of South Alabama, and **Ilya Kofman**, College of Staten Island, CUNY (1023-57-966)

4:15PM (238) *Khovanov Homology, Twist Number and Surfaces.*
Robert G. Todd, University of Iowa (1023-57-494)

4:45PM (239) *SL(2,$\mathbb{C}$) and PSL(2,$\mathbb{C}$) Casson invariants and A-polynomials.* Preliminary report.
Hans U. Boden, McMaster University, and **Cynthia L. Curtis***, The College of New Jersey (1023-57-1534)

5:15PM (240) *Knot Concordance and Blanchfield Duality.*
Shelly Harvey, Rice University (1023-57-1016)

5:45PM (241) *Surgery of type-p and quantum invariants of 3-manifolds.*
Patrick M Gilmer, Louisiana State University (1023-57-512)

AMS Special Session on Arrangements and Related Topics, II

2:15 PM – 6:05 PM

Organizers: **Daniel C. Cohen**, Louisiana State University
Anne V. Shepler, University of North Texas

2:15PM (242) *Hyperbolic Deligne complexes and Artin groups.* **Ruth Charney***, Brandeis University, and **John Crisp**, Universite de Bourgogne, Dijon (1023-20-462)

2:45PM (243) *Relative Invariants : An Exterior Algebra.* **Vincent Beck**, Institut Mathematiques de Jussieu - Universite Paris 7 (1023-20-503)

3:15PM (244) *A symmetric function generalization of the Tutte polynomial.* **Harm Derksen**, University of Michigan (1023-05-936)

3:45PM (245) *Lattice theory of the poset of regions, with applications to W-Catalan combinatorics.* **Nathan Reading**, North Carolina State University (1023-05-1097)

4:15PM ► (246) *A problem about tilings of squares.* Preliminary report. **Aaron D Abrams**, Emory University (1023-51-1571)

4:45PM ► (247) *The Rauzy tiling and associated algebras.* **Alex Clark**, University of North Texas, **Karin Erdmann** and **Sibylle Schroll***, University of Oxford (1023-16-615)

5:15PM (248) *Logarithmic vector fields and truncated affine Weyl arrangements.* **Masahiko Yoshinaga**, The Abdus Salam International Centre for Theoretical Physics (1023-05-931)

5:45PM (249) *Rational maps with the symmetries of complex reflection groups.* Preliminary report. **Scott Crass**, CSU, Long Beach (1023-51-909)

AMS Special Session on Recent Developments in Analysis and Numerics of Geophysical Fluid Dynamics Problems, II

2:15 PM – 5:40 PM

Organizers: **Jie Shen**, Purdue University
Shouhong Wang, Indiana University

2:15PM (250) *A Dyadic Model for the Inviscid Fluid Equations.* Preliminary report. **Susan Friedlander**, University of Illinois-Chicago (1023-35-342)

2:45PM ► (251) *Exact solutions of a spherical model for the energy-enstrophy theory of a barotropic fluid coupled to rotating massive sphere.* **Chjan C Lim**, Rensselaer Pooytechnic Institute (1023-86-312)

3:15PM (252) *Nonlinear local Lyapunov exponent and predictability.* **Jianping Li*** and **Ruiqiang Ding**, LASG, Institute of Atmospheric Physics, Chinese Academy of Sciences (1023-37-202)

3:45PM (253) *A Finite volume implicit Euler scheme for the linearized Shallow Water equations: stability and convergence.* **Du X Pham***, The Institute for Scientific Computing and Applied Mathematics, Indiana University, and **Karine Adamy**, Numerique, Universite Paris-Sud (1023-65-346)

4:15PM (254) *The Global Attractor for the Solutions to the 3D Viscous Primitive Eqautions in H^2 space.* **Ning Ju**, Oklahoma State University (1023-35-1141)

4:45PM (255) *Large Prandtl Number Behavior of the Boussinesq System of Rayleigh-Benard Convection.* **Xiaoming Wang**, Florida State University (1023-76-360)

5:15PM (256) *Stability and transitions for the double-diffusive convections.* **Chun-Hsiung Hsia**, University of Illinois at Chicago, **Tian Ma**, Sichuan University, and **Shouhong Wang***, Indiana University (1023-86-1510)

AMS Special Session on Coding Theory and Its Applications, II

2:15 PM – 6:10 PM

Organizers: **Roxana N. Smarandache**, University of Notre Dame and San Diego State University
Pascal O. Vontobel, Hewlett-Packard Laboratories

2:15PM Discussion.

2:45PM (257) *Skew Hadamard Designs and Their Codes.* Preliminary report. **Jon-Lark Kim**, University of Louisville (1023-94-1037)

3:15PM (258) *Rediscovering Our Roots: Coding Theory and Reed-Solomon Codes.* **Henry D Pfister**, Texas A&M University (1023-94-1868)

3:45PM (259) *Algebraic Soft Decision Decoding of Reed Solomon Codes using Bit-level Soft Information.* **Jing Jiang** and **Krishna R Narayanan***, Texas A&M University (1023-94-1886)

4:15PM Break.

4:45PM ► (260) *On the generalized reversal distance.* **Olgica Milenkovic**, University of Colorado, Boulder (1023-05-1849)

5:15PM (261) *String Reconstruction: Putting right what once went wrong.* **Sampath Kannan** and **Andrew McGregor***, University of Pennsylvania (1023-60-1375)

5:45PM Discussion.

AMS Special Session on Cohomology and Representation Theory, II

2:15 PM – 6:05 PM

Organizers: **Jon F. Carlson**, University of Georgia
Daniel K. Nakano, University of Georgia
Julia Pevtsova, University of Washington

2:15PM (262) *Special bases via positive characteristic.* **Roman V Bezrukavnikov**, MIT (1023-20-1254)

2:45PM (263) *Tensor categories attached to cells in finite Weyl groups.* **Victor Ostrik**, University of Oregon (1023-20-990)

3:15PM (264) *Injective Modules and Cohomology of Lie Algebras.* **Jorg Feldvoss**, University of South Alabama (1023-17-545)

3:45PM (265) *Cohomology of Category $\mathcal{O}$ for the Virasoro algebra.* **Brian Boe**, **Daniel Nakano** and **Emilie Wiesner***, University of Georgia (1023-17-471)

4:15PM (266) *Cohomology for Lie superalgebras.* **Brian D Boe***, **Jonathan R Kujawa** and **Daniel K Nakano**, University of Georgia (1023-17-1201)

4:45PM (267) *Support Varieties for Lie Superalgebras.* **Jonathan R Kujawa***, **Brian Boe** and **Daniel K Nakano**, University of Georgia (1023-17-1166)

5:15PM (268) *Varieties for modules of quantum elementary abelian groups.*
Julia Pevtsova, University of Washington, and **Sarah Witherspoon***, Texas A&M University (1023-16-1310)

5:45PM (269) *The exact category of modules of constant Jordan type.* Preliminary report.
Jon F. Carlson, University of Georgia, **Eric M. Friedlander***, Northwestern University, and **Julia Pevtsova**, University of Washington (1023-20-501)

AMS Special Session on Experimental Mathematics in Action, II

2:15 PM – 6:05 PM

Organizers: **Victor H. Moll**, Tulane University
Tewodros Amdeberhan, Tulane University

2:15PM ► (270) *Symbol-Crunching the Gambler's Ruin Problem.*
Shalosh B. Ekhad and **Doron Zeilberger***, Rutgers University (1023-05-228)

2:45PM ► (271) *GFUN: 15 years later.*
Bruno Salvy, INRIA Rocquencourt, France (1023-40-227)

3:15PM ► (272) *Which Partial Sums of the Taylor Series for e Are Convergents to e? (with an Appendix by Kyle Schalm).*
Jonathan Sondow, New York City (1023-11-115)

3:45PM ► (273) *Asymptotic analysis of differential-difference equations.* Preliminary report.
Diego Ernesto Dominici, State University of New York at New Paltz (1023-41-319)

4:15PM ► (274) *Experimental Mathematics and Radix Representations for Vectors.*
Eva Curry, Acadia University (1023-37-1903)

4:45PM ► (275) *Polyhedral theta functions - theorems and experiments.* Preliminary report.
Sinai Robins, Temple University (1023-11-305)

5:15PM (276) *Hypergeometric Functions that Generate Series Acceleration Formulae for Values of the Riemann Zeta Function.*
David M. Bradley, University of Maine (1023-33-903)

5:45PM (277) *Divisibility Properties of Integer Sequences.*
Dante V. Manna*, Dalhousie University, **Tewodoros Amdeberhan** and **Victor H. Moll**, Tulane University (1023-11-67)

AMS Special Session on Financial Mathematics, II

2:15 PM – 6:10 PM

Organizers: **Jean-Pierre Fouque**, University of California Santa Barbara
Craig A. Nolder, Florida State University
Knut Solna, University of California Irvine
Thaleia Zariphopoulou, University of Texas Austin

2:15PM (278) *Arbitrage Bounds for Volatility Derivatives and the Skorokhod embedding Problem.*
Bruno Dupire, Bloomberg (1023-60-1703)

3:15PM (279) *Small-time and tail asymptotics for diffusion and time-changed diffusion processes.* Preliminary report.
Martin S Forde, UCBS (1023-60-1404)

3:50PM (280) *Mathematical Foundation for Technial Analysis of Stock price.* Preliminary report.
Wei Liu, Department of Statistics, East China Normal University, Shanghai, and **Weian Zheng***, University of California Irvine (1023-60-892)

4:45PM (281) *Unified Modeling of Corporate Debt, Credit Derivatives, and Equity Derivatives.*
Vadim Linetsky, Northwestern University (1023-60-566)

5:45PM (282) *Pricing credit from the top down with affine point processes.*
Kay Giesecke, Stanford University, Department of Management Science and Engineering (1023-60-569)

MAA Minicourse #13: Part A

2:15 PM – 4:15 PM

Teaching a course in the history of mathematics.
Organizers: **Victor J. Katz**, University of the District of Columbia
V. Frederick Rickey, U. S. Military Academy

MAA Minicourse #2: Part A

2:15 PM – 4:15 PM

Some deterministic models in mathematical biology and their simulations.
Organizers: **James F. Selgrade**, North Carolina State University
Cammey E. Cole, Meredith College
Hüseyin Koçak, University of Miami, Coral Gables

MAA Minicourse #8: Part A

2:15 PM – 4:15 PM

Mathematics and geometry of voting.
Organizer: **Donald G. Saari**, University of California Irvine

AMS Session on Algebra and Group Theory, II

2:15 PM – 6:10 PM

2:15PM (283) *The Primeness of Just Infinite Algebras.*
Cayley A. Pendergrass*, Albion College, and **John Farina**, University of California, San Diego (1023-16-490)

2:30PM ► (284) *Tridiagonal pairs and the q-tetrahedron algebra.* Preliminary report.
Darren R Funk-Neubauer, University of Wisconsin-Madison (1023-16-527)

2:45PM (285) *On distributive properties of operations with ideals in an algebra.* Preliminary report.
Avraham Goldstein* and **Chokri Cherif**, BMCC (1023-16-710)

3:00PM Break.

3:15PM ► (286) *E_6: The Group.* Preliminary report.
Aaron Daniel Wangberg* and **Tevian Dray**, Oregon State University (1023-17-1743)

3:30PM (287) *Maximal subalgebras of the octonions.*
Stephen Gagola III, Case Western Reserve University (1023-17-1894)

3:45PM Break.

4:00PM (288) *Nilpotent Lie Algebras with Property $L'' \neq 0$ and dim$(L'/L'') = 3$.* Preliminary report.
Laurie M Zack, North Carolina State University (1023-17-232)

4:15PM (289) *Cotorsion pairs of chain complexes and possible Quillen model structures.* Preliminary report.
James R. Gillespie, Penn State McKeesport (1023-18-1300)

4:30PM (290) *Categorical Morita Equivalence For Group-Theoretical Categories.*
Deepak Naidu, University of New Hampshire (1023-18-293)

4:45PM (291) *Symmetric Cohomology for Groups.*
Mihai D Staic, SUNY at Buffalo (1023-18-93)

5:00PM (292) *Hochschild Cohomology and Derived Categories.*
Alin A. Stancu, Drexel University (1023-18-94)

5:15PM (293) *Deformation K-theory of surface groups via Yang-Mills theory.*
Daniel A. Ramras, Stanford University (1023-19-1865)

5:30PM ► (294) *The Automorphism Group of a Finite p-Group is Almost Always a p-Group.*
Geir T. Helleloid*, Stanford University, and **Ursula Martin**, Queen Mary University of London (1023-20-1001)

5:45PM (295) *On applications of Mackey imprimitivity for gerbes.* Preliminary report.
Calder Daenzer, University of Pennsylvania (1023-20-1424)

6:00PM ► (296) *Gassmann Equivalent Dessins.*
Mona Brigitta Merling, Bard College (1023-20-1442)

AMS Session on Partial Differential Equations, II

2:15 PM – 5:55 PM

2:15PM (297) *On the Painleve Property of certain Partial Differential Equations.*
A. Bathi Kasturiarachi, Kent State University, Stark Campus (1023-35-1661)

2:30PM (298) *Minimal action for Lagrangians in the Wasserstein space of probability measures.*
Wilfrid Gangbo, **Truyen V. Nguyen*** and **Adrian Tudorascu**, Georgia Institute of Technology (1023-35-1725)

2:45PM ► (299) *Convexity of Level Curves for solutions to $\Delta u = f(u)$.* Preliminary report.
David L Finn, Rose-Hulman Institute of Technology (1023-35-1781)

3:00PM (300) *Harmonic maps of polyhedra to a sphere with tangent boundary conditions on faces.*
Maxim Zyskin, University of Oxford (1023-35-1782)

3:15PM (301) *Exponential attractors for the Allen-Cahn equation with dynamic boundary conditions.* Preliminary report.
Ciprian G Gal, Morgan State University (1023-35-1876)

3:30PM ► (302) *Symmetry analysis of a two dimensional diffusion equation with a nonlinear source term.*
Danny Arrigo*, University of Central Arkansas, **Luis Suazo** and **Olabode Sule** (1023-35-1911)

3:45PM (303) *Hyperbolic Monge-Ampère Equation.*
Tamani M Howard, University Of North Texas (1023-35-229)

4:00PM (304) *Saddle point characterization and computation for strongly indefinite functionals.* Preliminary report.
Xianjin Chen* and **Jianxin Zhou**, Texas A&M University, College Station (1023-35-245)

4:15PM ► (305) *Existence of solutions to nonlinear hyperbolic equations arising in gas dynamics in pipe networks.*
Michael Herty, TU Kaiserslautern (1023-35-278)

4:30PM (306) *Conservation laws for fourth order systems in four dimensions.*
Tobias Lamm, Max-Planck-Institute for Gravitational Physics (1023-35-374)

4:45PM ► (307) *Radial solutions for $\Delta_p u + f(u) = 0$, with $\lim_{|x|\to\infty} u(x) = 0$.* Preliminary report.
Sridevi Pudipeddi, University of North Texas (1023-35-398)

5:00PM (308) *Asymptotic behavior of the integrand for free surface elevation in axisymmetric water wave problem.*
Dambaru D Bhatta, The University of Texas-Pan American, Edinburg, TX (1023-35-453)

5:15PM (309) *Localized and Spatially Extended Waves in Bose-Einstein Condensates in Periodic Potentials.*
Mason A Porter, California Institute of Technology (1023-35-46)

5:30PM (310) *A system of delay partial differential equations for traffic flow.*
Mostafa Ghandehari* and **Sia Ardekani**, University of Texas at Arlington (1023-35-53)

5:45PM (311) *On explosive solutions of a class of semilinear elliptic equations.*
Peng Feng, Florida Gulf Coast University (1023-35-314)

AMS Session on Algebra and Number Theory, II

2:15 PM – 5:55 PM

2:15PM (312) *Going Up of the u-Invariant over Formally Real Fields.*
Claus Schubert, University of California, Los Angeles (1023-11-1313)

2:30PM ► (313) *Sequences of reducible 0,1-polynomials with exponents in arithmetic progression.* Preliminary report.
Carrie E Finch, University of South Carolina (1023-11-1373)

2:45PM (314) *Generalizations of Wild semigroups related to the $3x+1$ problem.*
Ana Caraiani, Princeton University (1023-11-1418)

3:00PM (315) *The Triviality and Nontriviality of Tate–Lichtenbaum Self–Pairings.*
Susan L. Schmoyer, University of Maryland (1023-11-1490)

3:15PM (316) *The reducible case of Serre's Conjecture.*
Spencer Hamblen*, Queen's University, and **Ravi Ramakrishna**, Cornell University (1023-11-1558)

3:30PM (317) *An improvement on the known bounds of discriminants of number fields.*
Jason Worth Martin, James Madison University (1023-11-1580)

3:45PM (318) *A Faster Algorithm for Random Dense Subset Sums.*
Andrew Shallue, University of Wisconsin-Madison (1023-68-810)

4:00PM (319) *Atkinson's formula for the mean square of the Riemann zeta function.* Preliminary report.
Jennifer Beineke*, Western New England College, and **Daniel Bump**, Stanford University (1023-11-1595)

4:15PM (320) *Buildings and Combinatorics: Preliminary Report.* Preliminary report.
Alison Setyadi, Dartmouth College (1023-11-165)

4:30PM (321) *Ruling out elliptic curves of prime conductor.* Preliminary report.
Jeremiah K Hower, University of Georgia (1023-11-1770)

4:45PM ► (322) *On composite numbers that remain composite after any insertion of a digit.*
Mark Kozek* and **Michael Filaseta**, University of South Carolina (1023-11-1803)

5:00PM (323) *On integer quadratic polynomials which are small at a given point.* Preliminary report.
Kiryl I Tsishchanka, DePaul University (1023-11-1850)

5:15PM ► (324) *Appell Sequences and Hypergeometric Bernoulli Polynomials.*
Abdul Hassen and **Hieu D Nguyen***, Rowan University (1023-11-256)

5:30PM (325) *On the Number of Norm Subgroups of the Multiplicative Group of an Algebraic Number Field.* Preliminary report.
Leonid Stern, Towson University (1023-11-265)

5:45PM (326) *Cyclotomic Polynomials of Order Three and Maximal Height of Divisors of $x^n - 1$.*
Nathan Kaplan, Princeton University (1023-11-348)

4:45PM (337) *An Adaptive Multiresolution Analysis for Image Compression Using Compact CUPOLETS.*
Kourosh Zarringhalam* and **Kevin M Short**, University of New Hampshire (1023-E5-290)

5:00PM ► (338) *Approximations of Continuous Newton's Method & Cayley's Problem.*
Jon Jacobsen*, Harvey Mudd College, **Brad Tennis**, Stanford, and **Owen Lewis**, Harvey Mudd College (1023-E5-343)

5:15PM (339) *Limit Sets in Graph Directed Constructions.*
Eugen Andrei Ghenciu, University of Alaska at Fairbanks (1023-E5-1204)

5:30PM ► (340) *Eigenvectors of recursively defined matrices and self-similar measures.*
Mark McClure, University of North Carolina at Asheville (1023-E5-860)

5:45PM ► (341) *Periodic and connecting orbits as source of chaos in ODEs.*
Brian A. Coomes, **Hüseyin Koçak***, University of Miami, and **Kenneth J. Palmer**, National Taiwan University (1023-E5-1242)

6:00PM ► (342) *An elementary approach to a symplectic integration algorithm.*
Daniel Hemberger and **James A Walsh***, Oberlin College (1023-E5-255)

MAA Session on Chaos and Fractals

2:15 PM – 6:10 PM

Organizers: **Denny Gulick**, University of Maryland
Jon W. Scott, Montgomery College

2:15PM ► (327) *Finding Gold In The Forest: Fractal Trees and the Golden Ratio.*
T D Taylor, St. Francis Xavier University, Antigonish, Nova Scotia, Canada (1023-E5-78)

2:30PM ► (328) *Fractal Forecasting Missing Image Data.*
Ning Chen, Shenyang Jianzhu University, and **Clifford Reiter***, Lafayette College (1023-E5-164)

2:45PM ► (329) *Describing Points in Sierpinski-Like Fractals.*
Sandra Fillebrown* and **Joseph Pizzica**, Saint Joseph's University (1023-E5-257)

3:00PM ► (330) *The Geometry of the Hausdorff Metric.*
Steven Schlicker, Grand Valley State University (1023-E5-269)

3:15PM ► (331) *From Sierpinski Triangle to Fractal Flowers.* Preliminary report.
Anne M Burns, Long Island University, C.W. Post Campus (1023-E5-270)

3:30PM ► (332) *Exploring Fractals from Cantor Dust to the Fractal Skewed Web.*
Mary Ann Connors, Westfield State College (1023-E5-375)

3:45PM ► (333) *Why Include Fractal Geometry in a Non-Euclidean Geometry Course?*
Elaine F. Magee, Shenandoah University (1023-E5-1692)

4:00PM ► (334) *Fractals Based on Iterative Structural Self-Cloning Method.* Preliminary report.
Mingjang Chen, Center for General Education, National Chiao Tung, Taiwan (1023-E5-1862)

4:15PM (335) *Billiards with Mixed Regular and Chaotic Dynamics.*
Mason A Porter, California Institute of Technology (1023-E5-50)

4:30PM ► (336) *An Amazing Bifurcation Diagram Arising from Newton's Method.*
Gareth E Roberts* and **Trevor M O'Brien**, College of the Holy Cross (1023-E5-907)

MAA Session on Content Courses for the Mathematical Education of Middle School Teachers, II

2:15 PM – 5:10 PM

Organizers: **Laurie Burton**, Western Oregon University
Maria G. Fung, Western Oregon University
Klay Kruczek, Western Oregon University

2:15PM (343) *Mathematical Courses for Middle School Teachers: The CSUSB Approach.*
Robert G Stein, California State University, San Bernardino (1023-G1-199)

2:35PM (344) *Mathematics Content for Middle School Teachers Design at the University of Louisiana at Lafayette.*
Lee E. Price, University of Louisiana at Lafayette (1023-G1-1246)

2:55PM ► (345) *A Problem-Solving Course for Pre-Service Middle School Teachers.*
Kathleen D. Lopez, University of Louisiana at Lafayette (1023-G1-1378)

3:15PM ► (346) *Bluffton's Explore and Explain Mathematics Courses for Middle School Teachers.*
Donald E. Hooley, Bluffton University (1023-G1-139)

3:35PM (347) *Using LOGO to Teach Geometry and Problem Solving To Future Middle School Teachers.*
Jerry Dwyer, **Gary Harris** and **G Brock Williams***, Texas Tech University (1023-G1-1235)

3:55PM ► (348) *Constructivist Integrated Mathematics and Methods for Middle Grades Teachers.*
Rebecca K. Walker*, Grand Valley State Univeristy, and **Charlene E. Beckmann**, Grand Valley State University (1023-G1-1450)

4:15PM (349) *Western Oregon University's Middle School Mathematics Focus.*
Laurie Burton, **Maria Fung** and **Klay Kruczek***, Western Oregon University (1023-G1-277)

4:35PM ► (350) *A (Pre)Calculus and Discrete Math Course for Pre-Service Middle School Teachers.* Preliminary report.
Timothy W. Flood, Pittsburg State University (1023-G1-143)

4:55PM ► (351) *Reflections from a journey: Diary excerpts highlighting the content preparation of a middle school mathematics teacher.*
Mandi S. Maxwell*, **David B. Klanderman** and **Mary Webster Moore**, Trinity Christian College (1023-G1-883)

MAA Session on Getting Students to Discuss and to Write about Mathematics, I

2:15 PM – 3:40 PM

Organizers: **Martha Ellen (Murphy) Waggoner**, Simpson College
Charlotte Knotts-Zides, Wofford College
Harrison W. Straley, Wheaton College

2:15PM (352) *Building Communication Skills - A Gradual Process.*
David D Gebhard, Wisconsin Lutheran College (1023-I1-761)

2:30PM ► (353) *On the Evening News.*
Sarah L Mabrouk, Framingham State College (1023-I1-1844)

2:45PM ► (354) *Projects that Encourage Students to Talk and Write about Mathematics.*
Aihua Li, Montclair State University (1023-I1-1729)

3:00PM ► (355) *Writing assessments in a College Algebra course.*
Brian P Kelly, Roger Williams University (1023-I1-1870)

3:15PM ► (356) *An Inter-disciplinary Writing Project in a Liberal Arts Mathematics Course.*
Rehana Patel, St. John's University (1023-I1-1864)

3:30PM ► (357) *Relations... Human Relations.* Preliminary report.
Saburo Matsumoto, The Master's College (1023-I1-326)

MAA Session on Entertaining with Math

2:15 PM – 5:50 PM

Organizer: **Timothy P. Chartier**, Davidson College

2:15PM ► (358) *Concept Videos for Calculus: A Context that Encapsulates a Lesson.*
Mike Martin, Johnson County Community College (1023-H1-635)

2:35PM ► (359) *Better Poker Hands Guaranteed.*
Card Colm Mulcahy, Spelman College (1023-H1-1341)

2:55PM ► (360) *The value of entertainment in a mathematics course.*
Mark John Meyer*, **Hilary C Singer** and **Artur Elezi**, American University (1023-H1-1487)

3:15PM ► (361) *Mathematical Mentalism.*
John M. Harris, Furman University (1023-H1-652)

3:35PM ► (362) *Graphs and juggling.*
Gregory S. Warrington, Wake Forest University (1023-H1-1437)

3:55PM (363) *Mathemagic.*
J. Alfredo Jimenez, Penn State University Hazleton (1023-H1-1351)

4:15PM ► (364) *Mathematics in Mime.*
Tim Chartier, Davidson College (1023-H1-311)

4:35PM ► (365) *Learning Groups via Object Manipulation.* Preliminary report.
Akihiro Matsuura, College of Science and Engineering, Tokyo Denki University (1023-H1-1832)

4:55PM ► (366) *Mangum, P.I.*
Colin C Adams*, Williams College, and **Mikhail Chkhenkeli**, Western New England College (1023-H1-279)

5:15PM ► (367) *Dancing with Mathematics.*
Karl Schaffer, De Anza College / Dr. Schaffer and Mr. Stern Dance Ensemble (1023-H1-130)

5:35PM ► (368) *An Amazing Mathematical Card Trick.*
Arthur T. Benjamin, Harvey Mudd College (1023-H1-73)

MAA Session on Research and Other Mathematical Experiences for Students Outside the Classroom

2:15 PM – 6:00 PM

Organizers: **Sarah Spence Adams**, Franklin W Olin College of Engineering
James A. Davis, University of Richmond
Susan E. Morey, Texas State University, San Marcos

2:15PM ► (369) *Center for Mentoring Undergraduate Research in Mathematics at BYU.*
Michael Dorff, Brigham Young University (1023-P1-382)

2:45PM ► (370) *Research Opportunities for Commuter Students.*
Diana M Thomas* and **Michael A Jones**, Montclair State University (1023-P1-1682)

3:00PM ► (371) *Significance of being an LSAMP scholar.* Preliminary report.
Reginald Dorcely*, **Frantz Mackenzy Voltaire**, **Karl C. Clarke**, **Umesh P. Nagarkatte** and **Wilbert Hope**, Medgar Evers College-CUNY (1023-P1-768)

3:15PM ► (372) *Student Research Projects: Success and Failure.* Preliminary report.
Nathaniel Dean, Texas State University University-San Marcos (1023-P1-1430)

3:30PM ► (373) *An International REU Site in Mathematics: Hong Kong.*
Graeme Fairweather* and **Barbara Moskal**, Colorado School of Mines (1023-P1-1438)

3:45PM ► (374) *Math Research in Brazil, I.R.E.S. 2006.*
Tania M. Lopez, California State University, Northridge (1023-P1-557)

4:00PM ► (375) *Designing a "Methods of Research" Course.* Preliminary report.
Jacqueline A Jensen, Sam Houston State University (1023-P1-1318)

4:15PM ► (376) *The Evolution of an Arts and Sciences Student Symposium.*
Jan O Case, Jacksonville State University (1023-P1-491)

4:30PM ► (377) *Undergraduate Teaching which Leads to Undergraduate Research.*
Sarah-Marie Belcastro, Smith College and Hampshire College Summer Studies in Mathematics (1023-P1-1021)

4:45PM ► (378) *Initiating A Sonya Kovelevsky Day.* Preliminary report.
Ramona Ranalli* and **Jennifer McLoud-Mann**, The University of Texas at Tyler (1023-P1-776)

5:00PM (379) *Pedagogical practice outside the traditional mathematics classroom:Enriching teacher candidates experiences.* Preliminary report.
Carol Klages* and **Barba Patton**, University of Houston-Victoria (1023-P1-1813)

5:15PM ► (380) *Mathematical Ideas: Tricks of the Trade.* Preliminary report.
Jesse W. Byrne* and **Charlotte K. Simmons**, University of Central Oklahoma (1023-P1-1639)

5:30PM Discussion.

MAA General Contributed Paper Session, II

2:15 PM – 5:55 PM

Organizers: **Eric S. Marland**, Appalachian State University
Jay A. Malmstrom, Oklahoma State Community College

2:15PM (381) *Valuing and Evaluating Teaching in the Mathematics Faculty Hiring Process.*
Derek Bruff, Vanderbilt University (1023-Z1-1709)

2:30PM (382) *Faculty Development: Promoting a Collegiate and Cooperative Environment and Preparing New Faculty for Success in the Classroom.* Preliminary report.
Barbra S. Melendez* and **Gerald C. Kobylski**, United States Military Academy (1023-Z1-1209)

2:45PM ► (383) *On the Transition in Mathematics from High School to College.* Preliminary report.
Richard O. Hill* and **Jon Star**, Michigan State University (1023-Z1-698)

3:00PM ► (384) *Results of the 2005 AP Statistics Curriculum Survey.*
Tim Jacobbe, Educational Testing Service (1023-Z1-47)

3:15PM ► (385) *Running a Mathematics Capstone Course in a Small Department.* Preliminary report.
J. Alan Alewine, McKendree College (1023-Z1-331)

3:30PM ► (386) *Exploring the similarities and differences in the use of Computer Algebra Systems in teaching at American and British universities.* Preliminary report.
Zsolt Lavicza, Cambridge University (1023-Z1-856)

3:45PM ► (387) *Moving from objects to process; the case of representations.*
May F Hamdan, Lebanese American University (1023-Z1-819)

4:00PM ► (388) *Houston . . . we have a bug problem.*
Michael R. Bacon, USC Sumter (1023-Z1-1551)

4:15PM ► (389) *Observations on Sir William Rowan Hamilton and George Boole.* Preliminary report.
Charlotte Simmons, University of Central Oklahoma (1023-Z1-1457)

4:30PM ► (390) *Euler Converses Euclid.*
Charlie Smith, Park University (1023-Z1-1170)

4:45PM ► (391) *Everything you want to know about bridge courses – except whether they work.* Preliminary report.
Michael B. Ward, Western Oregon University (1023-Z1-299)

5:00PM ► (392) *Quantitative Literacy Topics: The Need for an "Industry Standard"?*
Eric Gaze, Alfred University (1023-Z1-770)

5:15PM (393) *Quantitative Literacy (QL) in the Major at a large University.*
Kimberly M Vincent, Washington State University (1023-Z1-1684)

5:30PM (394) *Mathematical Philosophies, and Computers in Educational Trends.*
Mohammad R. Khadivi, Jackson State University (1023-Z1-1646)

5:45PM ► (395) *Can Philosophers Learn How to Solve Problems from Mathematicians (Meno 86e-87c)?* Preliminary report.
Carlos Bovell, Mercer County Community College (1023-Z1-923)

SIAM Minisymposium on Recent Advances in Computational Scattering

2:15 PM – 6:10 PM

Organizer: **Jie Shen**, Purdue University

2:15PM (396) *Boundary perturbation methods for high-frequency scattering.*
David P. Nicholls*, University of Illinois at Chicago, and **Fernando Reitich**, University of Minnesota (1023-78-1279)

2:45PM ► (397) *Discontinuous Galerkin Method for PDEs with Dirac sources with applications in Optical Fiber Laser.* Preliminary report.
Wei Cai, UNC Charlotte (1023-65-1594)

3:15PM (398) *Exact Dirichlet-to-Neumann maps on general geometries for elasticity.* Preliminary report.
Nilima Nigam*, McGill University, and **D.P. Nicholls**, U. Illinois Chicago (1023-65-1577)

3:45PM (399) *Scattering by Open Surfaces.*
Shidong Jiang, New Jersey Institute of Technology (1023-65-479)

4:15PM (400) *Numerical Solution of the Nonlinear Helmholtz Equation.*
Guy Baruch, **Gadi Fibich**, Tel Aviv University, and **Semyon Tsynkov***, North Carolina State University (1023-65-528)

4:45PM (401) *Dispersion analysis of nonconforming finite element methods for the Helmholtz equation.*
Dongwoo Sheen*, Seoul National University and Purdue University, **Taeyoung Ha**, Seoul National University, and **Kitak Lee**, Samsung SDS (1023-65-1154)

5:15PM (402) *Acceleration of an iterative method for the evaluation of high-frequency multiples scattering effects.*
Yassine Boubendir* and **Fernando Reitich**, University of Minnesota (1023-65-1734)

5:45PM (403) *Efficient and Stable Spectral Methods for the Helmholtz equation in exterior domains.*
Jie Shen, Purdue University (1023-65-564)

SIAM Minisymposium on Environmental Modeling: Challenges in Practical Applications and in Teaching

2:15 PM – 5:55 PM

Organizer: **William L. Briggs**, University of Colorado at Denver

2:15PM ► (404) *Hazardous materials modeling and other opportunities for student applied mathematics projects.*
Charles R. Hadlock, Bentley College (1023-97-1670)

2:45PM ► (405) *Ecological Problems for Undergraduate Research.*
Glenn Ledder, University of Nebraska-Lincoln (1023-92-1305)

3:15PM ► (406) *Making Models Useful to Decision-Makers.*
Holly D. Gaff*, University of Maryland, School of Medicine, and **Louis Gross**, University of Tennessee, Knovxille (1023-92-1207)

3:45PM (407) *Undergraduate Mathematical Biology Research at Appalachian State University.*
Rene A. Salinas, Appalachian State University (1023-92-1203)

4:15PM ► (408) *Using integro-difference equations to model the effect of growing season length on the spread of the Eurasian collared dove in North America.*
Andrew Whittle*, Kennesaw State University, **Erika Asano**, USF St. Petersburg, and **Michael Fuller**, University of Tennessee (1023-92-1155)

4:45PM (409) *A Mathematical Biology Program at the University of Louisiana: Curriculum Development and Research.*
Azmy S Ackleh, University of Louisiana at Lafayette (1023-92-767)

5:15PM (410) *Hurricane modeling and Katrina.*
T. N. Krishnamurti, Department of Meteorology, Florida State University (1023-92-1806)

Math on the Web, I

2:15 PM – 4:50 PM

2:15PM (411) *MathML 3: Where are we going from here?*
Patrick Ion, American Mathematical Society

2:45PM (412) *Creating mathematical documents for the Web with Scientific WorkPlace.*
Barry MacKichan, MacKichan Software, Inc.

3:30PM (413) *Writing questions with randomized parameters in proper mathematical notation for online homework assignments.*
John Risley, WebAssign

4:30PM (414) *Adventures in sustainability: Development, direction, and lessons from PlanetMath.*
Aaron Krowne, Emory University

Project NExT-YMN Poster Session

2:15 PM – 4:15 PM

Organizers: **Kevin E. Charlwood**, Washburn University
Michael C. Axtell, Wabash College

MAA Committee on the Profession Panel Discussion

2:15 PM – 3:35 PM

Ethics in the mathematical sciences.
Organizer: **Susan C. Geller**, Texas A&M University
Panelists: **Donald L. Bentley**, Pomona College
John D. Fulton, Clemson University
Linda Keen, Herbert H. Lehman College of CUNY
Henry Walker, Grinnell University

MAA Committee on the Undergraduate Program in Mathematics and the SIGMAA on Statistics Education Panel Discussion

2:15 PM – 3:35 PM

Preparing majors for the nonacademic workforce: Projects and internships in applied mathematics and statistics.
Organizers: **Thomas L. Moore**, Grinnell College
Harriet S. Pollatsek, Mount Holyoke College
Moderator: **Thomas L. Moore**
Panelists: **Matthew P. Richey**, St. Olaf College
Nagambal Shah, Spelman College
Suzanne L. Weekes, Worcester Polytechnic Institute

MAA Panel Discussion

2:15 PM – 3:35 PM

The role of assessment in helping students learn.
Organizers: **Catherine M. Murphy**, Purdue University Calumet
Daniel P. Maki, Indiana University
Panelists: **Bernard L. Madison**, University of Arkansas
William A. Marion, Jr, Valparaiso University
Barbara Moskal, Colorado School of Mines

AWM Panel Discussion

2:15 PM – 3:40 PM

Women advancing to leadership: When and how.
Organizer: **Barbara L. Keyfitz**, The Fields Institute and University of Houston
Moderator: **Barbara L. Keyfitz**
Panelists: **Lisa Fauci**, Tulane University
Cathy B. Kessel, Berkeley, CA
Johanna Levelt Sengers, NIST
Joan R. Leitzel, University of New Hampshire
Carolyn R. Mahoney, Lincoln University

MAA Session on Mathlets for Teaching and Learning Mathematics

2:20 PM – 5:35 PM

Organizers: **David Strong**, Pepperdine University
Thomas Leathrum, Jacksonville State University
Joe Yanik, Emporia State University

2:20PM ► (415) *Experiments with Matrices Showing How to Transform and Animate Computer Images to New Students.* Preliminary report.
Charles A Sulewski* and **Frank Wattenberg**, United States Military Academy at West Point (1023-M5-746)

2:40PM ► (416) *A Mathlet to Interactively Explore Ordinary Differential Equation Solvers.*
Nicholas A Dovidio, Davidson College (1023-M5-1637)

3:00PM ► (417) *Modeling with Functions: A Student Centered, Discovery Approach.*
Joseph M Lindquist* and **James Dzwonchyk**, United States Military Academy (1023-M5-1779)

3:20PM ► (418) *Parameter passing in Mathematical Java Toolkit applets.*
Michael Mays, West Virginia University (1023-M5-309)

3:40PM ► (419) *Interactive Workbooks for Classifying Distributions and Balancing Chemical Equations.*
Sarah L Mabrouk, Framingham State College (1023-M5-1856)

4:00PM ► (420) *Using Maplets and Java to Teach Reed-Solomon Codes.* Preliminary report.
Richard E. Klima*, Appalachian State University, and **Neil P. Sigmon**, Radford University (1023-M5-117)

4:20PM ► (421) *An Applet-Based Presentation of the Chebyshev Equioscillation Theorem.*
Robert A. Mayans, Fairleigh Dickinson University (1023-M5-44)

4:40PM ► (422) *The UW Praxis Project.*
Jennifer J. Kosiak* and **Bob Hoar**, University of Wisconsin - La Crosse (1023-M5-1810)

5:00PM ► (423) *Multilingual Maplets for WebALT Calculus.*
Douglas B Meade*, University of South Carolina, **Philip B Yasskin**, Texas A&M University, and **Mika Seppala**, University of Helsinki (1023-M5-1567)

5:20PM ► (424) *Maplets for Calculus - Now with Proofs.*
Philip B. Yasskin*, Texas A&M University, **Douglas B. Meade**, University of South Carolina, and **Mika Seppala**, University of Helsinki (1023-M5-254)

MAA Section Officers

2:30 PM – 5:00 PM

Project NExT Panel Discussion

3:00 PM – 5:00 PM

Becoming a leader in your department.

Organizers: **Edwin P. Herman**, University of Wisconsin-Stevens Point
J. Lyn Miller, Slippery Rock University

Panelists: **Stuart Boersma**, Central Washington University
Linda Braddy, East Central University
Duff Campbell, Hendrix College
Jill E. Guerra, University of Arkansas, Fort Smith
Thomas C. Ratliff, Wheaton College
Judy L. Walker, University of Nebraska-Lincoln

MAA Invited Address

3:40 PM – 4:30 PM

(425) *Baseball, Shakespeare, and modern statistical theory.*
Bradley Efron, Stanford University (1023-A0-20)

AWM Business Meeting

3:45 PM – 4:15 PM

SIGMAA on the History of Mathematics Panel Discussion

3:50 PM – 5:40 PM

The practice of math history.

Organizers: **William Branson**, St. Cloud State University
Amy E. Shell-Gellasch, Pacific Lutheran University

Panelists: **V. Frederick Rickey**, U.S. Military Academy
Karen H. Parshall, University of Virginia
Joseph W. Dauben, Herbert H. Lehman College of CUNY

MAA Study Abroad Tours Subcommittee Panel Discussion

3:50 PM – 5:40 PM

Mathematics and mathematicians in emerging nations.

Organizers: **M. Leigh Lunsford**, Longwood University
Lisa Elaine Marano, West Chester University of Pennsylvania

Panelists: **Joel K. Haack**, University of Northern Iowa
Aihua Li, Montclair State University
Kate McGivney, Shippensburg University of Pennsylvania
Claudio H. Morales, University of Alabama, Huntsville
Miranda I. Teboh-Ewungkem, Lafayette College

MAA Committee on Graduate Students-YMN Panel Discussion

3:50 PM – 5:10 PM

How to interview for a job in the mathematical sciences.

Organizer: **David C. Manderscheid**, University of Iowa

Panelists: **Allen Butler**, Daniel H. Wagner Associates, Inc.
Sharon M. Clarke, Pepperdine University
James H. Freeman, Cornell College
David T. Kung, St. Mary's College of Maryland
David C. Manderscheid

SIGMAA on Environmental Mathematics Annual Meeting and Guest Lecture

4:00 PM – 5:30 PM

Organizer: **Ben A. Fusaro**, Florida State University

Welcome Reception for Undergraduate Students

4:00 PM – 5:00 PM

AMS Committee on the Profession Presentation

4:30 PM – 6:00 PM

Katrina and its aftermath: Institutional survival in New Orelans since the storm.

Organizer: **Jim E. Hoste**, Pitzer College

Moderator: **Jim E. Hoste**

Panelists: **Kenneth W. Holladay**, University of New Orleans
Morris Kalka, Tulane University
Vlajko L. Kocic, Xavier University of Louisiana
Katarzyna Saxton, Loyola University New Orleans

MAA Minicourse #14: Part A

4:45 PM – 6:45 PM

Contemporary college algebra: A refocused college algebra course.

Organizers: **Donald B. Small**, U. S. Military Academy
Laurette Foster, Prairie View A&M University

MAA Minicourse #3: Part A

4:45 PM – 6:45 PM

A tool to implement quantitative literacy (QL): Spreadsheets Across the Curriculum.

Organizers: **Semra Kiliç-Bahi**, Colby-Sawyer College
Gary T. Franchy, Davenport University
Cheryl Coolidge, Colby-Sawyer College
William A. Thomas, Colby-Sawyer College

MAA Minicourse #9: Part A

4:45 PM – 6:45 PM

Evaluating student presentations in mathematics.

Organizers: **Suzanne Dorée**, Augsburg College
Richard J. Jardine, Keene State College
Thomas J. Linton, Central College

MAA Information Session

5:00 PM – 7:00 PM

Current issues in actuarial science education.

Organizers: **Robert E. Buck**, Slippery Rock University
Bettye Anne Case, Florida State University
Matthew J. Hassett, Arizona State University
Steve Paris, Florida State University

Reception for Graduate Students and First-Time Participants

5:30 PM – 6:30 PM

The AMS and MAA warmly invite these special groups to meet the leadership of your sponsoring organizations.

SIGMAA on the History of Mathematics Annual Meeting and Guest Lecture

6:00 PM – 7:00 PM

Organizer: **Amy E. Shell-Gellasch**, Pacific Lutheran University

► (426) *Hardy's Oxford Years.*
Robin J. Wilson, The Open University, UK (1023-A0-204)

AMS Josiah Willard Gibbs Lecture

8:30 PM – 9:30 PM

(427) *Mathematics and physics.*
Peter D. Lax, New York University-Courant Institute (1023-01-10)

Saturday, January 6

MAA Department Liaisons Breakfast Meeting

7:00 AM – 8:30 AM

Joint Meetings Registration

7:30 AM – 4:00 PM

AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates, I

8:00 AM – 11:55 AM

Organizers: **Darren A. Narayan**, Rochester Institute of Technology
Carl V. Lutzer, Rochester Institute of Technology
Bernard Brooks, Rochester Institute of Technology
Tamas I. Wiandt, Rochester Institute of Technology
Michael J. Fisher, California State University, Fresno

8:00AM ► (428) *Automorphisms and Lattices of the Heisenberg Group.* Preliminary report.
Lisa M Lackney*, University of Akron, and **Rebecca Black**, Swarthmore College (1023-20-112)

8:30AM ► (429) *The Steiner problem on the cone.*
Jamie L Burwood*, Bowdoin College, and **Caroline Nielson**, University of Southern Utah (1023-51-146)

9:00AM ► (430) *The 3-point Steiner problem on the projective plane of constant Gaussian curvature.*
Timothy Luke Muggy*, University of Nebraska - Lincoln, and **Daniel Murphree**, Berry College, Georgia (1023-51-151)

9:30AM ► (431) *Delay differential equations modeling vertically transmitted diseases.* Preliminary report.
Jonathan Adler, Worcester Polytechnic Institute, **Lynne Erickson**, Ursinus College, **L. Thomas Hill**, **Kristen Mazur***, Lafayette College, and **Thomas Tyrrell**, Boston University (1023-34-209)

10:00AM ► (432) *A Mathematical Model for the Progression of Idiopathic Pulmonary Fibrosis and its Potential Treatments.*
Rahul Bansal, The University of Texas at Austin (1023-92-280)

10:30AM ► (433) *On Singular and Nonsingular Magic Squares.*
Elizabeth L Love*, Howard University, **Elizabeth A Wascher** and **Michael Z Lee**, Central Michigan University (1023-15-366)

11:00AM ► (434) *On the Parameterized Complexity of Independent Set.* Preliminary report.
Teruhisha Haruguchi, Lafayette College, **Janine LoBue***, Loyola College in Maryland, **James Pierce**, Illinois Institute of Technology, and **David Roberson**, North Carolina State University (1023-00-332)

11:30AM *The Honeycomb Conjecture on the Sphere.*
► (435) **Conor B Quinn**, Williams College (1023-51-679)

AMS Special Session on Initial- and Boundary-Value Problems, Solvability, and Stability for some Nonlinear PDEs: Theorem, Computation, and Application, I

8:00 AM – 10:55 AM

Organizers: **Jerry L. Bona**, University of Illinois at Chicago
Laihan Luo, New York Institute of Technology

8:00AM (436) *Remarks on the singular set of the Navier - Stokes equations.*
Andrei Biryuk, **Walter Craig***, McMaster University, and **Slim Ibrahim**, Arizona State University (1023-35-613)

8:30AM ► (437) *Numerical investigation of three-dimensional water waves.* Preliminary report.
Min Chen, Purdue University (1023-76-487)

9:00AM (438) *Global Existence of Stagnation-Point Class Solutions for a Perfect Incompressible Fluid.*
Ralph Saxton* and **Feride Tiglay**, University of New Orleans (1023-35-402)

9:30AM (439) *Two point boundary value problems: the BBM and KdV equations.*
Jerry L Bona, University of Illinois at Chicago, **Hongqiu Chen***, University of Memphis, **Shuming Sun**, Virginia Polytechnic Institute and State University, and **Bingyu Zhang**, University of Cincinnati (1023-35-661)

10:00AM (440) *Local Ill-posedness of the 1D Zakharov system.* Preliminary report.
Justin Holmer*, University of California, Berkeley, and **Nikolaos Tzirakis**, University of Toronto (1023-35-1730)

10:30AM (441) *Analysis of a system of PDEs arising in the homogenisation of chemical degradation mechanisms of porous media inducing an evolution of the microstructure.*
Peter A. Malte, Centre for Industrial Mathematics, FB 3, University of Bremen, Germany (1023-35-142)

AMS Special Session on Invariant Theory, I

8:00 AM – 11:55 AM

Organizers: **Mara D. Neusel**, Texas Tech University
Frank D. Grosshans, West Chester University

8:00AM (442) *Modular Invariants of Cyclic 2-groups.*
H E A Eddy Campbell*, Memorial University, **R J Shank,**, University of Kent, Canterbury, and **D L Wehlau**, Royal Military College and Queen's University (1023-13-649)

8:30AM (443) *Conformal symmetries of the wave equation and the ladder representation of* $SO(2, n+1)$. Preliminary report.
Markus Hunziker*, **Mark R. Sepanski** and **Ronald J. Stanke**, Baylor University (1023-22-1259)

9:00AM (444) *Linearisation of Multiplicative Group Actions.* Preliminary report.
Nicole Lemire, University of Western Ontario (1023-20-951)

9:30AM ► (445) *Multiplicative invariant theory.*
Martin Lorenz, Temple University (1023-13-356)

10:00AM ► (446) *Rings of Invariants Satisfying the Weak Splitting Principle.*
Mara D Neusel, Texas Tech University (1023-13-443)

10:30AM (447) *A generalization of the Chevalley-Mitchell theorem.*
Victor Reiner*, University of Minnesota, **Larry Smith**, Universitat Gottingen, and **Peter Webb**, University of Minnesota (1023-05-367)

11:00AM (448) *Invariant Theory, Hochschild Cohomology, and Graded Hecke Algebras.*
Anne V. Shepler*, University of North Texas, and **Sarah Witherspoon**, Texas A&M University (1023-16-1195)

11:30AM ► (449) *Apolarity.* Preliminary report.
Joseph P Brennan*, North Dakota State University and University of Central Florida, and **Robert M Fossum**, University of Illinois at Urbana-Champaign (1023-14-1495)

AMS Special Session on Mathematical Techniques in Musical Analysis, I

8:00 AM – 11:55 AM

Organizers: **Robert W. Peck**, Louisiana State University
Julian Hook, Indiana University-Bloomington
Rachel W. Hall, Saint Joseph's University

8:00AM ► (450) *Introduction to Musical Spaces and Transformations.* Preliminary report.
Julian Hook, Indiana University (1023-00-181)

8:30AM (451) *Mathematical Aspects of Pairwise Well-formed Scales.*
David Clampitt, Yale University (1023-05-516)

9:00AM (452) *Musical Intervals and Special Linear Transformations.*
Thomas Noll, Escola Superior de Musica de Catalunya (1023-11-1349)

9:30AM ► (453) *Elementary Proofs of the Hexachordal Theorem.* Preliminary report.
Godfried T. Toussaint, School of Computer Science, McGill University (1023-00-252)

10:00AM ► (454) *Homometric sets and Z-related chords.*
Clifton Callender*, Florida State University, and **Rachel Hall**, St. Joseph's University (1023-00-1264)

10:30AM (455) *Orbifolds and musical scales.*
Dmitri Tymoczko, Princeton University (1023-51-1118)

11:00AM (456) *Voice leading, submajorization, and the distribution constraint.*
Rachel Hall*, Saint Joseph's University, and **Dmitri Tymoczko**, Princeton University (1023-00-1634)

11:30AM (457) *Chord Quality and Callender-Quinn-Tymoczko Spaces.* Preliminary report.
Ian Quinn, Yale University (1023-00-1791)

AMS Special Session on Radon Transforms, Convex Geometry, and Geometric Analysis, I

8:00 AM – 11:55 AM

Organizers: **Eric L. Grinberg**, University of New Hampshire
Peter Kuchment, Texas A&M University
Gestur Olafsson, Louisiana State University
Eric Todd Quinto, Tufts University

Boris S. Rubin, Louisiana State University

8:00AM (458) *An Inversion Formula for the X-ray Transform on a Compact Symmetric Space.*
Sigurdur Helgason, MIT (1023-81-268)

8:30AM (459) *An injectivity theorem for Radon transforms restricted to isotropic functions.* Preliminary report.
Paul Goodey, University of Oklahoma, and **Ralph Howard***, University of South Carolina (1023-44-350)

9:00AM (460) *Integral geometric problems arising in thermoacoustic tomography.*
David V. Finch*, Oregon State University, **Rakesh**, U. Delaware, and **Markus Haltmeier**, Dept of Computer Science, U. Innsbruck (1023-35-858)

9:30AM (461) *On reconstruction in limited view tomography.* Preliminary report.
Gaik Ambartsoumian, The University of Texas at Arlington (1023-44-699)

10:00AM (462) *A 1PI algorithm for helical trajectories that violate the convexity condition.*
Michael Kapralov* and **Alexander Katsevich**, University of Central Florida (1023-44-934)

10:30AM (463) *Semyanistyi's integrals and Radon transforms on matrix spaces.*
Elena Ournycheva*, Kent State University, and **Boris Rubin**, Louisiana State University (1023-42-547)

11:00AM (464) *Microlocal analysis of the linearized attenuated Radon transform.* Preliminary report.
Allan Greenleaf*, University of Rochester, and **Karthik Ramaseshan**, Vancouver, B.C. (1023-44-449)

11:30AM (465) *Analytic, number theoretic and combinatorial aspects of incidence theory.*
Alex Iosevich, University of Missouri-Columbia (1023-42-853)

AMS Special Session on Calculus of Variations and Nonlinear PDEs: Theory and Applications, I

8:00 AM – 11:45 AM

Organizers: **Marian Bocea**, North Dakota State University
Cristina M. Popovici, North Dakota State University

8:00AM (466) *Sufficient conditions for smooth strong local minimizers.*
Tadele Mengesha* and **Yury Grabovsky**, Temple University (1023-49-205)

8:30AM (467) *Boundary layers in the study of the error estimates for the classical problem of homogenization. Improvement of the existing results and applications.*
Daniel T Onofrei* and **Bogdan Vernescu**, Worcester Polytechnic Institute (1023-35-1156)

9:00AM (468) *Capacity of a Multiply-connected Domain and Nonexistence of Ginzburg-Landau Minimizers with Prescribed Degrees on the Boundary.*
Dmitry Golovaty*, The University of Akron, **Leonid Berlyand**, Penn State University, and **Volodymyr Rybalko**, Institute for Lower Temperature Physics and Engineering (1023-49-1415)

10:00AM (469) *Finite time singularity of Landan-Lifshitz-Gilbert equation.* Preliminary report.
Shijin Ding, South China Normal University, and **Changyou Wang***, University of Kentucky (1023-35-1165)

11:00AM (470) *Analysis on the Lawrence-Doniach Energy for Layered Superconductors.*
Patricia Bauman, Purdue University (1023-35-1528)

AMS Special Session on Microlocal Analysis and Singular Spaces, I

8:00 AM – 11:40 AM

Organizers: **Paul A. Loya**, Binghamton University
Andras Vasy, Massachusetts Institute of Technology

8:00AM (471) *Patterson-Sullivan distributions are asymptotic to Wigner distributions on hyperbolic manifolds: An exact conjugacy between classical and quantum mechanics.* Preliminary report.
Steve Zelditch*, Johns Hopkins University, and **Nalini Anantharaman**, Ecole Normale Superieure de Lyon (1023-37-41)

9:00AM (472) *Quantum decay rates in chaotic scattering.*
Maciej Zworski*, University of California, Berkeley, and **Stephane Nonnenmacher**, CEA, Saclay (1023-81-1732)

10:00AM (473) *Spreading of regularity for quasimodes.*
Jared Wunsch, Northwestern University (1023-35-543)

11:00AM (474) *On multilinear eigenfunction estimates for compact manifolds with boundary.*
Matthew D Blair*, Johns Hopkins University, **Hart F Smith**, University of Washington, and **Christopher D Sogge**, Johns Hopkins University (1023-42-383)

AMS Special Session on Cohomology and Representation Theory, III

8:00 AM – 11:50 AM

Organizers: **Jon F. Carlson**, University of Georgia
Daniel K. Nakano, University of Georgia
Julia Pevtsova, University of Washington

8:00AM (475) *Cohomology and Extensions for Finite Groups of Lie Type and Small Primes.*
Christopher P. Bendel, University of Wisconsin-Stout, **Daniel K. Nakano**, University of Georgia, and **Cornelius Pillen***, University of South Alabama (1023-20-667)

8:30AM (476) *On the kernel of the Gassner representation.*
Kevin Knudson, Mississippi State University (1023-20-1325)

9:00AM (477) *Decomposition numbers and Alvis-Curtis duality.*
Bernd Ackermann, Universität Stuttgart, and **Sibylle Schroll***, University of Oxford (1023-16-650)

9:30AM (478) *A supercharacter theory for unipotent groups.*
P. Diaconis and **N. Thiem***, Stanford University (1023-20-1026)

10:00AM ► (479) *Galois module structure of square classes in Klein 4-group extensions.*
F. Chemotti, University of Wisconsin, **J. Mináč**, University of Western Ontario, and **J. Swallow***, Davidson College (1023-12-60)

10:30AM ► (480) *Control of Fusion and Normal Fusion Subsystems.*
Radu Stancu, The Ohio State University (1023-20-1104)

11:00AM (481) *Cohomology of Specht Modules.*
David J Hemmer*, University of Toledo, and **Daniel K Nakano**, University of Georgia (1023-20-1101)

11:30AM (482) *Endo-trivial modules and finite p-groups.* Preliminary report.
J. L. Alperin, University of Chicago (1023-20-15)

AMS Special Session on Dynamic Programming, I

8:00 AM – 11:45 AM

Organizers: **Gerald C. Kobylski**, United States Military Academy
Randal Hickman, United States Military Academy

8:00AM (483) *Population-Based Evolutionary Approaches for Solving Markov Decision Processes.*
Michael C. Fu*, University of Maryland, **Hyeong Soo Chang**, Sogang University, **Jiaqiao Hu**, SUNY Stonybrook, and **Steven Marcus**, University of Maryland (1023-49-1187)

9:00AM (484) *Optimality Equations and Inequalities for Markov Decision Processes with Applications to Inventory Control.* Preliminary report.
Mark Lewis, Cornell University (1023-49-1202)

10:00AM (485) *Dynamic Decision Networks, an Efficient Approach to Automated Decision Support in Complex, Uncertain, and Evolving Decision Situations.* Preliminary report.
Dan Maxwell*, Innovative Decisions Inc., **Gerald Kobylski**, United States Military Academy, **Dennis Buede**, **Gary Smith**, Innovative Decisions Inc., and **Brian E. Souhan**, United States Military Academy (1023-49-1247)

11:00AM (486) *Approximate Dynamic Programming for Military Applications.* Preliminary report.
Warren Powell, Princeton University (1023-49-1196)

AMS Special Session on Financial Mathematics, III

8:00 AM – 11:55 AM

Organizers: **Jean-Pierre Fouque**, University of California Santa Barbara
Craig A. Nolder, Florida State University
Knut Solna, University of California Irvine
Thaleia Zariphopoulou, University of Texas Austin

8:00AM (487) *Pricing and Trading Credit Default Swaps.*
Tomasz R. Bielecki*, Illinois Institute of Technology, **Monique Jeanblanc**, Universite d'Evry Val d'Essonne, and **Marek Rutkowski**, University of New South Wales (1023-60-1045)

9:00AM (488) *Markovian Projection in the Problems of Credit Basket Modeling.*
Timur Misirpashaev* and **Andrei Lopatin**, NumeriX LLC (1023-60-426)

9:30AM (489) *Optimal stopping in regime switching Lévy models, with applications to American options and real options.*
Svetlana Boyarchenko and **Sergei Levendorskiĭ***, The University of Texas at Austin (1023-60-630)

10:00AM (490) *Option Pricing with Parsimonious Time-inhomogeneous Additive Models.*
Mack L. Galloway* and **Craig Nolder**, Florida State University (1023-60-1051)

10:30AM (491) *Continuity corrections for certain perpetual American and Bermudan options on multiple assets.*
Frederik S. Herzberg, Universitaet Bonn (1023-91-37)

11:00AM (492) *Pricing credit default swaps under a Markov-modulated structural model.* Preliminary report.
Tak Kuen Siu, Heriot-Watt University, **Rogemar Mamon***, University of Western Ontario, and **Christina Erlwein**, Brunel University (1023-91-660)

11:30AM (493) *The Non-Markovian Approach to the Valuation and Hedging of European Contingent Claims on Power with Scaling Spikes.*
Valery A. Kholodnyi, Middle Tennessee State University (1023-90-933)

MAA Minicourse #4: Part A

8:00 AM – 10:00 AM

Creating visual mathematics applets using flash programming.

Organizers: **Douglas E. Ensley**, Shippensburg University
Barbara Kaskosz, University of Rhode Island

AMS Session on Analysis and Ordinary Differential Equations, I

8:00 AM – 11:55 AM

8:00AM ► (494) *Functional equations associated with some mean value theorems of differential calculus.* Preliminary report.
Nasser Dastrange, Buena Vista University (1023-26-1018)

8:15AM ► (495) *A Tale of Two Integrals on Graphs and Manifolds.* Preliminary report.
Mohammad Javaheri, University of Oregon (1023-28-1390)

8:30AM ► (496) *A Generalized Wallis Formula.* Preliminary report.
Javad Namazi, Fairleigh Dickinson University (1023-28-859)

8:45AM (497) *Boundary interpolation problems for finite Blaschke products.*
Gunter Semmler, Munich University of Technology (1023-30-1198)

9:00AM (498) *A Hellerstein-Williamson type theorem for functions in U_{2p}^*.* Preliminary report.
Stephanie Edwards, University of Dayton (1023-30-1474)

9:15AM ► (499) *Counterexamples: Limiting Generalizations of Schwarz's Lemma.*
Dov N Chelst* and **Doug Cahl**, DeVry University (1023-30-1722)

9:30AM (500) *The Dual of a Space OF Cauchy Transforms.* Preliminary report.
Yusuf A Muhanna, American University of Sharjah (1023-30-248)

9:45AM (501) *Unexpected local extrema for the Sendov conjecture, part 2.*
Michael J. Miller, Le Moyne College (1023-30-537)

10:00AM (502) *Functional equations of meromorphic functions with small function coefficients.*
Chung-Chun Yang, Hong Kong Univ. of Sci.&Tech. (1023-30-552)

10:15AM (503) *Fuchsian Differential Equations with Regular Singularities.*
David J. Pinchbeck, St. Joseph's College (1023-30-583)

10:30AM (504) *A Characterization of p-Hyperbolicty/ p-Parabolicity and Decomposition of p-Dirichlet Spaces on Infinite Graphs.* Preliminary report.
Lucio Prado, BMCC - The City University of New York (1023-31-1574)

10:45AM (505) *Geometric sufficient conditions for compactness of the $\overline{\partial}$-Neumann operator.* Preliminary report.
Samangi Munasinghe*, College of the Holy Cross, and **Emil J Straube**, Texas A&M University (1023-32-1043)

11:00AM (506) *On the growth of vector functions of several complex variables.* Preliminary report.
Faruk F Abi Khuzam, American University of Beirut (1023-32-1078)

11:15AM (507) *A Class of Loewner Chain Preserving Extension Operators.* Preliminary report.
Jerry R. Muir, Jr., University of Scranton (1023-32-1193)

11:30AM (508) *Strong q-Convexity in Uniform Neighborhoods of Subvarieties in Coverings of Complex Spaces.* Preliminary report.
Michael Fraboni*, Moravian College, and **Terrence Napier**, Lehigh University (1023-32-1701)

11:45AM (509) *Solution of Delay Systems by Orthogonal Functions and Taylor Series.*
Mohsen Razzaghi, Mississippi State University (1023-49-234)

AMS Session on Dynamical Systems

8:00 AM – 11:55 AM

8:00AM (510) *Recurrence and chain-recurrence dimension.*
Jim Wiseman, Agnes Scott College (1023-37-1034)

8:15AM ► (511) *Dynamics of the p-adic Shift and Applications.*
Alex Levin, Harvard University (1023-37-1071)

8:30AM (512) *Pulse Solutions of Multi-Parameter Oscillatory Coupling Functions in Neural Networks.* Preliminary report.
J. Angela Hart Murdock, Rhodes College (1023-37-1136)

8:45AM (513) *Pre-bifurcation Amplification and Nonlinear Saturation of Noise Correlation Time.*
Elena D Surovyatkina*, Space Research Institute of Russian Academy of Science, Moscow, Russia and Delaware State University, and **Mazen Shahin**, Delaware State University (1023-37-1157)

9:00AM (514) *A Denjoy-Wolff Theorem for Hilbert Metric Nonexpansive Maps on Polyhedral Domains.*
Brian C. Lins, Rutgers University - New Brunswick (1023-37-116)

9:15AM (515) *Homoclinic Tangencies, Periodic Orbits and Connecting Orbits: An Investigation of the Hénon Map.*
Brian A. Coomes*, **Hüseyin Koçak**, University of Miami, and **Kenneth J. Palmer**, National Taiwan University (1023-37-1253)

9:30AM (516) *Return tims of polynomials as meta-Fibonacci numbers.*
Nathaniel D Emerson, University of Southern California (1023-37-1550)

9:45AM (517) *A universal model for Borel semiflows.* Preliminary report.
David M McClendon, Northwestern University (1023-37-1750)

10:00AM Break.

10:15AM (518) *How the Fed Chaotically Distorts the Relationship Between Risk and Return.*
James Michael Haley, Point Park University (1023-37-1871)

10:30AM ► (519) *Algorithms for Rigorous Symbolic Dynamics and Topological Entropy.*
Rodrigo Trevino*, University of Texas at Austin, and **Rafael Frongillo**, Cornell University (1023-37-1889)

10:45AM (520) *On ergodic transformations that are simultaneously weakly mixing and uniformly rigid.*
Thomas M. Koberda*, University of Chicago, **Jennifer James**, **Kathryn Lindsey**, Williams College, **Peter Speh**, Princeton University, and **Cesar E. Silva**, Williams College (1023-37-294)

11:00AM (521) *Strong Extimate for Lebesgue Derivatives and Ergodic Averages.* Preliminary report.
Chaoyuan Liu, Eastern Kentucky University (1023-37-542)

11:15AM (522) *Lie Symmetries for a Model of Growth-death Kinetics.*
Rachelle C. DeCoste, United States Military Academy, West Point (1023-37-686)

11:30AM (523) *A Rodent-Hantavirus Model Structured by Disease, Developmental Stage, and Sex.*
Curtis Lawrence Wesley* and **Linda J. S. Allen**, Texas Tech University (1023-37-806)

11:45AM (524) *Mathematical analysis of an integro-differential equation arising in neuroscience.*
Marina Bevzushenko, Boston University (1023-37-814)

AMS Session on Geometry and Topology, I

8:00 AM – 11:40 AM

8:00AM (525) *The Three-Point Problem of Chinese Checker Circles.* Preliminary report.
Phoebe H McLaughlin* and **Shing So**, University of Central Missouri (1023-51-1240)

8:15AM (526) *Approximating short maps by PL-isometries and Arnold's "Can you make your dollar bigger" problem.*
Dmitri Burago, Pennsylvania State University, **Svetlana Krat***, Georgia Institute of Technology, and **Anton Petrunin**, Pennsylvania State University (1023-51-1302)

8:30AM ► (527) *An Analysis of Convex Shapes Using Tridrafters.* Preliminary report.
Nathan H Reff, Rochester Institute of Technology (1023-51-1819)

8:45AM ► (528) *Algorithmic Search for Flexibility Using Resultants of Polynomial Systems.* Preliminary report.
Robert H Lewis, Fordham University (1023-51-1906)

9:00AM (529) *Toledo invariants of Higgs bundles on elliptic surfaces associated to base orbifolds of Seifert-fibered homology 3-spheres.*
Mike Krebs, California State University, Los Angeles (1023-51-71)

9:15AM Break.

9:45AM ► (530) *An algorithm to measure symmetry of n points.* Preliminary report.
Dennis Glenn Collins, Univ. of Puerto Rico, Mayaguez (1023-52-1900)

10:00AM (531) *A Decomposition Theorem in Cyclic Element Theory.*
Shing S. So, University of Central Missouri (1023-54-821)

10:15AM ► (532) *Minimal Knotting Numbers.*
Casey Mann*, The University of Texas at Tyler, **Benjamin McCarty**, Louisiana State University, **Jennifer McLoud-Mann**, **Ramona Ranalli** and **Nathan Smith**, The University of Texas at Tyler (1023-52-260)

10:30AM *Distance in Three-Dimensional Lattices.*
► (533) **Jennifer McLoud-Mann***, **Casey Mann**, The University of Texas at Tyler, **Benjamin McCarty**, Louisiana State University, **Ramona Ranalli** and **Nathan Smith**, The University of Texas at Tyler (1023-52-261)

10:45AM *Local/Global Phenomena in Geometric Random*
► (534) *Graphs.* Preliminary report.
Ross M Richardson, University of California, San Diego (1023-52-956)

11:00AM *Timelike minimal submanifolds in Robertson-Walker*
(535) *spacetimes.* Preliminary report.
Paul T Allen, University of Oregon (1023-53-1181)

11:15AM *Cohomogeneity One Manifolds and Non-negative*
(536) *Curvature.*
Corey Hoelscher, University of Pennsylvania (1023-53-1384)

11:30AM *On Enriched Quantum Yang-Baxter Principal Fiber*
(537) *Bundles.* Preliminary report.
Molobe Mohlala* and **S. M. Einstein-Matthews**, Howard University (1023-53-1507)

AMS Session on Applications of Mathematics, I

8:00 AM – 10:40 AM

8:00AM *Rigid Body Multiple Impact With the Ground.*
► (538) **Florin V Badiu***, **Jianzhong Su** and **Shan Hua**, University of Texas at Arlington (1023-70-1706)

8:15AM *Saari's Conjecture for the Restricted Three-body*
► (539) *Problem.*
Gareth E Roberts*, College of the Holy Cross, and **Lisa Melanson**, Northwestern University (1023-70-902)

8:30AM *Further results on the critical Rayleigh number R_**
(540) *and wave number k_* for the planar Bénard problem with asymmetric boundary conditions.* Preliminary report.
Matthew J Glomski, University at Buffalo (1023-76-1072)

8:45AM *Analysis of a Simple sheared Ferro-fluid.*
(541) **Arup Mukherjee***, **Mark Korlie**, **Bogdan Nita**, **John Stevens** and **Philip Yecko**, Montclair State University (1023-76-1107)

9:00AM *Symplectic Approximation of Euler Flow on a*
(542) *Riemannian Manifold.* Preliminary report.
Steven Benzel, Berry College (1023-76-1162)

9:15AM *The inviscid limit of incompressible fluid flow in an*
► (543) *annulus.*
Sara E. Frietze*, California State University, Northridge, **Robert Gerrity**, Pomona College, and **Tiago Picon**, Universidade Federal de São Carlos (1023-76-1299)

9:30AM *Numerical Simulations of Vortex Sheets and*
(544) *Electron Sheets Using Boundary Integral Methods.*
Lyudmyla Barannyk, University of Michigan (1023-76-1616)

9:45AM *Stability of geophysical two-phase flow in two*
► (545) *dimensions.* Preliminary report.
Long H. Le, University of Central Arkansas (1023-76-640)

10:00AM *On the Stability of KdV equation with a forcing*
(546) *term.*
Jeongwhan Choi*, Korea University, and **Shuming Sun**, Virginia Polytech (1023-76-969)

10:15AM *An efficient algorithm for the solution of*
► (547) *high-frequency scattering by infinite rough surfaces.*
Harun Kurkcu* and **Fernando Reitich**, University of Minnesota (1023-78-1773)

10:30AM *Lp estimates of Maxwell's Equations in a bounded*
(548) *domain.*
Gang Bao, **Ying Li*** and **Zhengfang Zhou**, Michigan State University (1023-78-1790)

AMS Session on Algebra and Number Theory, III

8:00 AM – 11:55 AM

8:00AM *Arf equivalence classes of quadratic number fields.*
(549) **Jeonghun Kim**, Louisiana State University (1023-11-352)

8:15AM *A lower bound on the Weil height in terms of an*
(550) *auxiliary polynomial.*
Charles L Samuels, The University of Texas at Austin (1023-11-447)

8:30AM *Improving The Erdős-Ginzburg-Ziv Theorem For*
(551) *Some Non-Abelian Groups.*
Jared Alexander Bass, Harvard Univeristy (1023-11-467)

8:45AM *The Lucas-Pratt primality tree.* Preliminary report.
(552) **Jonathan W Bayless**, Dartmouth College (1023-11-483)

9:00AM *Fundamental Units of Norm One in Real Quadratic*
(553) *Number Fields.* Preliminary report.
Thomas C Palfrey, University of New Orleans (1023-11-496)

9:15AM *Polynomial Variations on a Theme of Sierpiński.*
► (554) Preliminary report.
Lenny Jones, Shippensburg University (1023-11-591)

9:30AM *Martinet Searches and Some Nonexistence*
(555) *Theorems.* Preliminary report.
Sharon Brueggeman, University of Tennessee at Chattanooga (1023-11-664)

9:45AM *Zero-free Region for a Hypergeometric zeta*
(556) *function.* Preliminary report.
Abdulkadir Hassen*, Rowan University, and **Nguyen D Hieu**, Rowan Univeristy (1023-11-675)

10:00AM *An Identity for Period k Second Order Linear*
(557) *Recurrence Systems.*
Curtis N. Cooper, University of Central Missouri (1023-11-825)

10:15AM *Roots of Fibonacci-Coefficient Polynomials.*
► (558) **Donald D Mills**, Rose-Hulman Institute of Technology (1023-11-861)

10:30AM *Systems of diagonal forms over p-adic fields.*
(559) Preliminary report.
Michael P. Knapp, Loyola College (1023-11-890)

10:45AM *Annihilation of Class Groups in Abelian Number*
(560) *Field Extensions of Degree $2p$.* Preliminary report.
Barry R. Smith, University of California, San Diego (1023-11-949)

11:00AM *Prime Divisibility in the Lucas Numbers.*
► (561) **Stefan Erickson**, Colorado College (1023-11-983)

11:15AM *Monomial orders on certain ring of invariants.*
(562) Preliminary report.
Mohammed Tesemma*, Spelman College, and **Haohao Wang**, South East Missouri State University (1023-13-1309)

11:30AM *A combinatorial approach to tetrahedral curves.*
(563) **Christopher A. Francisco**, Univeristy of Missouri (1023-13-822)

11:45AM *Bounding Orders in Rosenfeld-Gröbner algorithm.*
(564) **Oleg Golubitsky**, University of Western Ontario, **Marina Kondratieva**, Moscow State University, **Marc Moreno Maza**, University of Western Ontario, and **Alexey Ovchinnikov***, North Carolina State University (1023-13-887)

MAA Session on Mathematics and Biology 2010: Building Connections

8:00 AM – 11:55 AM

Organizers: **G. Elton Graves**, Rose-Hulman Institute of Technology
Catherine M. Murphy, Purdue University

8:00AM ► (565) *A Course in DNA Chemistry for Mathematicians at the State University of New York at Geneseo.* **Wendy K Pogozelski*** and **Anthony J Macula**, SUNY Geneseo (1023-K5-1624)

8:20AM ► (566) *Mathematics in Genomic Analysis—A Module for Biology Students.* **Vera Cherepinsky**, Fairfield University (1023-K5-1690)

8:40AM (567) *Desiging a Introductory course in Mathematical Biology with Team Teaching.* **Krishan M Agrawal**, Virginia State University (1023-K5-1458)

9:00AM (568) *A course in computational biology—Reaching out and reaching within.* **M. Chakrabarti**, Grand Valley State University (1023-K5-1834)

9:20AM ► (569) *Introductory Bioinformatics Interdisciplinary Course.* Preliminary report. **Yana Kortsarts***, Widener University, Computer Science Department, and **Robert W. Morris**, Widener University, Biology Department (1023-K5-264)

9:40AM ► (570) *A Story of Developing a Course and a Textbook in Mathematical Biology.* **Raina Robeva*** and **Robin Davies**, Sweet Briar College (1023-K5-1796)

10:00AM ► (571) *The Mother of Invention: From Desperation to Collaboration.* **Christopher C. Leary***, **Colin Kremer**, **Rachel VanCott** and **Gregg Hartvigsen**, SUNY Geneseo (1023-K5-1747)

10:20AM ► (572) *Biocalculus at Benedictine University and College of DuPage: A Collaboration Between Mathematicians and Biologists and Between Four-Year and Two-Year Institutions.* **Timothy D. Comar**, Benedictine University (1023-K5-158)

11:00AM (573) *Building an Interdisciplinary Institute: The Institute for Quantitative Biology at ETSU.* **Istvan Karsai***, Dept. of Biological Sciences, The Institute for Quantitative Biology, East Tennessee State University, and **Jeff R Knisley**, The Institute for Quantitative Biology, East Tennessee State University (1023-K5-1441)

11:20AM ► (574) *Collaborations between the ETSU Math and Biology Departments.* Preliminary report. **Anant P Godbole**, East Tennessee State University (1023-K5-418)

11:40AM ► (575) *Integrating students from mathematics and biology.* Preliminary report. **Marshall E Hampton**, University of Minnesota, Duluth (1023-K5-505)

MAA Session on Getting Students to Discuss and to Write about Mathematics, II

8:00 AM – 11:55 AM

Organizers: **Martha Ellen (Murphy) Waggoner**, Simpson College
Charlotte Knotts-Zides, Wofford College
Harrison W. Straley, Wheaton College

8:00AM ► (576) *Writing, Learning, and Mathematics.* **Ward E. Canfield**, National-Louis University (1023-I1-1114)

8:15AM ► (577) *Concepts in Context: Writing and Reasoning about Quantitative Issues.* **Tanya Cofer***, Northeastern Illinois University, and **David C. Jabon**, DePaul University, Chicago (1023-I1-1124)

8:30AM ► (578) *Reading and Discussing Mathematics with Peers.* **Penelope H Dunham**, Muhlenberg College (1023-I1-1192)

8:45AM ► (579) *Converting Calculus Students from Showing Work to Explaining.* Preliminary report. **Feryal Alayont**, Grand Valley State University (1023-I1-1280)

9:00AM ► (580) *Getting Math Students to Take Writing Seriously.* Preliminary report. **Stephen B. Maurer**, Swarthmore College (1023-I1-173)

9:15AM ► (581) *What is an Assignment Like You Doing in a Class Like This?!* **Paula R Stickles**, Millikin University (1023-I1-1338)

9:30AM ► (582) *Group Consulting Projects Using Matrices and Linear Programming.* **Katharine F Gurski**, George Washington University (1023-I1-140)

9:45AM (583) *Using Research Projects to Develop Mathematical Knowledge While Expanding Communication Skills.* **Elizabeth C Rogers**, Piedmont College (1023-I1-1409)

10:00AM ► (584) *Transitions: Using a Variety of Writing Assignments in a Bridge Course.* Preliminary report. **Christopher Goff**, University of the Pacific (1023-I1-1423)

10:15AM ► (585) *Writing projects and rubrics in foundational mathematics courses.* **Joshua Brandon Holden**, Rose-Hulman Institute of Technology (1023-I1-1439)

10:30AM ► (586) *A Problem-Solving Project for a General Education Course.* **Mike Pinter**, Belmont University (1023-I1-1497)

10:45AM ► (587) *Using Mythbusters Episodes to Prompt Discussion in a Mathematical Modeling Course.* **Jennifer Wightman**, Coastal Carolina University (1023-I1-1315)

11:00AM ► (588) *Implementing Problem-Based Learning in Introductory Statistics Courses, a Preliminary Report.* Preliminary report. **Catherine A Matos**, Clayton State University (1023-I1-1780)

11:15AM ► (589) *Using Group Homework in Calculus to Develop Written and Verbal Communication Skills.* **Brian J Birgen**, Wartburg College (1023-I1-201)

11:30AM (590) *Wiki in the mathematics classroom.* Preliminary report. **P. Christopher Staecker**, Messiah College (1023-I1-238)

11:45AM ► (591) *A Course with a Focus on the Other Two R's.* **John F. Putz**, Alma College (1023-I1-300)

MAA Session on Philosophy of Mathematics, I

8:00 AM – 11:55 AM

Organizers: **Bonnie Gold**, Monmouth University

Charles R. Hampton, The College of Wooster

8:00AM ► (592) *What Place Does Philosophy Have in Teaching Mathematics?* Preliminary report.
Martin E. Flashman, Humboldt State University (1023-N1-1867)

8:40AM ► (593) *Mathematics as Representational Art.* Preliminary report.
Sam Stueckle, Trevecca Nazarene University (1023-N1-1392)

9:20AM (594) *From an analysis of definitions to a view of mathematics.*
Ruggero Ferro, University of Verona, Italy (1023-N1-637)

10:00AM (595) *Searle's Metaphysics of Computation and Alternative Logics: A Surprising Connection.*
Jeff Buechner, Rutgers University/Newark (1023-N1-973)

10:40AM ► (596) *Why do we all get the same answers? Kitcher's anti-apriorism and the problems of social constructivism.*
Carl E. Behrens, Alexandria, VA (1023-N1-882)

11:20AM ► (597) *In Praise of Cranks: Are You Thinking What I'm Thinking?* Preliminary report.
Andy D. Martin, University of Kentucky (1023-N1-292)

MAA Session on Innovative and Effective Ways to Teach Linear Algebra, II

8:00 AM – 11:55 AM

Organizers: **David Strong**, Pepperdine University
Gilbert Strang, Massachusetts Institute of Technology

8:00AM (598) *Introducing Eigenvalues by way of the Resolvent.*
Elaine T. Hale* and **Steven Cox**, Rice University (1023-J1-1663)

8:20AM ► (599) *Cross Stitching, Graph Theory and a Least Path Problem.*
Barbara A Ashton*, Borough of Manhattan Community College, CUNY, and **Kevin L Dove**, Lander University (1023-J1-1758)

8:40AM ► (600) *A matrix route to Snell's law.*
Andrew J. Simoson, King College (1023-J1-259)

9:00AM (601) *Linear Algebra For Everyone: The Arithmetic Portal Into Vector-Spaces.*
Clyde L. Greeno, The MALEI Mathematics Institute (1023-J1-1805)

9:20AM ► (602) *Vector spaces and linear functionals in elementary probabiliy.*
Arnold Lebow, Yeshiva University (1023-J1-987)

9:40AM ► (603) *Approximate Contour Image Generation: A Project in Linear Algebra.*
Mohamed Allali, Chapman University (1023-J1-1306)

10:00AM ► (604) *Visually Illustrating Rotations, Reflections and Translations in Flash.*
Paul R Bouthellier, University of Pittsburgh-Titusville (1023-J1-405)

10:20AM ► (605) *Pedagogy and Visualization: Two Aspects of the Use of a CAS in Linear Algebra.*
Russell D Blyth* and **Mike May, S.J.**, Saint Louis University (1023-J1-170)

10:40AM ► (606) *Using gimbal lock in 3d programs to illustrate linear algebra Concepts.* Preliminary report.
Helmer Aslaksen, National University of Singapore (1023-J1-1918)

11:00AM (607) *Using a Markov Matrix Model as a Thread Throughout the First Linear Algebra Course.* Preliminary report.
Stephen Hilbert, Ithaca College, Ithaca NY (1023-J1-1600)

11:20AM (608) *Using the discovery learning method in linear algebra.*
Petre Ion Ghenciu, University of Wisconsin-Stout (1023-J1-1535)

11:40AM (609) *An Honors First-year Seminar in Linear Algebra.*
Stephen B. Maurer, Swarthmore College (1023-J1-174)

MAA Session on Research on the Teaching and Learning of Undergraduate Mathematics

8:00 AM – 11:55 AM

Organizers: **David E. Meel**, Bowling Green State University
Michael Oehrtman, Arizona State University
Chris Rasmussen, San Diego State University

8:00AM ► (610) *How your students use their textbook: A preliminary report.* Preliminary report.
Bret Benesh*, Harvard University, **Tim Boester**, University of Wisconsin-Madison, **Aaron Weinberg**, Ithaca College, and **Emilie Wiesner**, University of Georgia-Athens (1023-P5-92)

8:20AM ► (611) *Making Sense of the Infinite: A Study Investigating the Learning and Teaching of Infinite Series.*
Brian J. Lindaman, University of Kansas (1023-P5-1763)

8:40AM ► (612) *Examining the Effectiveness of Reading Questions in Introductory University Mathematics Courses.*
M. Axtell* and **W. Turner**, Wabash College (1023-P5-168)

9:00AM (613) *Controlling the work in Solving Initial Value Problems: Contrasting Introductory Calculus Textbooks.*
Vilma Mesa, University of Michigan (1023-P5-863)

9:20AM (614) *Diagrammatic Reasoning.*
H A Dye, US Military Academy (1023-P5-878)

9:40AM ► (615) *An analysis of equation solving strategies of mathematics professors versus undergraduate mathematics majors and secondary mathematics teachers while using graphing calulators.*
James R. Hersberger, Indiana University Purdue University Fort Wayne (1023-P5-1241)

10:00AM (616) *Study of the Cognitive Relation Between an Infinite Decimal and the Real Number It Represents: How Does an Individual Understand the Truth or Falsity of the Relation* $0.999\ldots = 1$*?*
Kirk Weller, University of Michigan Flint (1023-P5-1287)

10:20AM ► (617) *A Framework for Characterizing Understanding of the Riemann Integral.*
Vicki L. Sealey, Arizona State University (1023-P5-1557)

10:40AM ► (618) *Mathematics Anxiety: A Multivariate Examination of Gender Differences between Moberly Area Community College and Truman State University Students.*
Carolyn M. Dixon, Truman State University (1023-P5-1660)

11:00AM (619) *A Classroom Study of Undergraduates' Understandings of Limits.* Preliminary report.
Timothy C. Boester, University of Wisconsin-Madison (1023-P5-1699)

11:20AM ► (620) *Students' Intuitive and Formal Solutions of Calculus Optimization Problems.*
Matthew E DeLong*, Taylor University, and **Dale J Winter**, University of Michigan (1023-P5-147)

11:40AM (621) *The Effect of Different College Algebra Courses on Students' Understanding of Linear and Exponential Function Concepts.*
Erick Brian Hofacker, University of Wisconsin - River Falls (1023-P5-1852)

MAA General Contributed Paper Session, III

8:00 AM – 11:55 AM

Organizers: **Eric S. Marland**, Appalachian State University
Jay A. Malmstrom, Oklahoma State Community College

8:00AM ► (622) *The Gilbreath Principle in Mathematical Magic.*
Card Colm Mulcahy, Spelman College (1023-Z1-1348)

8:15AM (623) *Uniqueness and Existence for Unbounded Boundary Value Problems.*
Aprillya Lanz*, Clayton State University, and **Jeffrey Ehme**, Spelman College (1023-Z1-1772)

8:30AM ► (624) *Incorporating Technology into Mathematics Courses for Secondary Education Mathematics Majors.* Preliminary report.
John W Thompson, U. of Pittsburgh at Johnstown (UPJ) (1023-Z1-106)

8:45AM (625) *Discrete Mathematics for Middle Level Teachers.* Preliminary report.
Cheryl L Olsen, University of Nebraska-Lincoln (1023-Z1-1752)

9:00AM (626) *Developing Middle School Teachers' Content Knowledge Through Inquiry In and About Mathematics.*
Eden M Badertscher, University of Maryland, College Park (1023-Z1-347)

9:15AM ► (627) *Enhancing Middle School Teachers' Knowledge of Mathematics.*
Gulden Karakok*, **Tina L. Johnston**, **Maggie Niess** and **Tevian Dray**, Oregon State University (1023-Z1-1799)

9:30AM (628) *Balancing Mathematical Content with Classroom Applications: Experiences from Our Third Year.* Preliminary report.
Kimberly J. Presser, Shippensburg University (1023-Z1-474)

9:45AM ► (629) *Comparing the K-8 Mathematical Content Knowledge of Future Teachers to College Algebra and Calculus Students: Results of a Pretest-Posttest Study.*
Betsy Darken, University of Tennessee at Chattanooga (1023-Z1-349)

10:00AM ► (630) *Using Handheld Technology in Teaching Geometry.*
Constance C Edwards, Western Kentucky University (1023-Z1-1486)

10:15AM ► (631) *Using non-Euclidean geometry to teach Euclidean geometry to K–12 teachers.* Preliminary report.
David Damcke, University of Portland, **Tevian Dray***, Oregon State University, **Maria Fung**, Western Oregon University, **Dianne Hart** and **Lyn Riverstone**, Oregon State University (1023-Z1-1828)

10:30AM ► (632) *The Integrated Laboratory Program – Guided Discovery in the Education of Teachers.*
Jerome S. Epstein, Polytechnic University, Brooklyn, NY (1023-Z1-396)

10:45AM ► (633) *Fraction Sets for Basic Digit Sets.* Preliminary report.
Darren Wick, Ashland University (1023-Z1-584)

11:00AM ► (634) *Factoring (16,6,2) difference sets.*
C. Bhattacharya*, Randolph-Macon College, and **Ken Smith**, Central Michigan University (1023-Z1-1417)

11:15AM ► (635) *The Extended Euclidean Algorithm.* Preliminary report.
William P. Wardlaw*, **Richard F. Maruszewski**, U. S. Naval Academy, and **Allen J. Schwenk**, Western Michigan University (1023-Z1-691)

11:30AM ► (636) *Identifying when computed PageRank scores are accurately ranked.* Preliminary report.
Rebecca S. Wills, North Carolina State University (1023-Z1-1484)

11:45AM ► (637) *Planarizing Non-Planar Polygons.*
Douglas G. Burkholder, Lenoir-Rhyne College (1023-Z1-524)

SIAM Minisymposium on Mathematical Modeling of Complex Systems in Biology, I

8:00 AM – 10:50 AM

Organizer: **Lisa J. Fauci**, Tulane University

8:00AM (638) *Modeling Biofilm Disinfection: How much is enough?*
Nick G Cogan, Florida State University (1023-92-216)

8:30AM (639) *A Multiscale Model of Biofilm as a Senescence-Structured Fluid.*
Bruce P. Ayati*, Southern Methodist University, and **Isaac Klapper**, Montana State University (1023-92-657)

9:00AM ► (640) *Voices from the fringe - How distal synapses make themselves heard.*
Steven J Cox*, Rice University, and **Kresimir Josic**, University of Houston (1023-35-836)

9:30AM (641) *Alcohol's Effect on Neuron Firing.*
Erika T Camacho, Loyola Marymount University (1023-92-1421)

10:00AM ► (642) *The Method of Regularized Stokeslets for Biological Flows.*
Ricardo Cortez, Tulane University (1023-76-1874)

10:30AM (643) *On the Stability of Periodic Solutions in the Perturbed Chemostat.*
Frederic Mazenc, Projet MERE, INRIA-INRA, France, **Michael Malisoff***, Louisiana State University, Baton Rouge, and **Patrick De Leenheer**, University of Florida (1023-92-57)

SIAM Minisymposium on Structure and Topology in Graph Theory, I

8:00 AM – 10:55 AM

Organizers: **Mark N. Ellingham**, Vanderbilt University
Chris Stephens, Middle Tennessee State University
Xiaoya Zha, Middle Tennessee State University

8:00AM (644) *Infinite 2-walks in 3-connected planar graphs.*
Daniel P. Biebighauser*, Concordia College, Moorhead, Minnesota, and **M. N. Ellingham**, Vanderbilt University (1023-05-771)

8:30AM ► (645) *Circumferences of 3-connected graphs with bounded degrees.* Preliminary report.
Guantao Chen*, Georgia State University, **Zhicheng Gao**, Carleton University, **Xingxing Yu**, Georgia Institute of Technology, and **Wenan Zang**, University of Hong Kong (1023-05-554)

9:00AM ► (646) *Packing of Sparse Graphs.* Preliminary report.
Alexandr V. Kostochka and **Gexin Yu***, University of Illinois at Urbana-Champaign (1023-05-167)

9:30AM (647) *On the Reconstruction of Planar Graphs.*
Mark Bilinski, **Young Soo Kwon** and **Xingxing Yu***, Georgia Institute of Technology (1023-05-824)

10:00AM (648) *Spanning subsets of toroidal and Klein bottle embeddings.*
D Christopher Stephens and **Xiaoya Zha***, Middle Tennessee State University (1023-05-848)

10:30AM (649) *Excluding induced subgraphs by degree sequence.*
Neil Robertson, Ohio State University (1023-05-1838)

SIGMAA Officers Meeting

8:00 AM – 10:00 AM

AMS Special Session on Free Discontinuity Problems: From Image Processing to Materials Science

8:30 AM – 11:55 AM

Organizers: **Blaise Bourdin**, Louisiana State University
Christopher J. Larsen, Worcester Polytechnic Institute

8:30AM (650) *Variational Fracture and Minimality.*
Gilles A Francfort, Université Paris 13, France (1023-49-992)

9:00AM (651) *Quasistatic evolution in brittle fracture based on a type of strict local energy minimization.*
Chris Larsen, WPI (1023-49-1614)

9:30AM (652) *Quasi static evolution for damage.*
Adriana Garroni*, Universita' di Roma "La Sapienza", Italy, and **Christopher Larsen**, Worcester Polytechnic Institute (1023-49-1317)

10:00AM (653) *Existence for a model of fracture evolution based on crack fronts.*
Christopher J Larsen, Worcester Polytechnic Institute, **Michael Ortiz**, California Institute of Technology, and **Casey L Richardson***, Worcester Polytechnic Institute (1023-49-1640)

10:30AM (654) *Heat Flows of Linear Growth Maps and Color Image Denoising.*
Xiaobing Feng, The University of Tennessee (1023-35-1613)

11:00AM (655) *Fracture energies as limit of non-local damage energies.*
Matteo Negri, Universita' di Pavia (1023-49-715)

11:30AM (656) *Numerical implementation of variational brittle fracture.*
Blaise A Bourdin, Louisiana State University (1023-49-1229)

MAA Panel Discussion

8:30 AM – 9:50 AM

Euler's continuing influence.
Organizer: **Ed Sandifer**, Western Connecticut State University
Panelists: **William W. Dunham**, Muhlenberg College
Charles R. Hampton, College of Wooster
June E. Barrow-Green, The Open University

Project NExT Panel Discussion

8:30 AM – 9:50 AM

Getting your first book published.
Organizers: **T. Christine Stevens**, St. Louis University
Aparna W. Higgins, University of Dayton
Joseph A. Gallian, University of Minnesota Duluth
Panelists: **Thomas C. Hull**, Merrimack College
Donald J. Albers, MAA
Laura A. Taalman, James Madison University
Ruth Baruth, W. H. Freeman

AWM Emmy Noether Lecture

9:00 AM – 9:50 AM

(657) *Automorphisms of free groups, outer space, and beyond.*
Karen Vogtmann, Cornell University (1023-20-27)

MAA Minicourse #10: Part A

9:00 AM – 11:00 AM

A beginner's guide to the scholarship of teaching and learning in mathematics.
Organizers: **Curtis D. Bennett**, Loyola Marymount University
Jacqueline M. Dewar, Loyola Marymount University

MAA Minicourse #16: Part A

9:00 AM – 11:00 AM

More music and mathematics.
Organizer: **Leon Harkleroad**, Wilton, ME

MAA Session on Reconceptualizing Content Courses for Prospective High School Mathematics Teachers, I

9:00 AM – 11:55 AM

Organizers: **Jean McGivney-Burelle**, University of Hartford
Neil Portnoy, Stony Brook University

9:00AM ► (658) *Effective Mathematics Course Experiences for Prospective High School Mathematics Teachers.*
Mary Ann Connors, Westfield State College (1023-N5-1485)

9:20AM ► (659) *Mathematical Explorations as a Gateway to High-school Content Mastery: a Number Theory Approach.* Preliminary report.
Maria G Fung, Western Oregon University (1023-N5-1422)

9:40AM ► (660) *A Multi-Angled Approach to Geometry for Secondary Mathematics Teachers.* Preliminary report.
Diane Barrett, St. John Fisher College (1023-N5-54)

10:00AM (661) *Developing Mathematics: A Mathematics Content Course for Teachers Resulting In a Proof of the Fundamental Theorem of Algebra.*
Benjamin J. Sinwell, Montgomery County Public Schools and Park City Mathematics Institute, and **Bowen Kerins***, Education Development Center, Inc. (1023-N5-1366)

10:20AM ► (662) *Famous Mathematical Constants.*
Jill Shahverdian, Quinnipiac University (1023-N5-1358)

10:40AM ► (663) *Methods, Math, and Madness.*
Tom Evitts, Shippensburg University (1023-N5-1278)

11:00AM ► (664) *Merging Mathematics, Pedagogy, and Technology: A New Design for Preparing Secondary Mathematics Teachers.* Preliminary report.
Douglas A. Lapp, Central Michigan University (1023-N5-1238)

11:20AM (665) *The History of Mathematics: An Investigation of Particular Course Assignments on Student Conceptions of Its Use in Teaching.* Preliminary report.
Kathleen M. Clark, Florida State University (1023-N5-523)

11:40AM ► (666) *Learning and Learning to Teach Modern Geometry.* Preliminary report.
Teresa E. Moore*, Ithaca College, and **L. Christine Kinsey**, Canisius College (1023-N5-1150)

MAA Poster Session on MAA/Tensor Foundation Projects which Increase the Participation of Women in Mathematics

9:00 AM – 11:00 AM

Organizers: **Elizabeth G. Yanik**, Emporia State University
Jennifer Hontz, Meredith College
Kathleen A. Sullivan, Seattle University

Joint AMS-MAA Committee on Teaching Assistants and Part-Time Instructors Panel Discussion

9:00 AM – 10:20 AM

Strategic thinking about nonladder faculty.
Organizers: **Judith L. Baxter**, University of Illinois at Chicago
Kevin E. Charlwood, Washburn University
Natasha M. Speer, Michigan State University
Panelists: **Charles Hale**, California State University, Pomona
Diane L. Herrmann, University of Chicago
Penelope Kirby, Florida State University
Fred Peskoff, Borough of Manhattan Community College/CUNY

Exhibits and Book Sales

9:30 AM – 5:30 PM

Math on the Web, II

10:00 AM – 3:35 PM

10:00AM (667) *Interactive math on the Web by Maplesoft.*
Mohamed Bendame, Maplesoft

10:45AM (668) *The Math Gateway: A NSDL portal for undergraduate math.*
Lang Moore, Duke University

11:30AM (669) *Math for the visually disabled: What you can do to help.*
Neil Soiffer, Design Science, Inc.

12:15PM (670) *MathML everywhere: Web pages, blogs, Wikis, computation and more.*
Neil Soiffer, Design Science, Inc.

1:00PM (671) *Math support for instant messaging, chat rooms, and other collaboration environments.*
Don DeLand, Integre Technical Publishing Co.

1:45PM (672) *Creating mathematical documents for the Web with Scientific WorkPlace.*
Barry MacKichan, MacKichan Software, Inc.

2:30PM (673) *Student answers to math homework on the Web using proper mathematical notation: A scalable, universal approach.*
John Risley, WebAssign

3:15PM (674) *Maplets for calculus.*
Philip Yasskin*, Texas A&M University, and **Doug Meade***, University of South Carolina

MAA Panel Discussion

10:00 AM – 11:20 AM

Using student portfolios for assessment.
Organizers: **Alex J. Heidenberg**, U.S. Military Academy
Michael D. Phillips, U.S. Military Academy
Panelists: **Connie S. Schrock**, Emporia State University
Dennis Kern, Texas A&M University at Texarkana
Cathy Liebars, College of New Jersey
Archie Willmer, III, U.S. Military Academy

MAA Committee on Technologies in Mathematics Education and WEBSIGMAA Panel Discussion

10:00 AM – 11:20 AM

Best practices for expository mathematics in the digital age.
Organizer: **Kyle T. Siegrist**, University of Alabama, Huntsville
Panelists: **Thomas E. Leathrum**, Jacksonville State University
Douglas E. Ensley, Shippensburg State University
Franklin A. Wattenberg, U.S. Military Academy
David Smith, Duke University
Kyle T. Siegrist

MAA Invited Address

10:05 AM – 10:55 AM

(675) *The Bernoulli brothers in the arena of the early calculus.*
Jan van Maanen, Utrecht University (1023-A0-21)

MAA Minicourse #5: Part A

10:30 AM – 12:30 PM

Wavelets and applications: A multidisciplinary undergraduate course with emphasis on scientific computing.
Organizer: **Patrick J. Van Fleet**, University of St. Thomas

MAA Special Presentation

10:30 AM – 11:50 AM

Proposal writing workshop for grant applications to the NSF Division of Undergraduate Education.
Organizers: **Elizabeth J. Teles**, NSF Division of Undergraduate Education
Lee L. Zia, NSF Division of Undergraduate Education

SIAM Invited Address

11:10 AM – NOON

► (676) *Geometry in the movies.*
Tony DeRose, Pixar Animation Studios (1023-00-14)

AMS Session on Logic

11:15 AM – 11:55 AM

11:15AM (677) *Coding a new countable-length sequence.*
Natasha Dobrinen, Kurt Goedel Research Center for Mathematical Logic (1023-03-1479)

11:30AM (678) *On the Free Left Distributive Algebra on κ-many Generators.* Preliminary report.
Sheila K Miller, University of Colorado, Boulder (1023-03-1545)

11:45AM (679) *On Non-Standard Set Theory Models and the Relativity of Real Numbers.*
L. Luo, Beijing Normal University (1023-03-89)

AMS Colloquium Lecture: Lecture II

1:00 PM – 2:00 PM

(680) *Limit shapes, real and imagined, II: Algebraic geometry of random surfaces.*
Andrei Okounkov, Princeton University (1023-60-03)

AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates, II

1:00 PM – 4:25 PM

Organizers: **Darren A. Narayan**, Rochester Institute of Technology
Carl V. Lutzer, Rochester Institute of Technology
Bernard Brooks, Rochester Institute of Technology
Tamas I. Wiandt, Rochester Institute of Technology
Michael J. Fisher, California State University, Fresno

1:00PM ► (681) *Modeling the Spread of Smallpox in the Mayan Population with Excel.* Preliminary report.
Hye Yon Yi, Rochester Institute of Technology (1023-00-1100)

1:30PM ► (682) *Colorability of Knots and the Kauffman-Harary Conjecture.*
Nicholas E. Dowdall*, Sonoma State University, California, **Thomas Mattman**, Chico State University, **Kevin Meek**, Florida State University, and **Pablo Solis**, MIT (1023-54-805)

2:00PM ► (683) *Turk's Head Knots and the Kauffman-Harary Conjecture.*
Pablo R Solis, Massachusetts Institute of Technology (1023-54-807)

2:30PM ► (684) *The Kauffman-Harary Conjecture, Turk's Head Knots and Pell Primes.*
Nick Dowdall, Sonoma State University, **Kevin Meek***, Florida State University, and **Pablo Solis**, Massachusetts Institute of Technology (1023-51-1058)

3:00PM (685) *A Compartmental Model for an Activity-Dependent Perforated Synapse.*
Olga Yuliana Noris* and **Diana W. Verzi**, San Diego State University-Imperial Valley Campus (1023-92-1119)

3:30PM ► (686) *Normal Subgroups of a Wreath p-Group and Corresponding Doubly-Invariant Vector Subspaces: Preliminary Report.* Preliminary report.
Sam P Ruth*, Northwestern University, **Arran Christopher Hamm**, Wake Forest University, and **Sarah Renee Bockting**, University of Evansville (1023-20-64)

4:00PM ► (687) *Pricing Convertible Bonds.* Preliminary report.
Jinjin Qian* and **Lindsay Bryant**, Lafayette College (1023-90-1553)

AMS-AWM Special Session on Geometric Group Theory, III

1:00 PM – 3:55 PM

Organizers: **Ruth M. Charney**, Brandeis University
Karen Vogtmann, Cornell University

1:00PM (688) *Wicket groups and ring groups.*
Tara E Brendle*, Louisiana State University, and **Allen Hatcher**, Cornell University (1023-57-1754)

1:30PM (689) *Brownstein-Lee Conjecture.*
Craig Jensen*, University of New Orleans, **Jon McCammond**, UC - Santa Barbara, and **John Meier**, Lafayette College (1023-20-69)

2:00PM (690) *Core and intersection number in compactified outer space, Part I.* Preliminary report.
Michael Handel, Lehman College, CUNY, and **Lee Mosher***, Rutgers University, Newark (1023-20-838)

2:30PM (691) *Core and intersection number in compactified outer space, Part II.* Preliminary report.
Michael Handel*, Lehman College, CUNY, and **Lee Mosher**, Rutgers University, Newark (1023-20-839)

3:00PM (692) *Unstable Morita Classes in the Homology of the Mapping Class Group.* Preliminary report.
James R Conant, University of Tennessee (1023-20-258)

3:30PM (693) *Cohomology of some subgroups of the automorphism group of a free group.*
Alexandra R Pettet, Stanford University (1023-20-1070)

AMS Special Session on Initial- and Boundary-Value Problems, Solvability, and Stability for some Nonlinear PDEs: Theorem, Computation, and Application, II

1:00 PM – 3:55 PM

Organizers: **Jerry L. Bona**, University of Illinois at Chicago
Laihan Luo, New York Institute of Technology

1:00PM (694) *Initial-boundary-value Problems for a Three-dimensional Model for Surface Water Waves.* Preliminary report.
Jerry L Bona, University of Illinois at Chicago (1023-76-1022)

1:30PM (695) *Time Periodic Solution of the Korteweg-de Vries Equation on a Bounded Domain and Its Stability.* Preliminary report.
Muhammad Usman and **Bing-Yu Zhang***, University of Cincinnati (1023-35-1362)

2:00PM ► (696) *Stability of incompressible viscous fluid flows.*
Dmitry Pelinovsky, McMaster University (1023-34-422)

2:30PM (697) *Fifth-order Korteweg-de Vries type equations in Sobolev spaces with negative indices.* Preliminary report.
Jiahong Wu*, Oklahoma State University, **Jie Shen**, Purdue University, and **Juan-Ming Yuan**, Providence University, Taiwan (1023-35-641)

3:00PM ► (698) *Approximate and Numerical Solutions of the Initial- and Boundary-Value Problems for fKdV Equation, Mass Postulate, and Satellite Observations.*
Samuel S Shen, San Diego State University (1023-76-400)

3:30PM (699) *Asymptotic Linearization of Some Nonlinear Partial Differential Equations.* Preliminary report.
Thanasis Fokas, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, and **Laihan Luo***, New York Institute of Technology (1023-35-813)

AMS Special Session on Invariant Theory, II

1:00 PM – 3:55 PM

Organizers: **Mara D. Neusel**, Texas Tech University
Frank D. Grosshans, West Chester University

1:00PM (700) *On the invariant theory of the orthogonal group.*
Matyas Domokos, Renyi Institute of Mathematics, Hungarian Academy of Sciences (1023-13-1081)

2:00PM Problem session on Invariant Theory.

3:00PM (701) *Black Box Algebras.*
Harm Derksen, University of Michigan (1023-17-935)

3:30PM (702) *Symmetry in SL(3,C)-Character Varieties.*
Sean D Lawton, Kansas State University (1023-14-97)

AMS Special Session on Knots, 3-Manifolds, and Their Invariants, III

1:00 PM – 3:55 PM

Organizers: **Oliver T. Dasbach**, Louisiana State University
Xiao-Song Lin, University of California Riverside

1:00PM ► (703) *Some applications of the cosine law to surface geometry and 3-manifolds.*
Feng Luo, Rutgers University (1023-57-1527)

1:30PM (704) *Virtual Homotopy.* Preliminary report.
H A Dye*, U.S. Military Academy, and **Louis H Kauffman**, University of Illinois at Chicago (1023-55-529)

2:00PM (705) *Hochschild homology, cones, and combinatorial patterns in Khovanov type graph homology.*
Jozef H. Przytycki*, George Washington University, **Milena D. Pabiniak** and **Radmila Sazdanovic**, GWU (1023-57-1406)

2:30PM (706) *Analyzing torsion in Khovanov-type graph cohomology over algebra* $Z[x]/(x^m)$.
Radmila Sazdanovic*, George Washington University, **Milena Pabiniak** and **Jozef H Przytycki**, GWU (1023-57-846)

3:00PM (707) *Mahler measures of twisted Alexander polynomials.*
Daniel S. Silver and **Susan G. Williams***, University of South Alabama (1023-57-1561)

3:30PM ► (708) *The Mahler measure of Jones polynomials and the twist-bracket polynomial.*
Abhijit Champanerkar, Univ. of South Alabama, and **Ilya Kofman***, College of Staten Island, CUNY (1023-57-1262)

AMS Special Session on Arrangements and Related Topics, III

1:00 PM – 3:50 PM

Organizers: **Daniel C. Cohen**, Louisiana State University
Anne V. Shepler, University of North Texas

1:00PM ► (709) *On the Heavyside functions of arrangements and the impossibility theorem by Kenneth Arrow.*
Hiroaki Terao, Hokkaido University (1023-32-1880)

1:30PM (710) *The* 1 mod k *partition poset and graph connectivity.* Preliminary report.
John Shareshian, Washington University, and **Michelle L. Wachs***, University of Miami (1023-05-1742)

2:00PM (711) *Degeneration varieties and Macaulay inverse systems.* Preliminary report.
Max D. Wakefield, Hokkaido University (1023-13-1073)

2:30PM Break.

3:00PM (712) *The space of n ordered points on the line is cut out by simple quadrics if n is not six.*
Benjamin J Howard*, Institute for Mathematics and its Applications, **John Millson**, University of Maryland College Park, **Andrew Snowden**, Princeton University, and **Ravi Vakil**, Stanford University (1023-14-1068)

3:30PM (713) *Freeness of Line-Conic Arrangements in* $\mathbb{P}^2$.
Stefan O Tohaneanu* and **Hal Schenck**, Texas A&M University (1023-52-1402)

AMS Special Session on Mathematical Techniques in Musical Analysis, II

1:00 PM – 3:55 PM

Organizers: **Robert W. Peck**, Louisiana State University
Julian Hook, Indiana University-Bloomington
Rachel W. Hall, Saint Joseph's University

1:00PM *Yea, Why Try Her Raw Wet Hat?*
► (714) **Robin J Wilson**, The Open University, UK (1023-00-289)

1:30PM *An order 1152 group of triadic transformations*
► (715) *and its relevance to music-theoretical structures.* Preliminary report.
Robert Peck*, Louisiana State University, and **Jack Douthett**, Albuquerque, New Mexico (1023-20-1231)

2:00PM *Consistent Fingerings for a Continuum of Syntonic*
(716) *Tunings.*
William A. Sethares*, University of Wisconsin, **Andrew Milne**, London, UK, and **Plamondon Jim**, Thumbtronics Ltd, Busselton, Western Australia (1023-51-689)

2:30PM *A multi-pronged approach to the creating of an*
► (717) *interdisciplinary research program in mathematics and computation in music.*
Elaine Chew, University of Southern California (1023-00-1757)

3:00PM *A Dynamic Programming Approach to the*
(718) *Extraction of Phrase Boundaries from Tempo Variations in Expressive Performances.* Preliminary report.
Ching-Hua Chuan*, Computer Science, University of Southern California, and **Elaine Chew**, Industrial and Systems Engineering, University of Southern California (1023-68-1756)

3:30PM *Information Theory and Melody: Zero and First*
► (719) *Order Markov Models.*
Kathryn R Elder, New York, NY (1023-62-551)

AMS Special Session on Radon Transforms, Convex Geometry, and Geometric Analysis, II

1:00 PM – 3:55 PM

Organizers: **Eric L. Grinberg**, University of New Hampshire
Peter Kuchment, Texas A&M University
Gestur Olafsson, Louisiana State University
Eric Todd Quinto, Tufts University
Boris S. Rubin, Louisiana State University

1:00PM *Isospectral metrics on balls, spheres, and other*
► (720) *manifolds with different local geometries.*
Zoltan I. Szabo, Lehman College and Graduate Center of the City University of New York (1023-58-510)

1:30PM *Some applications of integral geometry to Finsler*
(721) *geometry.* Preliminary report.
Juan-Carlos Alvarez Paiva*, Universite des Sciences et Technologies de Lille, and **Gautier Berck**, Scuola Normale Superiore di Pisa (1023-44-511)

2:00PM L_p *Intersection Bodies.*
(722) **Monika Ludwig*** and **Christoph Haberl**, Technische Universität Wien (1023-52-609)

2:30PM *The geometry of* L_0.
(723) **Nigel Kalton**, **Alexander Koldobsky**, University of Missouri, **Vladyslav Yaskin** and **Maryna Yaskina***, University of Oklahoma (1023-52-750)

3:00PM *A solution to the lower dimensional Busemann-Petty*
(724) *problem in the hyperbolic space.*
Vladyslav Yaskin, University of Oklahoma (1023-52-745)

3:30PM *Determination of convex bodies from derivatives of*
(725) *section functions.*
Alexander Koldobsky* and **Chris Shane**, University of Missouri-Columbia (1023-52-169)

AMS Special Session on Calculus of Variations and Nonlinear PDEs: Theory and Applications, II

1:00 PM – 3:45 PM

Organizers: **Marian Bocea**, North Dakota State University
Cristina M. Popovici, North Dakota State University

1:00PM *New exact bounds for effective properties of*
(726) *multicomponent conducting composites and Localized polyconvexity.* Preliminary report.
Andrej Cherkaev, University of Utah (1023-51-559)

2:00PM *Dynamics of steps along a martensitic phase*
(727) *boundary.* Preliminary report.
Anna Vainchtein*, University of Pittsburgh, and **Yubao Zhen**, Harbin Institute of Technology (1023-74-455)

3:00PM ε*-stable* Γ*-convergence.* Preliminary report.
(728) **Andrea Braides**, University of Rome, and **Chris Larsen***, WPI (1023-49-1631)

AMS Special Session on Dynamic Programming, II

1:00 PM – 3:45 PM

Organizers: **Gerald C. Kobylski**, United States Military Academy
Randal Hickman, United States Military Academy

1:00PM *Dynamic Programming and the Dragonfly Guided*
(729) *Airdrop System.* Preliminary report.
David W. Carter*, Draper Laboratory, Cambridge, MA, and **Steve Tavan**, US Army, RDECOM, Natick, MA (1023-49-1182)

1:30PM *Applications of Dynamic Programming in a*
(730) *Network of Autonomous Vehicles and Sensors.* Preliminary report.
Randal E. Hickman, United States Military Academy (1023-49-1371)

2:00PM *Stochastic UAV Route Planning Using Adaptive*
(731) *Dynamic Programming.* Preliminary report.
Darryl K. Ahner, U.S. Army TRADOC Analysis Center, Monterey, CA (1023-49-1227)

3:00PM *Assignment Scheduling Capability for UAVs—an*
(732) *Approximate Dynamic Programming Simulation Implementation to a Combinatorial Scheduling Problem.* Preliminary report.
Arnold Buss, Naval Postgraduate School, Monterey, CA (1023-49-1232)

MAA Minicourse #11: Part A

1:00 PM – 3:00 PM

Origami in undergraduate mathematics courses.
Organizer: **Thomas C. Hull**, Merrimack College

MAA Minicourse #13: Part B

1:00 PM – 3:00 PM

Teaching a course in the history of mathematics.
Organizers: **Victor J. Katz**, University of the District of Columbia
V. Frederick Rickey, U. S. Military Academy

MAA Minicourse #6: Part A

1:00 PM – 3:00 PM

WeBWorK 2: An Internet-based system for generating and delivering homework.

Organizers: **Arnold K. Pizer**, University of Rochester
Michael E. Gage, University of Rochester
Vicki Roth, University of Rochester

AMS Session on Analysis and Ordinary Differential Equations, II

1:00 PM – 3:55 PM

1:00PM (733) *Heat kernel estimates with applications to several complex variables.*
Andrew S Raich, Texas A&M University (1023-32-397)

1:15PM (734) *Zeros of Generalized Rogers Ramanujan Series.* Preliminary report.
Tim Huber, University of Illinois at Urbana-Champaign (1023-33-1177)

1:30PM ► (735) *On Some Inverse Problem Leading to a Second-Order Linear Functional.*
Ridha Sfaxi, Institut Superieur de Gestion de Gabes, Tunisia (1023-33-1556)

1:45PM ► (736) *Monotone Solutions of Nonlinear Differential Equations.*
Bryce Holthouse*, University of Central Missouri, and **Lianwen Wang**, Department of Mathematics and Computer Science, University of Central Missouri (1023-34-1331)

2:00PM (737) *Stability of Invariant Sets for Functional Differential Equations.*
Zhivko S. Athanassov, Bulgarian Academy of Sciences (1023-34-1433)

2:15PM ► (738) *Blending Mechanical Engineering With Mathematics to Create Interdisciplinary Lively Application Projects (ILAPs).* Preliminary report.
Michael R. Huber*, Muhlenberg College, **Jonathan L. Paynter** and **Zachary W. Seidel**, United States Military Academy (1023-34-154)

2:30PM (739) *Uniqueness implies existence for nth order boundary value problems.*
Jeffrey A. Ehme, Spelman College (1023-34-1635)

2:45PM ► (740) *Minimal Periods of Closed Curves in $\mathbb{R}^n$.*
George R Grover* and **Diana M Thomas**, Montclair State University (1023-34-1676)

3:00PM (741) *Impulsive hybrid set valued integro-differential equations and the monotone iterative technique.*
Seenith Sivasundaram, Embry-Riddle Aeronautical University (1023-34-323)

3:15PM (742) *Positive Solutions of an n^{th} Order Boundary Value Problem: A Functional Approach.*
John E. Ehrke, Baylor University (1023-34-477)

3:30PM (743) *Analysis of a family of model quasilinear boundary-value problems.* Preliminary report.
Matthew Rudd, University of Idaho (1023-34-485)

3:45PM (744) *Existence Results for Nonautonomous Evolution Equations with Nonlocal Initial Conditions.* Preliminary report.
Sergiu Aizicovici, Ohio University, and **Haewon Lee***, Dillard University (1023-34-880)

AMS Session on Geometry and Topology, II

1:00 PM – 4:10 PM

1:00PM (745) *Cheeger Constants of Certain Arithmetic Hyperbolic Three-Manifolds.* Preliminary report.
Dominic Lanphier, Western Kentucky University, and **Jason Rosenhouse***, James Madison University (1023-53-1726)

1:15PM (746) *On Conformal Invariant First Order Symmetry Operators of Powers of the Laplacian.* Preliminary report.
Alfredo Villanueva, The University of Iowa (1023-53-1808)

1:30PM (747) *Deformations of the gyroid and Lidinoid minimal surfaces.*
Adam G. Weyhaupt, Southern Illinois University Edwardsville (1023-53-1839)

1:45PM (748) *A Family of Minimal Tori in the Sphere S^5.*
Rodrigo Ristow Montes, Washington University in St Louis (1023-53-330)

2:00PM (749) *Techniques for classifying nonnegatively curved left-invariant metrics on compact Lie groups.*
Jack Huizenga, University of Chicago (1023-53-401)

2:15PM (750) *Energy and Riemannian Flows.* Preliminary report.
Amine Fawaz, The University of Texas of the Permian Basin (1023-53-588)

2:30PM (751) *Lie Groups of Automorphisms on Almost r-Paracontact Riemannian Manifolds.* Preliminary report.
Andrew Bucki, Langston University (1023-53-917)

2:45PM ► (752) *Tessellation of Klein Bottle by Congruence (mod 6) and Theorems of Fermat (1640) and Joncourt (1762).* Preliminary report.
Okan Gurel*, New York, NY, and **Demet Gurel**, Touro College (1023-54-1293)

3:00PM (753) *Topological Model of Melodic Clustering of a Music Score: Theory and Application to Schumann's Träumerei.*
Chantal Buteau, Brock University (1023-54-1605)

3:15PM (754) *On ê-Baire and ê-Shanin spaces.* Preliminary report.
Andrzej A. Szymanski, Slippery Rock University of Pennsylvania (1023-54-1650)

3:30PM ► (755) *A weighted quasimetric for digital topology.* Preliminary report.
Ralph Kopperman, The City College of CUNY (1023-54-1785)

3:45PM (756) *Uniqueness of Polish group topologies.* Preliminary report.
Bojana Pejic* and **Paul Gartside**, University of Pittsburgh (1023-54-1836)

4:00PM ► (757) *On results from convexity related to the phase retrieval problem.*
Gennadiy Averkov, University of Magdeburg (1023-52-1922)

AMS Session on Applications of Mathematics, II

1:00 PM – 4:10 PM

1:00PM ► (758) *Numerical simulations of resonant optics in meta-materials with negative refractive index.* Preliminary report.
Kathryn E Rasmussen, Rensselaer Polytechnic Institute (1023-78-826)

1:15PM (759) *Strongly Universal Quantum Turing Machines and Invariance of Kolmogorov Complexity.*
Markus Müller, Technische Universitaet Berlin, Germany (1023-81-1132)

1:30PM (760) *Wave-functions of Šeba billiards.*
B Winn, Texas A&M University (1023-81-1748)

1:45PM (761) *The spectral form factor for quantum graphs with spin-orbit coupling.*
Jonathan Harrison, Texas A&M University (1023-81-1884)

2:00PM (762) *Mathematical modeling and simulation of texture evolution.*
Maria Emelianenko*, **David Kinderlehrer**, **Shlomo Ta'asan**, Carnegie Mellon University, and **Dmitry Golovaty**, University of Akron (1023-82-1901)

2:15PM (763) *Statistical Equilibrium of Slender Vortex Filaments.*
Timothy D Andersen* and **Chjan C Lim**, Rensselaer Polytechnic Institute (1023-82-601)

2:30PM ► (764) *Well-Posed Initial-Boundary Value Constrained Evolution Problems.*
Alexander Alekseenko, California State University Northridge (1023-83-1833)

2:45PM ► (765) *Imaging conditions in geophysical depth migration algorithms.*
Bogdan G. Nita, Montclair State University (1023-86-295)

3:00PM ► (766) *Global Optimization in Model-Based Clustering.*
Jeffrey Heath*, **Michael Fu** and **Wolfgang Jank**, Univ. of Maryland, College Park (1023-90-1158)

3:15PM (767) *Discrete OR and continuous vintage capital models.*
Natali Hritonenko, Prairie View A&M University, and **Yuri Yatsenko***, Houston Baptist Universtity (1023-90-1174)

3:30PM (768) *A Hybrid Sampling Algorithm for Stochastic Optimization.* Preliminary report.
Shane Drew* and **Tito Homem-de-Mello**, Northwestern University (1023-90-1283)

3:45PM (769) *General option exercise rules for regime-switching models.*
Svetlana Boyarchenko and **Sergei Levendorskii***, Department of Economics, The University of Texas at Austin (1023-90-131)

4:00PM ► (770) *Portfolio Selection as a Nash Bargaining Game.*
Youngna Choi and **Michael A. Jones***, Montclair State University (1023-90-1414)

AMS Session on Algebra and Number Theory, IV

1:00 PM – 3:55 PM

1:00PM (771) $\mathbb{Z}_2$ *Homology of Singular Real Toric Varieties.* Preliminary report.
Valerie M. Hower, University of Georgia (1023-14-961)

1:15PM (772) *Some Results on Jónsson Modules over Commutative Rings with Identity.*
Greg G Oman, The Ohio State University (1023-13-959)

1:30PM (773) *Instability of projective reconstruction from 1-view in higher dimension.* Preliminary report.
Marina Bertolini, Universita' degli Studi di Milano, **GianMario Besana***, DePaul Univeristy - CTI, and **Cristina Turrini**, Universita' degli Studi di Milano (1023-14-118)

1:45PM (774) *Optimal fewnomial bounds from Gale dual polynomial systems.*
Frank Sottile*, Texas A&M University, and **Frederic Bihan**, Universite de Savoie (1023-14-1560)

2:00PM (775) *Equivalence of Mirror Families Constructed from Toric Degenerations of Flag Varieties.* Preliminary report.
Joseph P Rusinko, University of Georgia (1023-14-1649)

2:15PM (776) *Algebraic Geometric Codes on Anticanonical Surfaces.*
Jennifer A. Everson, University of Nebraska-Lincoln (1023-14-1712)

2:30PM (777) *A generalized Euler integral formula for ε-factors of irregular singular connections.*
Christopher L Bremer, University of Chicago (1023-14-1744)

2:45PM (778) *A mirror conjecture for projective bundles.*
Artur Elezi, American University (1023-14-1872)

3:00PM Break.

3:15PM (779) *Vanishing theta nulls of algebraic curves with automorphisms.* Preliminary report.
Sujeeva Wijesiri, Oakland University (1023-14-797)

3:30PM (780) *Numerical deflation of multiple solution components of systems of polynomial equations.*
Anton Leykin*, University of Minnesota, **Jan Verschelde** and **Ailing Zhao**, University of Illinois at Chicago (1023-14-798)

3:45PM (781) *Surfaces of general type with zero geometric genus.* Preliminary report.
Caryn Werner, Allegheny College (1023-14-876)

MAA Session on Teaching Innovations in Real Analysis, I

1:00 PM – 3:55 PM

Organizers: **Robert W. Vallin**, Slippery Rock University
Erik O. Talvila, University College of the Fraser Valley

1:00PM ► (782) *A Spoonful of Sugar: Using Just Enough Innovation For Success.*
Karl-Dieter Crisman, Gordon College (1023-Q1-1539)

1:20PM ► (783) *Enticing the Reluctant Analyst.*
M. Jean McKemie, St. Edward's University (1023-Q1-1425)

1:40PM ► (784) *To Cantor and Beyond.*
Ioana Mihaila, Cal Poly Pomona (1023-Q1-662)

2:00PM ► (785) *A Constructive Approach to Real Analysis.*
Mark Bridger, Northeastern University (1023-Q1-1776)

2:20PM ► (786) *A More Student Friendly Definition of Limit.* Preliminary report.
David Scott, University of Puget Sound (1023-Q1-381)

2:40PM ► (787) *Making it "Real".* Preliminary report.
Sarah V Cook, Washburn University (1023-Q1-1599)

3:00PM (788) *Using the discovery learning method in Real Analysis.*
Petre Ion Ghenciu, University of Wisconsin-Stout (1023-Q1-1529)

3:20PM ► (789) *How Logical Thinking Can Be Enhanced in Learning Real Analysis.* Preliminary report.
Long Wang, Southern Polytechnic State University (1023-Q1-638)

3:40PM (790) *Guided Discovery of "Big Picture" Results in Analysis.*
Clark Wells, Grand Valley State University (1023-Q1-948)

MAA Session on Communication Theory in Undergraduate Courses

1:00 PM – 3:35 PM

Organizer: **Tim McDevitt**, Elizabethtown College

1:00PM ► (791) *Simple Signal Processing in the Engineering Mathematics Classroom.*
Jong Chung*, **Joseph D. Myers** and **Sebastien P. Joly**, US Military Academy (1023-F5-1213)

1:20PM ► (792) *Fourier Analysis in a Calculus Course Using Student-Generated Sound Waves.* Preliminary report.
Phil Gustafson, Mesa State College (1023-F5-1094)

1:40PM (793) *Using Frames to Provide Repetitiously Repetitive Redundancy in Signal Processing.*
Troy Henderson, United States Military Academy (1023-F5-1582)

2:00PM ► (794) *Using the Complex Spectral Theorem to Introduce the Discrete Fourier Transform.*
Michael E. Orrison, Harvey Mudd College (1023-F5-1080)

2:20PM ► (795) *Edge Detection.*
Yu-Ju Kuo, Indiana University of Pennsylvania (1023-F5-1662)

2:40PM (796) *A Motivational Course in Cryptology and Coding Theory.*
Sarah Spence Adams*, Olin College of Engineering, and **Gordon Prichett**, Babson College (1023-F5-152)

3:00PM ► (797) *A Matlab GUI for teaching Cryptography and Cryptanalysis.*
Robert J McDevitt, Naval Surface Warfare Center, Dahlgren Division (1023-F5-1008)

3:20PM ► (798) *Toward Making Elliptic Curves Accessible to Undergraduates.* Preliminary report.
Tim McDevitt, Elizabethtown College (1023-F5-1581)

MAA Session on Getting Students to Discuss and to Write about Mathematics, III

1:00 PM – 3:55 PM

Organizers: **Martha Ellen (Murphy) Waggoner**, Simpson College
Charlotte Knotts-Zides, Wofford College
Harrison W. Straley, Wheaton College

1:00PM ► (799) *Service Learning Projects for Discussing and Writing about Mathematics and Computer Technology: Implementation and Assessments.*
Morteza Shafii-Mousavi* and **Paul Kochanowski**, Indiana University South Bend (1023-I1-39)

1:15PM ► (800) *Student Problem Writing Exercises Used to Enhance and Develop Mathematical Exposition.* Preliminary report.
Linda McGuire, Muhlenberg College (1023-I1-393)

1:30PM ► (801) *Can You Understand Me Now? Mathematics as Another Language.*
Jean M Horn*, NVCC - Woodbridge, and **Toni T Robertson**, NVCC-Woodbridge (1023-I1-486)

1:45PM ► (802) *Using Groups and Peer Reviews in a Proof Course.* Preliminary report.
Sharon S Emerson-Stonnell, Longwood University (1023-I1-506)

2:00PM ► (803) *"Writing-Intensive" Linear Algebra.*
Patrick Bahls, University of North Carolina, Asheville (1023-I1-611)

2:15PM ► (804) *The Best Bluffer Contest: Rewarding Students for Creating Invalid Proofs.* Preliminary report.
Pam Miltenberger Wovchko, West Virginia Wesleyan College (1023-I1-620)

2:30PM ► (805) *Are you a Mathematical Maoist? Writing Exercises to Explore the Mathematical Self.*
Judith L Gieger* and **John C Nardo**, Oglethorpe University (1023-I1-674)

2:45PM ► (806) *Involving Students in Their Own Learning: Follow up After the First Implementation.*
Rodney X. Sturdivant, **Robert E. Burks** and **Brian E. Souhan***, Unitited States Military Academy (1023-I1-769)

3:00PM ► (807) *Writing in a Number Sense Course for Future Elementary Teachers.*
Judith Covington, Louisiana State University Shreveport (1023-I1-855)

3:15PM (808) *The Mathematics of Politics & Power as an alternative to Trigonometry.*
Carl Lutzer* and **Bernard Brooks**, Rochester Institute of Technology (1023-I1-894)

3:30PM (809) *Teaching Writing in a General Education Geometry Course.* Preliminary report.
Teresa D Magnus, Rivier College (1023-I1-900)

3:45PM ► (810) *Let's Talk Mathematics.*
Melinda Schulteis, Concordia University, Irvine (1023-I1-916)

MAA Session on Philosophy of Mathematics, II

1:00 PM – 3:45 PM

Organizers: **Bonnie Gold**, Monmouth University
Charles R. Hampton, The College of Wooster

1:00PM ► (811) *Why the Universe MUST be Complicated.* Preliminary report.
G. Edgar Parker*, **James S. Sochacki** and **David C. Carothers**, James Madison University (1023-N1-243)

1:40PM ► (812) *Catching the Tortoise: A Case Study in the Rules of Mathematical Engagement.*
James R Henderson, University of Pittsburgh-Titusville (1023-N1-133)

2:20PM ► (813) *The Philosophical Status of Diagrams in Euclidean Geometry.*
Nathaniel Miller, University of Northern Colorado (1023-N1-459)

3:00PM ► (814) *Representations in Knot Classification.*
Kenneth Manders, University of Pittsburgh (1023-N1-1387)

MAA Session on Reconceptualizing Content Courses for Prospective High School Mathematics Teachers, II

1:00 PM – 3:55 PM

Organizers: **Jean McGivney-Burelle**, University of Hartford
Neil Portnoy, Stony Brook University

1:00PM (815) *Connecting Postsecondary and Secondary Mathematics: Prospective Teachers' Understanding of Transformational Geometry.*
Karen J Graham*, University of New Hampshire, **Todd Grundmeier**, California Polytechnic State University, San Luis Obispo, and **Neil Portnoy**, University of New Hampshire (1023-N5-1515)

1:20PM (816) *Connecting Postsecondary and Secondary Mathematics: Content for Preservice Teacher Courses.*
Steven R Benson*, Education Development Center, **Karen J Graham**, University of New Hampshire, **Todd Grundmeier**, California Polytechnic State University, San Luis Obispo, and **Neil Portnoy**, University of New Hampshire (1023-N5-1494)

1:40PM ► (817) *The role of professional development resources in generating mathematical discourse.*
Karen A Marrongelle* and **Sean Larsen**, Portland State University (1023-N5-1822)

2:00PM ► (818) *Connections in Abstract Algebra for Teachers: Bridging Theory and Practice.*
Tanya Cofer*, Northeastern Illinois University, and **Bradford R. Findell**, University of Georgia (1023-N5-1360)

2:20PM (819) *A Senior Capstone Course for Future Secondary Mathematics Teachers.*
Mary Garner* and **Josip Derado**, Kennesaw State University (1023-N5-1536)

2:40PM ► (820) *A "reconceptualized" university calculus course –with hands-on applications –designed for prospective and practicing high school teachers.*
Patricia Baggett*, New Mexico State University, and **Andrzej Ehrenfeucht**, University of Colorado at Boulder (1023-N5-141)

3:00PM ► (821) *Facilitating genuine discovery experiences for future high-school mathematics teachers.* Preliminary report.
Greisy Winicki-Landman, Calif. State Polytechnic University Pomona (1023-N5-72)

3:20PM ► (822) *Changing Math Education Students' Perceptions of the Role of Graphs in Understanding Functions.* Preliminary report.
Christopher J Yakes* and **Jorgen Berglund**, California State University, Chico (1023-N5-1379)

3:40PM ► (823) *Psychology, pedagogy and epistemology in context of secondary mathematics: A content course for secondary mathematics teachers.*
Debasree Raychaudhuri, California State University at Los Angeles (1023-N5-1891)

MAA Session on The Scholarship of Teaching and Learning in Mathematics

1:00 PM – 4:00 PM

Organizers: **Curtis D. Bennett**, Loyola Marymount University
Jacqueline M. Dewar, Loyola Marymount University

1:00PM ► (824) *Choices, Representations, and Strategies Used in Posing and Solving Problems by Elementary Education Students in the First Math Content Course.* Preliminary report.
Kathryn T Ernie, University of Wisconsin - River Falls (1023-R5-1814)

1:20PM ► (825) *Using Clinical Interviewing to Inform Teaching: The Experiences of Three Prospective K-8 Teachers.* Preliminary report.
Cindia D Stewart, Shenandoah University (1023-R5-1546)

1:40PM ► (826) *Using Reading Questions in an Introductory Statistics Course to Enhance Understanding of Concepts.* Preliminary report.
Edwin P Herman, University of Wisconsin, Stevens Point (1023-R5-599)

2:00PM (827) *What Are Students Likely to Learn by Reading Their Textbooks Before Class?*
Bruff Derek, Vanderbilt University (1023-R5-1728)

2:20PM ► (828) *How to Engage and Challenge Students in Learning Calculus.* Preliminary report.
Simei Tong, University of Wisconsin-Eau Claire (1023-R5-368)

2:40PM ► (829) *Partial Notes: A tool for understanding calculus.* Preliminary report.
Larissa B. Schroeder*, University of Connecticut, **Nicholas Gorgievski**, Nichols College, and **Thomas C. DeFranco**, University of Connecticut (1023-R5-1248)

3:00PM (830) *Curve Sketching Difficulties of Students in Upper Level Courses.*
Ronald E. Mickens, Clark Atlanta University (1023-R5-34)

3:20PM ► (831) *Student Engagement in History of Mathematics.* Preliminary report.
Pam Crawford, Jacksonville University (1023-R5-1915)

3:40PM Discussion.

MAA General Contributed Paper Session, IV

1:00 PM – 3:40 PM

Organizers: **Eric S. Marland**, Appalachian State University
Jay A. Malmstrom, Oklahoma State Community College

1:00PM ► (832) *Understanding Protein-DNA Binding via Fox Coloring.* Preliminary report.
Junalyn P. Navarra-Madsen* and **Angela McMichael**, Texas Woman's University (1023-Z1-129)

1:15PM ► (833) *Modeling Cell Division in Escherichia coli.* Preliminary report.
Gretchen A. Koch*, Goucher College, and **Donald A. Drew**, Rensselaer Polytechnic Institute (1023-Z1-1654)

1:30PM ► (834) *Geometric Measures as Brain Shape Descriptors.* Preliminary report.
Christian Laing* and **Juan B. Gutierrez**, Florida State University (1023-Z1-1817)

1:45PM (835) *A Second Course in Biostatistics at a Liberal Arts College?* Preliminary report.
John D. Kloke, Pomona College (1023-Z1-1411)

2:00PM ► (836) *A Model for the Peopling of the Americas Using Logistic-Diffusion Simulations.* Preliminary report.
Elizabeth L. Martin* and **Charles Collins**, The University of Tennessee (1023-Z1-1403)

2:15PM (837) *Surface Segregation and solute trapping during planar film growth.*
Xiaoying Han* and **Brain Spencer**, University at Buffalo, The State University of New York (1023-Z1-1381)

2:30PM (838) *Curricula Models for Undergraduate Computational Science Education.*
Ignatios E. Vakalis, Computer Science, CalPoly State Univ. (1023-Z1-373)

2:45PM ► (839) *Louisiana Tech University's STEM Talent Expansion Program.*
Kelly Crittenden*, **James D. Nelson** and **Galen E. Turner III**, Louisiana Tech University (1023-Z1-1596)

3:00PM ► (840) *Undergraduate Research Projects using Artificial Neural Networks.*
John C. Merkel, Morehouse College (1023-Z1-1892)

3:15PM (841) *Hybrid Multiscale Landmark and Deformable Image Registration.*
Dana C Paquin*, **Doron Levy**, Stanford University, and **Lei Xing**, Stanford University Department of Radiation Oncology (1023-Z1-818)

3:30PM (842) *Normal Functions of the First Category and the Interaction Between Coefficient Conditions and Solution Conditions of Differential Equations in the Unit Disk.* Preliminary report.
Kari E. Fowler, University of Tampa (1023-Z1-138)

SIAM Minisymposium on Mathematical Modeling of Complex Systems in Biology, II

1:00 PM – 3:50 PM

Organizer: **Lisa J. Fauci**, Tulane University

1:00PM (843) *Mathematical Models for Estimating the Number of People Infected with HIV.*
J. Mac Hyman* and **Gerardo Chowell**, Los Alamos National Laboratory (1023-92-1167)

1:30PM ► (844) *Fluid dynamics and computer simulations of mucociliary transport.* Preliminary report.
Xingzhou Yang*, Center for Computational Science, Tulane University, **Lisa J. Fauci**, Tulane University, and **Robert H. Dillon**, Washington State University (1023-92-1133)

2:00PM ► (845) *Parametric inference of biochemical network models.* Preliminary report.
Abdul S Jarrah, **Reinhard Laubenbacher***, **Paola M Vera-Licona**, Virginia Tech, and **Bernd Sturmfels**, University of California, Berkeley (1023-92-651)

2:30PM (846) *Towards the Human Genotope.* Preliminary report.
Peter M Huggins*, **Lior Pachter** and **Bernd Sturmfels**, UC Berkeley (1023-92-1429)

3:00PM ► (847) *Modeling Cancer, the Immune System and Treatment.*
L. G. de Pillis, Harvey Mudd College (1023-92-362)

3:30PM ► (848) *Modeling the Shape and Structure of the Human Brain.*
Monica K Hurdal, Florida State University (1023-92-673)

SIAM Minisymposium on Structure and Topology in Graph Theory, II

1:00 PM – 4:15 PM

Organizers: **Mark N. Ellingham**, Vanderbilt University
Chris Stephens, Middle Tennessee State University
Xiaoya Zha, Middle Tennessee State University

1:00PM (849) *1-embedded minors of 1-embedded graphs.* Preliminary report.
Bojan Mohar, Simon Fraser University, Burnaby (1023-05-1353)

1:30PM ► (850) *An extension of Kuratowski Theorem.* Preliminary report.
Guoli Ding, LSU (1023-05-1377)

2:00PM (851) *Representativity of Cayley maps.*
D. Christopher Stephens*, Middle Tennessee State University, **Thomas W. Tucker**, Colgate University, and **Xiaoya Zha**, Middle Tennessee State University (1023-05-1454)

2:30PM (852) *Progress on Lovász' Path Removal Conjecture.*
Ken-ichi Kawarabayashi, Natoinal Institute of Informatics (1023-05-1075)

3:00PM ► (853) *Some Remarks on Δ-critical Graphs.*
Zixia Song, University of Central Florida (1023-05-1221)

3:30PM (854) *Orientable strong embeddings for cubic projective-planar graphs.*
Mark Ellingham*, Vanderbilt University, and **Xiaoya Zha**, Middle Tennessee State University (1023-05-578)

3:55PM (855) *Degree-Splittability of k-regular graphs.*
Jeong Ok Choi*, **Lale Ozkahya** and **Douglas B. West**, University of Illinois at Urbana-Champaign (1023-05-1658)

AMS-ASL-MAA Panel Discussion

1:00 PM – 2:30 PM

Contemporary perspectives on Hilbert's Second Problem and the Gödel Incompleteness Theorems.

Moderator: **Akihiro Kanamori**, Boston University
Panelists: **Harvey M. Friedman**, Ohio State University
David E. Marker, University of Illinois at Chicago
Michael Rathjen, University of Leeds

MAA CUPM Subcommittee on Curriculum Renewal Across the First Two Years Panel Discussion

1:00 PM – 2:20 PM

Reshaping undergraduate mathematics for biology-related disciplines: Ideas and innovations.

Organizer: **Jenna P. Carpenter**, Louisiana Tech University
Panelists: **Eric S. Marland**, Appalachian State University
Debra L. Hydorn, University of Mary Washington
Ami Radunskaya, Pomona College
Kathy Taylor, Duquesne University

MAA Committee on Two-Year Colleges and Committee on Articulation and Placement Panel Discussion

1:00 PM – 2:20 PM

Placement: Friend or foe?

Organizers: **Susan L. Forman**, Bronx Community College
Reginald K. U. Luke, Middlesex County College
Stephen B. Rodi, Austin Community College
Panelists: **Geoffrey Akst**, Borough of Manhattan Community College
Steve Newman, Northern Kentucky University
Gordon S. Woodward, University of Nebraska-Lincoln

MAA Committee on Undergraduate Student Activities and Chapters Panel Discussion

1:00 PM – 2:20 PM

Engaging students in research, clubs, student chapters, and internships.

Organizers: **Kay B. Somers**, Moravian University
Jody Sorenson, Augsburg College
Panelists: **Gary Gordon**, Lafayette College

Deanna B. Haunsperger, Carleton College
Angela Spalsbury, Youngstown State University
Richard A. Zang, University of New Hampshire, Manchester

AMS Session on Analysis and Functional Analysis, I

1:15 PM – 3:25 PM

1:15PM ► (856) *Singular Discrete Third Order Boundary Value Problems.*
Curtis J. Kunkel, Baylor University (1023-39-445)

1:30PM (857) *Total regularity revisited.* Preliminary report.
B. E. Rhoades, Indiana University, Bloomington, IN (1023-40-188)

1:45PM ► (858) *Euler's little summation formula and special values of the zeta function.*
Thomas J Osler, Rowan University (1023-40-696)

2:00PM ► (859) *Energy and Discrepancy Are Equivalent.*
Fred J. Hickernell, Illinois Institute of Technology (1023-41-1281)

2:15PM (860) *On Bernstein's Inequality for Entire Functions of Exponential Type.*
Tariq Qazi, Virginia State University (1023-41-562)

2:30PM (861) *On The Existence of Haar Sets.* Preliminary report.
Martin W. Bartelt*, Christopher Newport University, and **John Swetits**, Old Dominion University (1023-41-982)

2:45PM Break.

3:00PM (862) *A halfspace is a multiplier on $L^p(\mathbb{T}^d)$.*
J Marshall Ash, DePaul University (1023-42-1149)

3:15PM (863) *Non-uniform sampling and reconstruction from sampling sets with unknown jitter.*
Akram Aldroubi and **Casey C Leonetti***, Vanderbilt University (1023-42-1369)

MAA Poster Session on Projects Supported by the NSF Division of Undergraduate Education

2:00 PM – 4:00 PM

Organizer: **Jon W. Scott**, Montgomery Community College

2:00PM (864) *Renewal of College Algebra at South Dakota State University.*
Donna Flint*, **Becky Hunter** and **Dan Kemp**, South Dakota State University

2:00PM (865) *A motivational course in cryptology and coding theory.*
Sarah Spence Adams*, Franklin W. Olin College of Engineering, and **Gordon Prichett**, Babson College

2:00PM (866) *Bridging the Vector Calculus Gap: Episode II.*
Tevian Dray* and **Corinne Manogue**, Oregon State University

2:00PM (867) *Paradigms in Physics: Multiple Entry Points.*
Corinne Manogue, **Tevian Dray***, **Barbara Edwards**, **David McIntyre** and **Emily van Zee**, Oregon State University

2:00PM (868) *Statistics Online Computational Resource for Education (SOCRE).*
Annie Che*, **Ivo Dinov** and **Juana Sanchez**, University of California at Los Angeles

2:00PM (869) *WeBWorK, a Web-based Interactive Homework System.*
Arnold Pizer*, **Michael Gage** and **Vicki Roth**, University of Rochester

2:00PM (870) *A Comprehensive WeBWorK Problem Library.*
John Jones*, Arizona State University, **Jeff Holt**, University of Virginia, and **William Ziemer**, California State University, Long Beach

2:00PM (871) *Adapting and Implementing Guided Discovery Notes in Combinatorics for Large Classes.*
Mary Flahive, Oregon State University

2:00PM (872) *College Algebra in Southeast Louisiana Post Katrina.*
Randall Wills*, **Sarah Clifton** and **Ana Wills**, Southeastern Louisiana University

2:00PM (873) *Adapting K-8 Mathematics Curricular Materials for Pre-Service Teacher Education.*
Donna Diaz* and **William Moss**, Clemson University

2:00PM (874) *Transforming Science and Mathematics Teacher Preparation.*
James Curry*, **Richard McCray**, **Carl Wieman**, **Valerie Otero** and **William Wood**, University of Colorado at Boulder

2:00PM (875) *Proof, Functions & Computations (A web-based course as a laboratory for enhanced teaching and learning in logic, mathematics, and computer science).*
Wilfried Sieg*, **Joseph Ramsey** and **Klaus Sutner**, Carnegie Mellon University

2:00PM (876) *Math Across the Community College Curriculum.*
Rebecca Hartzler*, Seattle Central Community College, **Christie Gilliland**, Green River Community College, **Deann Leoni**, Edmonds Community College, **Patrick Bibby**, Miami Dade College, and **Ruth Collins**, Delaware Technical and Community College

2:00PM (877) *RUTE: Research for Undergraduates in Theoretical Ecology.*
Glenn Ledder*, **Bo Deng**, **Robert Gibson**, **Irakli Loladze** and **Svata Louda**, University of Nebraska-Lincoln

2:00PM (878) *Phaser: A universal simulator for dynamical systems.*
Huseyin Kocak*, **Brian Coomes** and **Burton Rosenberg**, University of Miami

2:00PM (879) *Mathematicians and Mathematics Educators Collaborating on Capstone Courses for Secondary Mathematics Teachers.*
Richard Hill*, **Sharon Senk** and **Natasha Speer**, Michigan State University

2:00PM (880) *Mathematical Methods for Biology and Medicine.*
Michael Martin*, Johnson County Community College, and **Glenn Ledder**, University of Nebraska-Lincoln

2:00PM (881) *MathematicsModels.org Expansion Project.*
Solomon Garfunkel*, Consortium For Mathematics & Its Applications, and **John Stroyls**, Georgia Southwestern State University

2:00PM (882) *WorkMAP: Students' Mathematical Preparation for Work.*
Solomon Garfunkel*, Consortium For Mathematics & Its Applications, and **Susan Forman**, Bronx Community College

2:00PM (883) *Dynamic Algebra for Technical Students.*
Solomon Garfunkel*, Consortium For Mathematics & Its Applications, and **Susan Forman**, Bronx Community College

2:00PM (884) *Collaborative Development of Java Laboratories for College Algebra and Trigonometry.*
Michael Mays* and **Laura Pyzdrowski**, West Virginia University

2:00PM (885) *College Algebra Reform at HACC.*
Chris Yarrish* and **Dan Fahringer**, Harrisburg Area Community College

2:00PM (886) *Enhancing the Mathematical Foundation of Students through Online Course Modules.*
Beth Klingner, Pace University

2:00PM (887) *Refocusing College Algebra.*
Laurette Foster*, Prairie View A&M University, and **Don Small**, U.S. Military Academy

2:00PM (888) *Center for Data Analysis and Statistics.*
Rod Sturdivant* and **Krista Watts**, U.S. Military Academy

2:00PM (889) *Core Mathematics.*
Alex Heidenberg*, **Jerry Kobylski** and **Don Small**, U.S. Military Academy

2:00PM (890) *UBM: Training Undergraduate Students in Mathematics and Biology at UL Lafayette.*
Azmy Ackleh*, University of Louisiana at Lafayette, **Jacoby Carter**, USGS-National Wetlands Research Center, and **Susan Mopper**, University of Louisiana at Lafayette

2:00PM (891) *Enhancing the Teaching of Linear Algebra with Digital Image Processing.*
Mohamed Allali, Chapman University

2:00PM (892) *Math Questions to Engage Students (Math QUEST).*
Mark Parker*, **Holly Zullo** and **Kelly Cline**, Carroll College

2:00PM (893) *The PascGalois Project: Visualization in Abstract Mathematics.*
Michael Bardzell*, **Kathleen Shannon**, Salisbury University, and **Eirini Poimenidou**, New College of Florida

2:00PM (894) *Classroom Response Systems in Statistics Courses.*
Teri J. Murphy*, **Curtis McKnight**, **Michael Richman** and **Robert Terry**, University of Oklahoma

2:00PM (895) *An Accessible Online Resource for Mathematics Students and Instructors.*
Lila Roberts*, Georgia College & State University, and **Gloria Reece**, Southern College of Optometry

2:00PM (896) *UBM, RUI: Research-Focused Learning Communities in Mathematical †Biology.*
Jason Miller*, **Jon Beck**, **Michael Kelrick** and **Laura Fielden-Rechav**, Truman State University

2:00PM (897) *The Next STEP: Integrating STEM Learning Communities.*
Jason Miller*, **Maria Nagan** and **Jennifer Thompson**, Truman State University

2:00PM (898) *Embedding Chemistry Problems in Calculus Courses.*
George Rublein* and **Robert Orwoll**, College of William and Mary

2:00PM (899) *Real World STEM Application Modules.*
Darren Narayan*, **Moises Sudit**, **Paul Tymann**, **William Basener** and **Matthew Coppenbarger**, Rochester Institute of Technology

2:00PM (900) *A Biomathematical Learning Enhancement Network for Diversity (BLEND).*
Dominic Clemence*, **Mingxiang Chen**, **Gregory Goins**, **Mary Smith**, **Vinaya Kelkar**, **Catherine White**, **Venkateswarlu Divi**, **Yohang Li** and **Gelonia Dent**, North Carolina A&T State University

2:00PM (901) *UBM: Foundation in mathematical biology through interdisciplinary research, training, and curriculum development.*
Bala Krishnamoorthy*, **Richard Gomulkiewicz**, **Robert Dillon**, **Judith McDonald**, **Martin Morgan** and **Charlotte Omoto**, Washington State University

2:00PM (902) *History Across the Mathematics Curriculum for Preservice Teachers.*
Gabriela Sanchis, Elizabethtown College

2:00PM (903) *Interdisciplinary Training of Undergraduates in Biological and Mathematical Sciences with Emphasis on Marine/Coastal Science.*
Tor Kwembe*, **Hyung Cho** and **Zhenbu Zhang**, Jackson State University

2:00PM (904) *CAUSEweb: An Undergraduate Statistics Education Digital Library.*
Ginger Holmes Rowell*, Middle Tennessee State University, **Dennis Pearl**, The Ohio State University, and **Roger Woodard**, North Carolina State University

2:00PM (905) *Inquiry Based Learning in Mathematics.*
Michael Starbird*, **Edward Odell**, **Sarah Simmons** and **Jennifer Smith**, The University of Texas at Austin

2:00PM (906) *The National Curve Bank Project - A MATH Archive.*
Shirley Gray*, California State University Los Angeles, **Bill Austin**, University of Tennessee at Martin, **Phillip Johnson**, Appalachian State University, and **Lou Talman**, Metropolitan State College of Denver

2:00PM (907) *Research Experiences in Mathematical Biology.*
Leslie Wilson*, **Ann Castlefranco**, **Steven Robinow** and **Andrew Taylor**, University of Hawaii

2:00PM (908) *Science Learning Community.*
Mary Kay Abbey, Montgomery College

2:00PM (909) *Renewal of College Algebra.*
Norma Agras*, Miami Dade College, and **J. Michael Pearson**, Mathematical Association of America

2:00PM (910) *PRofessional Enhancement Program (PREP).*
J. Michael Pearson, Mathematical Association of America, **William Haver**, Virginia Commonwealth University, **Nancy Baxter Hastings**, Dickinson College, **Nathaniel Dean**, Texas State University-San Marcos, and **Jon Scott***, Montgomery College

2:00PM (911) *Equipment and Modules for a Capstone Course in Applied Mathematics.*
Dan Goldman, **Michael Booty**, **Bruce Bukiet**, **Lou Kondic** and **Michael Siegel***, New Jersey Institute of Technology

2:00PM (912) *Analysis of Stress in Biological Systems.*
Ben Fitzpatrick*, **Erika Camacho**, **Wendy Binder**, **Kam Dahlquist** and **Gary Kuleck**, Loyola Marymount University

2:00PM (913) *ESP: Enhancing Secondary Mathematics Teacher Preparation.*
Beverly K. Michael*, **Margaret Smith**, **Ellen Ansel** and **Paul Gartside**, University of Pittsburgh

2:00PM (914) *Preparing Computational Biologists by Encouraging an Academic Minor.*
Angelean Hendrix*, **David Senseman**, **Dmitry Gokhman**, **Kay Robbins**, **James Bower** and **Nandini Kannan**, University of Texas at San Antonio

2:00PM (915) *Teaching College Algebra from a Modeling Perspective.*
Tracii Friedman* and **Cathy Bonan-Hamada**, Mesa State College

2:00PM (916) *UBM:Quantitative Systems Biology.*
Guillermo Goldsztein*, **Mark Borodovsky**, **Leonid Bunimovich** and **Jung Choi**, Georgia Institute of Technology

2:00PM (917) *Revitalizing College Algebra at UND.*
Richard Millspaugh*, **Michele Iiams** and **Katrina Nagel**, University of North Dakota

2:00PM (918) *Florida Southern College:† Experiences with Modeling in College Algebra.*
Susan Serrano*, **Daniel Jelsovsky** and **Kenneth Henderson, Jr**, Florida Southern College

2:00PM (919) *College Algebra with Data Analysis.*
Tina Deemer*, **Elias Toubassi** and **Ted Laetsch**, The University of Arizona

2:00PM (920) *Native American-based Materials for Integration into Undergraduate Mathematics Courses.*
Charles Funkhouser*, University of Montana Missoula, **A. Duane Porter**, University of Wyoming, **Armando Martinez-Cruz**, California State University-Fullerton, and **Miles Pfahl**, Turtle Mountain Community College

2:00PM (921) *Undergraduate Biomathematical Research Career Initiative at SUNY-Geneseo.*
Anthony Macula*, **Christopher Leary**, **Gregg Hartvigsen** and **Wendy Pogozelski**, SUNY College at Geneseo

2:00PM (922) *UBM: Undergraduate Training in Quantitative Environmental Biology.*
David Meredith* and **Edward Connor**, San Francisco State University

Project NExT Panel Discussion

2:00 PM – 3:30 PM

Updating the undergraduate mathematics major.

Organizers: **Timothy R. Ray**, Southeast Missouri State University
John W. Thompson, University of Pittsburgh, Johnstown

Panelists: **William H. Barker**, Bowdoin College
Laurette B. Foster, Prairie View A&M University
David O. Lomen, University of Arizona
Paul Zorn, St. Olaf College

Summer Program for Women in Mathematics (SPWM) Reunion

2:00 PM – 4:00 PM

Participants will describe their experiences from past programs.

Organizer: **Murli M. Gupta**, George Washington University

AMS Invited Address

2:15 PM – 3:05 PM

(923) *Gauss composition and generalizations.*
Manjul Bhargava, Princeton University (1023-11-25)

MAA Committee on Technologies in Mathematics Education Panel Discussion

2:30 PM – 3:50 PM

Electronic student assessment systems.

Organizers: **Michael D. Hvidsten**, Gustavus Adolphus College
Bruce W. Yoshiwara, Los Angeles Pierce College

Panelists: **David P. Bell**, Florida Community College
Michael E. Gage, University of Rochester
Jolene Rhodes, Valencia Community College
Phoebe B. Rouse, Louisiana State University

SIGMAA on Quantitative Literacy Panel Discussion

2:30 PM – 3:50 PM

Current practices in quantitative literacy: An interdisciplinary perspective.

Organizer: **Maura B. Mast**, University of Massachusetts, Boston

Panelists: **John A. Winn, Jr**, SUNY Farmingdale
William O. Martin, North Dakota State University
Dogan Comez, North Dakota State University
Robert Kantrowitz, Hamilton College
Mary O'Neill, Hamilton College

SIGMAA on Research in Undergraduate Mathematics Education Panel Discussion

2:30 PM – 4:10 PM

Featured presentations from the Ninth Conference on Research in Undergraduate Mathematics Education.

Organizers: **Chris Rasmussen**, San Diego State University
David E. Meel, Bowling Green State University

Panelists: **Michael Oehrtman**, Arizona State University
Susan Nickerson, San Diego State University
Kyeong Hah Roh, Arizona State University

AMS Session on History

3:00 PM – 3:45 PM

3:00PM ► (924) *Did Fermat inspire Euler to discover the Quadratic Reciprocity Law for prime numbers?*
David J Pengelley, New Mexico State University (1023-01-119)

3:15PM ► (925) *Irrationality, Incommensurability, and the Euclidean Algorithm.*
David A. Steele, University of North Carolina at Asheville (1023-01-1307)

3:30PM ► (926) *Myths of Hypatia.* Preliminary report.
William Roger Fuller, Ohio Northern University (1023-01-1370)

AMS Invited Address

3:20 PM – 4:10 PM

► (927) *A Tale of Three Complexities: the Worst of Times, the Best of Times, the Spring of Hope.*
Margaret H. Wright, Courant Institute of Mathematical Sciences, New York University (1023-68-07)

Joint Prize Session

4:25 PM – 5:25 PM

Joint Prize Session Reception

5:25 PM – 6:25 PM

SIGMAA on the History of Mathematics Guest Lecture

5:45 PM – 6:30 PM

► (928) *The Story of the Euler Story.*
C. Edward Sandifer, Western Connecticut State University (1023-A0-492)

SIGMAA on the Philosophy of Mathematics Annual Meeting and Guest Lecture

5:45 PM – 6:15 PM

Organizers: **Bonnie Gold**, Monmouth University
Kevin M. Iga, Pepperdine University

► (929) *Does a proof exist if nobody has read it?*
Klaus Peters, A K Peters Publishers (1023-A0-1399)

SIGMAA on Business, Industry, and Government Reception

5:45 PM – 6:45 PM

SIGMAA on Quantitative Literacy Annual Business Meeting and Reception

5:45 PM – 6:30 PM

Organizer: **Maura B. Mast**, University of Massachusetts Boston

SIGMAA on Research in Undergraduate Mathematics Education Business Meeting and Presentation of the 2006 RUME Best Paper Award

5:45 PM – 8:15 PM

Organizers: **Chris Rasmussen**, San Diego State University
David E. Meel, Bowling Green State University
Michael Oehrtman, Arizona State University

SIGMAA on Mathematical and Computational Biology Business Meeting and Reception

5:45 PM – 7:00 PM

Organizer: **Eric S. Marland**, Appalachian State University

SIGMAA on Statistics Education Business Meeting

5:45 PM – 7:00 PM

Organizer: **Ginger Holmes Rowell**, Middle Tennessee State University

MAA Two-Year College Reception

5:45 PM – 7:00 PM

Mathematics in Art Presentation

6:00 PM – 6:45 PM

Tetrahedral variations.
Presenter: **Arthur Silverman**, New Orleans sculptor

The Institute in the History of Mathematics and Its Use in Teaching (IHMT) Reunion

6:30 PM – 8:30 PM

All former participants of this MAA project (including those from the Historical Modules Project) are invited.

Young Mathematicians Network Town Meeting

7:30 PM – 8:30 PM

Sunday, January 7

MAA Student Chapter Advisors' Breakfast

7:00 AM – 8:00 AM

Joint Meetings Registration

7:30 AM – 4:00 PM

AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates, III

8:00 AM – 10:55 AM

Organizers: **Darren A. Narayan**, Rochester Institute of Technology
Carl V. Lutzer, Rochester Institute of Technology
Bernard Brooks, Rochester Institute of Technology
Tamas I. Wiandt, Rochester Institute of Technology
Michael J. Fisher, California State University, Fresno

8:00AM *The Nonexistence of Cyclic Difference Sets.*
► (930) **Bridget D Franklin***, University of Kansas, and **Steven Sam**, University of California, Berkeley (1023-05-84)

8:30AM *On the Minimum Vector Rank of a Multigraph.*
► (931) Preliminary report.
Ian A. Rogers, Rose-Hulman Institute of Technology (1023-05-85)

9:00AM *Combinatorial symmetry of the 24-cell via*
(932) *matroids.*
Stephanie Fried*, Grinnell College, **Aydin Gerek**, **Gary Gordon**, Lafayette College, and **Andrija Perunicic**, Bard College (1023-05-318)

9:30AM *Universal Cycles of Multisets.* Preliminary report.
► (933) **Tobias L Johnson***, Yale University, and **Joshua Zahl**, California Institute of Technology (1023-05-448)

10:00AM *Counting Lower Hessenberg Matrices.* Preliminary
► (934) report.
Katherine Victoria Field*, **Hakan Seyalioglu** and **Charles R Johnson**, The College of William and Mary (1023-05-815)

10:30AM (935) *Combinatorial Formulas for an Involution Poset.* **Chelsey A Cooley***, North Carolina State University, and **Nathan Williams**, Carleton College (1023-05-1041)

AMS-MAA Special Session on History of Mathematics, I

8:00 AM – 10:55 AM

Organizers: **Joseph W. Dauben**, Lehman College
Patti Hunter, Westmont College
Victor J. Katz, University of the District of Columbia
Karen H. Parshall, University of Virginia

8:00AM ► (936) *Mathematical Concepts of Infinity in Ancient China.* **Yibao Xu**, Borough of Manhattan Community College of the City University of New York (1023-01-603)

8:30AM ► (937) *An Exploration of Indian Upapatti (Proof) in Nīlakaṇṭha Somayājin.* Preliminary report. **Homer S. White**, Georgetown College, Kentucky (1023-01-244)

9:00AM ► (938) *Is addition a fundamental operation in arithmetic? and other foundational issues in Indian mathematics.* **Kim Plofker**, Providence, RI (1023-01-874)

9:30AM ► (939) *Diagrams — sources hitherto ignored.* **Ken Saito**, Department of Human Sciences, School of Humanities and Social Sciences, Osaka Prefecture University, Japan (1023-01-404)

10:00AM ► (940) *Mirrors of the Sea and Jade: Chinese Mathematics in the Song and Yuan Dynasties.* Preliminary report. **Joseph W. Dauben**, Herbert H. Lehman College, City University of New York (1023-01-619)

10:30AM ► (941) *Geometry and Islamic Art in Tenth-Century Baghdad.* **J. Lennart Berggren**, Simon Fraser University (1023-01-944)

AMS Special Session on Frames and Wavelets in Harmonic Analysis, Geometry, and Applications, I

8:00 AM – 10:50 AM

Organizers: **Palle E. T. Jorgensen**, University of Iowa
David R. Larson, Texas A&M University
Peter R. Massopust, Institute of Biomathematics and Biometry, Neuherberg, and Technical University of Munich
Gestur Olafsson, Louisiana State University

8:00AM (942) *Bases and frames in L^2-spaces in affine iterated function systems (IFS).* **Palle E. T. Jorgensen***, University of Iowa, and **Dorin E. Dutkay**, Rutgers University (1023-42-08)

8:30AM ► (943) *Uncertainty principle for fractals, graphs and metric measure spaces.* Preliminary report. **Kasso A. Okoudjou***, University of Maryland, **Laurent Saloff-Coste**, Cornell University, and **Alexander Teplyaev**, University of Connecticut (1023-42-1115)

9:00AM (944) *Isometries arising from filter functions and wavelets.* Preliminary report. **Judith A Packer**, University of Colorado, Boulder (1023-42-964)

9:30AM (945) *Smooth, well-localized frame wavelets based on new simple wavelet sets in R^2.* Preliminary report. **Kathy D. Merrill**, Colorado College (1023-43-550)

10:00AM (946) *The Dimension Function Of A Rationally Dilated Wavelet Associated With A GMRA.* **Kenneth R. Hoover**, University of Oregon (1023-42-1615)

10:30AM (947) *The Kadison-Singer Problem in Frame Theory and Harmonic Analysis.* **Peter G. Casazza**, University of Missouri (1023-42-75)

AMS Special Session on Group Representations, Ergodic Theory, and Mathematical Physics: Honoring the Memory of George W. Mackey, I

8:00 AM – 10:45 AM

Organizers: **Robert S. Doran**, Texas Christian University
Calvin C. Moore, University of California Berkeley
Robert J. Zimmer, The University of Chicago

8:00AM (948) *Virtual Groups 45 Years Later.* **Calvin C Moore**, University of California Berkeley (1023-22-310)

9:00AM (949) *Induced representations, intertwining operators and transfer.* **James Arthur**, University of Toronto (1023-22-847)

10:00AM ► (950) *Some thoughts about George Mackey and his Imprimitivity theorem.* **Alexandre Kirillov**, University of Pennsylvania, Philadelphia, PA (1023-22-376)

AMS Special Session on Infinite Dimensional Analysis Honoring H.-H. Kuo, I

8:00 AM – 10:50 AM

Organizers: **Ambar N. Sengupta**, Louisiana State University
P. Sundar, Louisiana State University

8:00AM (951) *Complex white noise and infinite dimensional unitary group.* **Takeyuki Hida**, Meijo University (1023-60-1652)

8:30AM Discussion.

9:00AM (952) *The Segal-Bargmann transform for symmetric spaces.* Preliminary report. **Brian C. Hall***, Univ. of Notre Dame, and **Jeffrey J. Mitchell**, Robert Morris University (1023-22-1609)

9:30AM (953) *A new explicit formula for the solution of the Black-Merton-Scholes equation.* Preliminary report. **Jerome A. Goldstein***, University of Memphis, **Rosa Maria Mininni** and **Silvia Romanelli**, Universita di Bari (1023-35-1260)

10:00AM (954) *Kuo's Fourier-Mehler transform and the Lévy Laplacian.* **Kimiaki Saito**, Meijo University (1023-60-967)

10:30AM (955) *Derivation and Applications of Dynamic Boundary Conditions to Nonlinear Partial Differential Equations.* **Gisele Ruiz Goldstein**, University of Memphis (1023-35-1840)

AMS Special Session on Nonlinear Variational Inclusion Problems and Optimization Theory, I

8:00 AM – 10:45 AM

Organizer: **Ram U. Verma**, University of Toledo, and International Publications

8:00AM (956) *Differential Inclusions Driven by Vector Measures and their Optimal Control.*
N.U Ahmed, SITE and Department of Mathematics, University of Ottawa (1023-49-135)

9:00AM (957) *Necessary and Sufficient Conditions for Isolated Local Minima of Nonsmooth Functions.*
Elena Constantin, University of Pittsburgh - Johnstown (1023-49-783)

10:00AM (958) *Multivariate Euler Type Identity and Optimal Multivariate Ostrowski Type Inequalities.* Preliminary report.
George A Anastassiou, University of Memphis (1023-26-184)

AMS Special Session on Numerical Relativity, I

8:00 AM – 10:55 AM

Organizers: **Alexander M. Alekseenko**, California State University Northridge
Arup Mukherjee, Montclair State University

8:00AM (959) *Generalized Harmonic Evolutions of Binary Black Hole Spacetimes.*
Lee Lindblom, Caltech (1023-83-985)

9:00AM (960) *On the uniqueness of asymptotically AdS space-times.* Preliminary report.
Mingliang Cai, University of Miami, and **Jie Qing***, UC Santa Cruz (1023-53-912)

9:30AM (961) *Quantum mechanical healing of classical spacetime singularities.*
Deborah A. Konkowski*, U.S. Naval Academy, and **Thomas M. Helliwell**, Harvey Mudd College (1023-83-666)

10:00AM (962) *Blowup of smooth solutions for relativistic Euler equations.*
Ronghua Pan*, Georgia Institute of Technology, and **Joel A. Smoller**, The University of Michigan (1023-35-1197)

10:30AM (963) *Linearized Stability of the Schwarzschild Black Hole.*
Joel A. Smoller, University of Michigam (1023-83-830)

AMS Special Session on Arithmetic of Function Fields, I

8:00 AM – 10:45 AM

Organizers: **Allison M. Pacelli**, Williams College
Michael J. Rosen, Brown University

8:00AM (964) *Heegner points and the rank of elliptic curves over large extensions of global fields.*
Bo-Hae Im*, Chung-Ang University, Seoul, Korea, and **Florian Breuer**, University of Stellenbosch (1023-11-1030)

8:30AM (965) *Ranks of abelian varieties in towers of function fields.*
Douglas Ulmer, University of Arizona (1023-11-1368)

9:00AM (966) *Families of Twists and Inverse Galois.* Preliminary report.
Chris Hall, University of Texas at Austin (1023-11-600)

9:30AM (967) *Euler systems in algebraic function fields over a finite field.*
David R. Hayes, University of Massachusetts at Amherst (1023-12-719)

10:00AM (968) *Galois groups of difference equations and algebraic relations among periods of Drinfeld modules.* Preliminary report.
Chieh-Yu Chang, National Tsing-Hua University, and **Matthew Papanikolas***, Texas A&M University (1023-11-1542)

AMS Special Session on Universal Algebra and Order, I

8:00 AM – 10:40 AM

Organizers: **John W. Snow**, Sam Houston State University
Japheth Wood, Bard College

8:00AM (969) *Characterizing Lattice Terms.* Preliminary report.
John W. Snow*, Sam Houston State University, and **Eric J. Martin**, University of Waterloo (1023-06-408)

8:30AM ► (970) *Eliminating Eve's Eavesdropping (or How to Stop a Snoop).*
Kristen Meyer, Wisconsin Lutheran College (1023-94-192)

9:00AM (971) *Density and Ordered Algebraic Structures.*
George Metcalfe, Vanderbilt University (1023-06-324)

9:30AM ► (972) *On the automorphisms of the congruence lattice of the semilattice* $\mathbf{2}^n$. Preliminary report.
John W. Snow, Sam Houston State University, and **Eric J. Martin***, University of Waterloo (1023-06-399)

10:00AM (973) *Existence theorems for weakly symmetric operations.*
Ralph McKenzie, Vanderbilt University (1023-08-186)

AMS Special Session on Microlocal Analysis and Singular Spaces, II

8:00 AM – 10:40 AM

Organizers: **Paul A. Loya**, Binghamton University
Andras Vasy, Massachusetts Institute of Technology

8:00AM (974) *Invisibility and singular metrics.*
Allan Greenleaf, University of Rochester, **Matti Lassas**, Helsinki University of Technology, and **Gunther Uhlmann***, University of Washington (1023-35-454)

9:00AM (975) *Tensor Tomography and Boundary and Lens Rigidity of Riemannian manifolds.* Preliminary report.
Plamen Stefanov, Purdue University (1023-35-977)

10:00AM (976) *Reduction of artifacts for two sided folds.*
Raluca Felea, Rochester Institute of Technology (1023-42-548)

AMS Special Session on Continuous and Discrete Integrable Systems and Their Applications, I

8:00 AM – 10:55 AM

Organizers: **Wen-Xiu Ma**, University of South Florida
Taixi Xu, Southern Polytechnic State University
Bao-Feng Feng, University of Texas-Pan American

Zhijun Qiao, University of Texas-Pan American

8:00AM (977) *Long time bounds on higher derivatives of nearly integrable equations.* Preliminary report.
Jerry L Bona, University of Illinois at Chicago (1023-35-1019)

8:30AM (978) *On solitonless semiclassical solutions for the focusing Nonlinear Schroedinger Equation.* Preliminary report.
Alexander Tovbis, University of Central Florida (1023-35-775)

9:00AM (979) *New integrable hierachies from vertex operators representations of plynomial Lie algebras.*
Paolo Casati, Universita' Milano Bicocca (1023-58-841)

9:30AM (980) *Integrable Couplings and Semi-Direct Sums of Lie Algebras.*
Wen-Xiu Ma, University of South Florida (1023-58-1005)

10:00AM (981) *Stability analysis of persisting periodic solutions to a Complex Ginzburg Landeau perturbation of the nonlinear Shrodinger equation.*
Stephane Lafortune, College of Charleston (1023-35-1135)

10:30AM (982) *On an integrable symmetric* (2 + 1)*-dimensional Lotka-Volterra equation and the corresponding modified* (2 + 1)*-dimensional Lotka-Volterra equation.*
H. B. Hu, Institute of Computational Mathematics and Scientific Engineering Computing, AMSS, Chinese Academy of Sciences, **C. X. Li***, Tsinghua University, and **J. J. C. Nimmo**, University of Glasgow (1023-35-1063)

AMS Session on Combinatorics, I

8:00 AM – 10:55 AM

8:00AM (983) *Asymptotic Bounds for Permutations Containing Many Different Patterns.*
Alison B Miller, Harvard University (1023-05-1057)

8:15AM (984) *The Metric Dimension of the Cayley Digraphs of Finite Abelian Groups.*
Angela S. Hicks, Furman University (1023-05-1062)

8:30AM ► (985) *Alliance Partitions in Graphs.* Preliminary report.
Ralucca M Gera*, Naval Postgraduate School, and **Linda Eroh**, University of Wisconsin Oshkosh (1023-05-1067)

8:45AM ► (986) *Counting Isomorphic (16,6,2) Configurations to a particular (16,6,2) Design.*
Sharon L Sullivan, Catawba College (1023-05-1151)

9:00AM (987) *Generalized correlation matrices and their relation to the de Bruijn Graph.*
Irina Gheorghiciuc, University of Delaware (1023-05-1173)

9:15AM ► (988) *Local Properties of Colored Trees.*
Rachel Esselstein, Dartmouth College (1023-05-1183)

9:30AM ► (989) *From a Banquet Seating Problem to a Graph Coloring Problem.*
Ping Zhang, **Futaba Okamoto*** and **Mary Radcliffe**, Western Michigan University (1023-05-1206)

9:45AM ► (990) *A Study of Code Switching in Coding Theory.*
Chen-Han Sung, Texas A&M International University (1023-05-122)

10:00AM (991) *Disjunctive Rado Numbers for some Linear Equations.*
Carl D. Mueller*, Georgia Southwestern State University, and **Daniel Schaal**, South Dakota State University (1023-05-1228)

10:15AM ► (992) *Forcing hexagons in a hexagonal system.* Preliminary report.
Zhongyuan Che*, Penn State University, Beaver Campus, and **Zhibo Chen**, Penn State University, McKeesport Campus (1023-05-1252)

10:30AM ► (993) *Distance Graphs on the Integers.*
Tristan Denley and **Joshua Hanes***, University of Mississippi (1023-05-1340)

10:45AM ► (994) 2*-Regular Leaves of Partial* 10*-cycle Systems.* Preliminary report.
D J Ashe, University of Tennessee at Chattanooga (1023-05-271)

AMS Session on Analysis and Ordinary Differential Equations, III

8:00 AM – 8:40 AM

8:00AM (995) *Impact of Travel Between Patches for Spatial Spread of Disease.*
Lin Wang, University of British Columbia (1023-34-489)

8:15AM ► (996) *Regularization of Simultaneous Binary Collisions and Periodic Solutions with Singularity in the Collinear Four-Body Problem.*
Tiancheng Ouyang, Brigham Young University, and **Zhifu Xie***, College of William & Mary (1023-34-531)

8:30AM (997) *Pattern Formation on Growing Square Domains.*
Adela Nicoleta Comanici*, Rice University, and **Martin Golubitsky**, University of Houston (1023-34-549)

AMS General Session

8:00 AM – 8:55 AM

8:00AM (998) *Computing local L-factors for principal series representations of* $Sp_4(F)$ *and* $\widetilde{Sp_4(F)}$ *over p-adic fields.* Preliminary report.
Christian A Zorn, University of Maryland, College Park (1023-00-1200)

8:15AM ► (999) *Critical Mathematics: Enhancing the equity principle in mathematics methods courses.*
Elizabeth M de Freitas, Adelphi University, NY (1023-00-1499)

8:30AM (1000) *The Generalized Extension Principle in Fuzzy Set Theory and Its Applications.* Preliminary report.
Zengxiang Tong, Otterbein College (1023-00-1677)

8:45AM (1001) *Neo-Riemannian Permutations.*
Franck Jedrzejewski, French Atomic Energy Commission (CEA) (1023-00-560)

AMS Session on Geometry and Topology, III

8:00 AM – 10:40 AM

8:00AM (1002) *Some results on shifts on o-dimensional compacta.* Preliminary report.
Minaksundaram Rajagopalan, Tennessee State University (1023-54-246)

8:15AM (1003) *On the Spectrum of Operators on Banach Spaces.* Preliminary report.
Mohammed Yahdi, Ursinus College (1023-54-473)

8:30AM (1004) *An Interesting Map on the Hilbert Cube.* Preliminary report.
Kailash C Ghimire, Oregon State University (1023-54-502)

8:45AM (1005) *Preimages Under $f(z) = z^n$ of Continua in the Complex Plane.* Preliminary report.
R Patrick Vernon, Tulane University (1023-54-521)

9:00AM (1006) *Any Hausdorff compactification of X obtained by a semi-Wallman base for X.* Preliminary report.
Hueytzen J Wu*, Texas A&M University - Kingsville, and **Wan-Hong Wu**, Institute for Drug Development, Cancer Therapy & Research Center (1023-54-700)

9:15AM Break.

9:30AM (1007) *Colie algebras and orbit configuration spaces of lens spaces.* Preliminary report.
Matthew Sean Miller, University of Oregon (1023-55-1225)

9:45AM (1008) *Canonical genus and the Whitehead doubles of pretzel knots.* Preliminary report.
Mark Brittenham, University of Nebraska - Lincoln, and **Jacqueline A Jensen***, Sam Houston State University (1023-55-1256)

10:00AM (1009) *Homotopy classification of a bilinear map related to octonion polynomial multiplications.*
Hugo Rodríguez Ordóñez, Colorado State University-Pueblo (1023-55-1314)

10:15AM (1010) *Polynomial quandle cocycles and obstructions to embedding disjoint union of tangles.*
Kheira Ameur, University of South Florida (1023-55-1407)

10:30AM (1011) *Solving Deligne's Conjecture via Polytopes.* Preliminary report.
Rachel Schwell, University of Connecticut (1023-55-1445)

9:15AM (1017) *Analytically tractable approximation of a forest individual-based simulator.*
Nikolay S Strigul*, Department of Ecology and Evolutionary Biology, Princeton University, **Denis Pristinski**, Stevens Institute of Technology, and **Stephen Pacala**, Department of Ecology and Evolutionary Biology. Princeton University. (1023-92-1427)

9:30AM ► (1018) *Application of Matrix Tree Theorem in Chinese Medicine.*
Najia Bao, University of Georgia (1023-92-148)

9:45AM (1019) *Competitive Exclusion and Coexistence in a Nonlinear Refuge-Mediated Selection Model.*
Youssef M Dib, University of Louisiana Lafayette (1023-92-1516)

10:00AM (1020) *A Dynamical Model of Influenza A Virus Infection and Its Clinical and Epidemiological Relevance.*
Baris Hancioglu*, **David Swigon** and **Gilles Clermont**, University of Pittsburgh (1023-92-1523)

10:15AM (1021) *A discrete competition model using a numbercal method.* Preliminary report.
Wendy Jacqueline Hernandez-Padilla* and **Lih-Ing Wu Roeger**, Texas Tech University (1023-92-1544)

10:30AM ► (1022) *Markov process modeling of biochemical reaction kinetics.*
Dmitry A Kondrashov*, Department of Biochemistry, University of Wisconsin - Madison, **George N. Phillips**, Deparment of Biochemistry and Computer Science, University of Wisconsin - Madison, and **Joseph C. Watkins**, University of Arizona (1023-92-1576)

10:45AM (1023) *The Effect of Static and Dynamic Spatially Structured Disturbances on a Locally Dispersing Population Model.*
David E Hiebeler, University of Maine, and **Benjamin R Morin***, Oregon State University (1023-92-642)

AMS Session on Applications of Mathematics, III

8:00 AM – 10:55 AM

8:00AM (1012) *Stochastic Metapopulation Models for Patch Occupancy.*
Amy J. Drew* and **Linda J. S. Allen**, Texas Tech University (1023-92-1055)

8:15AM (1013) *Uniqueness of an equilibrium for a discrete selection-migration model in population genetics.*
James F. Selgrade*, North Carolina State University, and **James H. Roberds**, USDA Forest Service (1023-92-1230)

8:30AM ► (1014) *Dynamics of Closely Coupled Nephrons.*
Saziye Bayram, SUNY-Buffalo State College (1023-92-1295)

8:45AM ► (1015) *Purinergic Receptor Signaling in the RAW 264.7 Macrophage: Modeling Species-Specific Diacylglycerol Dynamics Following Receptor Activation by Uridine 5'-Diphosphate.*
Hannah L Callender, Vanderbilt University (1023-92-1324)

9:00AM (1016) *Asymptotic Profiles of the Steady States for an SIS Epidemic Patch Model.*
L. J.S. Allen, Texas Tech University, **B. M. Bolker**, Department of Biology, University of Florida, **Y. Lou**, The Ohio State University, and **A. L. Nevai***, Mathematical Biosciences Institute, The Ohio State University (1023-92-1364)

AMS Session on Education

8:00 AM – 10:25 AM

8:00AM ► (1024) *Making Physiology Significant and Statistics Meaningful.*
Mary F. Majerus* and **April Collins-Potterfield**, Westminster College (1023-97-1012)

8:15AM (1025) *Teaching to succeed.*
Natali Hritonenko* and **Edward Mason**, Prairie View A&M University (1023-97-1169)

8:30AM ► (1026) *Conceptions of infinitesimals in undergraduate calculus students and in history.*
Robert E Ely, University of Wisconsin-Madison (1023-97-1301)

8:45AM ► (1027) *An Overview of Ohio Northern University's Mathematical Assessments being used to Satisfy NCATE's New Guidelines.* Preliminary report.
Sandy Schroeder, Ohio Northern Universtiy (1023-97-1389)

9:00AM ► (1028) *Engaging Students in College Algebra.*
Juli D'Ann Ratheal, West Texas A & M University (1023-97-313)

9:15AM ► (1029) *A Fertile Ground for Undergraduate Research: Cryptography.* Preliminary report.
Manmohan Kaur, Benedictine University (1023-97-465)

9:30AM (1030) *Japanese High School Mathematics Teacher Competence in Real World Problem Solving and its Implication for the Use of Modeling to Improve Japanese Mathematics Education.*
Kazuko Ito West, Keio Academy of New York (1023-97-56)

► 9:45AM (1031) *The Reasoning of Bayesian and Empirical Bayes Analysis in Undergraduate Statistics Education.*
Zhao Chen, Florida Gulf Coast University (1023-97-677)

10:00AM (1032) *The process and impact of implementing performance standards in mathematics.*
Samuel Obara, Texas State University, San Marcos (1023-97-823)

► 10:15AM (1033) *Girls Can Do Math, But Most Don't Due to Cultural Factors.*
Janet E Mertz, University of Wisconsin – Madison (1023-97-971)

MAA Session on Building Diversity in Advanced Mathematics: Models that Work, I

8:00 AM – 10:55 AM

Organizers: **Patricia Hale**, California State Polytechnic University, Pomona
Abbe H. Herzig, University of Albany, SUNY

8:00AM (1034) *Case Study: My Experience Teaching Mathematics to a Student Who is Blind.*
Richard P Spindler, Bemidji State University (1023-E1-231)

► 8:20AM (1035) *Improving engineering student retention by enhancing their mathematical preparation in a case study at the University of Michigan.*
Zsolt Lavicza, University of Cambridge, **Darryl M Koch** and **Helen Siedel***, University of Michigan (1023-E1-1111)

8:40AM (1036) *Summary Undergraduate Research Program at Clayton State University.*
Aprillya Lanz, Clayton State University (1023-E1-1797)

► 9:00AM (1037) *Bifurcation and Chaos in One-dimensional Discrete Dynamical Systems (BaC): A National Research Experience for Undergraduates Program Attracting a Diverse Group of Mathematics Students.* Preliminary report.
Mazen Shahin*, Delaware State University, and **Elena Surovyatkina**, Space Research Institute, Russian Academy of Science, and Delaware State University (1023-E1-565)

► 9:20AM (1038) *Coloring Groups in Jersey City and Park City.* Preliminary report.
Brian Hopkins* and **Stephanie Charles**, Saint Peter's College (1023-E1-1428)

► 9:40AM (1039) *Vertically Integrated Workshop for Women in Mathematics.* Preliminary report.
Sarah J. Greenwald* and **Katherine Mawhinney***, Appalachian State University (1023-E1-390)

10:00AM (1040) *Center for Women in Mathematics at Smith College.*
Ruth Haas* and **James Henle**, Smith College (1023-E1-764)

► 10:20AM (1041) *Advance Program at NMSU: A Formalized Mentoring for STEM faculty.*
Tiziana Giorgi, New Mexico State University (1023-E1-1217)

► 10:40AM (1042) *The Importance of Community in Supporting Diverse Learners in Mathematics.*
Abbe H. Herzig, University at Albany, State University of New York (1023-E1-481)

MAA Session on Countering "I Can't Do Math": Strategies For Teaching Under-Prepared, Math-Anxious Students, I

8:00 AM – 10:55 AM

Organizers: **Winston Crawley**, Shippensburg University
Kim Presser, Shippensburg University

► 8:00AM (1043) *Games and Hands-on Activities in Introductory Mathematics Course for Non-Majors.*
Annela R Kelly, Roger Williams University (1023-G5-1869)

► 8:20AM (1044) *Thinking of Using Software? Why it Works for Us!*
Sue R Beck, Morehead State University (1023-G5-242)

► 8:40AM (1045) *I Can Prove It!*
J A Hall, Longwood University; Farmville, VA (1023-G5-958)

9:00AM (1046) *Engaging Students in Quantitative Reasoning: Activities, Real Data, and Relevant Issues.*
Kay Somers* and **Alicia Sevilla**, Moravian College (1023-G5-678)

9:20AM (1047) *Breaking student math anxiety by doing something different.*
Ed D. Laughbaum, The Ohio State University (1023-G5-799)

► 9:40AM (1048) *Reading, Writing, and How Not to be a Fat Head.* Preliminary report.
Trisha Moller, DeSales University (1023-G5-766)

10:00AM Break.

► 10:20AM (1049) *So They Don't Want to Hear About Math? Tell a Story Instead.* Preliminary report.
Carlos R Bovell, Mercer County Community College (1023-G5-150)

► 10:40AM (1050) *Overcoming Students' Anxiety With Translation Problems via Polya.*
Tim Jacobbe, Clemson University (1023-G5-45)

MAA Session on Teaching Operations Research in the Undergraduate Classroom

8:00 AM – 10:50 AM

Organizers: **Gerald Kobylski**, United States Military Academy
Steve Horton, United States Military Academy
Christopher J. Lacke, Rowan University
William Fox, Francis Marion University

► 8:00AM (1051) *A Freshman Introduction to Operations Research.* Preliminary report.
Heather Stevenson, United States Military Academy (1023-R1-1775)

► 8:25AM (1052) *Redesign of Undergraduate Mathematical Optimization.* Preliminary report.
A. Bathi Kasturiarachi, Kent State University, Stark Campus (1023-R1-1679)

8:50AM (1053) *So, You Think That You Have Problems?*
Christopher J Lacke, Rowan University (1023-R1-1522)

► 9:15AM (1054) *Project MathWORKS! Introducing Systems Engineering to High Schools.* Preliminary report.
Jason C McKay* and **Ernest Y Wong**, United States Military Academy (1023-R1-1447)

9:40AM (1055) *Linear Optimization: The Simplex Workbook.* Preliminary report.
Glenn Hurlbert, Arizona State University (1023-R1-938)

10:05AM ► (1056) *Applications of Computer Technology in an Undergraduate Probability Curriculum.* Preliminary report.
Randal E. Hickman, United States Military Academy, West Point, NY (1023-R1-1393)

10:30AM (1057) *Teaching Mathematical Modeling/ Quantitative Analysis as part of a core sequence to Students without a Calculus.*
William P. Fox, Naval Postgraduate School (1023-R1-623)

MAA Session on The Mathematics of Sudoku and Other Puzzles, I

8:00 AM – 10:55 AM

Organizer: **Laura A. Taalman**, James Madison University

8:00AM ► (1058) *Cayley-Sudoku tables: An undergraduate research project.* Preliminary report.
Jennifer Carmichael and **Michael B. Ward***, Western Oregon University (1023-M1-298)

8:20AM ► (1059) *Row-Filled Completion Problem for Sudoku Latin Squares.*
Izabela Kanaana*, Sonoma State University, and **Bala Ravikumar**, Department of Computer Science, Sonoma State University (1023-M1-1559)

8:40AM (1060) *A Computer Alogrithm for Solving Sudoku.*
Philip A. Cobb, Queensborough Community College (1023-M1-275)

9:00AM ► (1061) *Sudoku Studio.*
Jonathan M Kane, University of Wisconsin – Whitewater (1023-M1-532)

9:20AM ► (1062) *A Java Program to Solve Kakuro Puzzles.*
Charles Ashbacher, Mount Mercy College (1023-M1-493)

9:40AM ► (1063) *A Hard Day's Knight.*
Joe DeMaio, Kennesaw State University (1023-M1-182)

10:00AM ► (1064) *Classroom Uses for the Game of "Dots": A Simple Bridge to Advanced Ideas.*
Carrie Muir, University of Colorado - Boulder (1023-M1-1766)

10:20AM ► (1065) *SET and Combinatorics.*
Anna Bickel and **Zsuzsanna Szaniszlo***, Valparaiso University (1023-M1-281)

10:40AM ► (1066) *Using SET to Visualize Higher Mathematics.* Preliminary report.
Ben Coleman and **Kevin Hartshorn***, Moravian College (1023-M1-1917)

MAA General Contributed Paper Session, V

8:00 AM – 10:55 AM

Organizers: **Eric S. Marland**, Appalachian State University
Jay A. Malmstrom, Oklahoma State Community College

8:00AM ► (1067) *A Closer Look at the Crease Length Problem.*
S F Ellermeyer, Kennesaw State University (1023-Z1-213)

8:15AM ► (1068) *Visualizing Elastic Wave Interactions with Multiple Interfaces.*
Richard J. Marchand, Slippery Rock University (1023-Z1-1448)

8:30AM ► (1069) *Double Layers, Solid Angles and Cubic Splines: Fun With a Well in a Stratified Aquifer.* Preliminary report.
Kenneth H Luther, Valparaiso University (1023-Z1-575)

8:45AM ► (1070) *Particle Tracking in Three-Dimensional Flows: Evolution and Refinement of a Smooth Surface.*
Paul von Dohlen*, William Paterson University, and **Patrick Miller**, Stevens Institute of Technology (1023-Z1-1339)

9:00AM ► (1071) *A Glimpse of Infinite-dimensional Tensegrities.* Preliminary report.
Ted Ashton, University of Georgia (1023-Z1-1680)

9:15AM ► (1072) *Mathematical modelling of rumor transmission during a dialogue.*
Bernard P Brooks*, **Nicholas DiFonzo** and **David S Ross**, Rochester Institute of Technology (1023-Z1-1659)

9:30AM ► (1073) *Seeing sums of single digit numbers.*
Cynthia A Crumb, University of South Alabama, Mobile, AL (1023-Z1-1334)

9:45AM ► (1074) *A Comparison of Online Homework Systems.* Preliminary report.
Jessica K. Sklar* and **Mei Zhu**, Pacific Lutheran University (1023-Z1-127)

10:00AM ► (1075) *The Birthday Problem: The Making of a Classic.*
Dale K Hathaway, Olivet Nazarene University (1023-Z1-250)

10:15AM ► (1076) *π to (hundreds of) thousands of digits, from Vieta's formula.*
Rick Kreminski, Texas A&M University - Commerce (1023-Z1-585)

10:30AM ► (1077) *Amazing Explorations.* Preliminary report.
Dennis P Walsh, Middle Tennessee State University (1023-Z1-1830)

10:45AM ► (1078) *Early Nineteenth Century Elementary Algebra Textbooks.*
Andrew B. Perry, Springfield College (1023-Z1-287)

PME Council

8:00 AM – 11:00 AM

MAA Invited Address

9:00 AM – 9:50 AM

(1079) *The Genome Project for Three-Manifolds.*
Jeffrey F. Brock, Brown University (1023-A0-23)

ASL Invited Address

9:00 AM – 9:50 AM

(1080) *Reducts of Omega-Categorical Theories.*
Carol S. Wood, Wesleyan University (1023-03-414)

MAA Minicourse #12: Part B

9:00 AM – 11:00 AM

Combinatorially thinking.

Organizers: **Arthur T. Benjamin**, Harvey Mudd College
Jennifer J. Quinn, Association for Women in Mathematics

MAA Minicourse #1: Part B

9:00 AM – 11:00 AM

Introduction to the mathematics of modern cryptography.

Organizers: **Colm K. Mulcahy**, Spelman College
Jeffrey Ehme, Spelman College

MAA Minicourse #8: Part B

9:00 AM – 11:00 AM

Mathematics and geometry of voting.

Organizer: **Donald G. Saari**, University of California Irvine

MAA Session on How to Start and Develop Undergraduate Level Financial Mathematics Programs

9:00 AM – 10:20 AM

Organizer: **Youngna Choi**, Montclair State University

9:00AM ► (1081) *Financial Mathematics in a Mathematically Accurate but Accessible Way.* **Morteza Shafii-Mousavi**, Indiana University South Bend (1023-I5-28)

9:30AM ► (1082) *Starting a B.S. in Mathematics-Mathematics of Finance Concentration Track: case of Montclair State University.* Preliminary report. **Youngna Choi**, Montclair State University (1023-I5-1354)

10:00AM ► (1083) *The Mathematics of Refinancing.* Preliminary report. **Youngna Choi** and **Crystal K Dahlhaus***, Montclair State University (1023-I5-1356)

MAA Panel Discussion

9:00 AM – 10:20 AM

The top ten things you should know if you intend to implement the standards of Beyond Crossroads.

Organizer: **Richelle Blair**, Lakeland Community College

Panelists: **Kathy Mowers**, Owensboro Community and Technical College
Robert L. Kimball, Jr, Wake Technical Community College
Brad Chin, West Valley College
Richelle Blair

MAA Panel Discussion

9:00 AM – 10:20 AM

Calculus, liberal arts, and quantitative literacy.

Organizer: **Richard A. Gillman**, Valparaiso University

Panelists: **William E. Briggs**, University of Colorado, Denver
Deborah Hughes-Hallett, University of Arizona
Michael Starbird, University of Texas at Austin
Richard A. Gillman

Project NExT Panel Discussion

9:00 AM – 10:30 AM

Publishing undergraduate research and expository articles.

Organizers: **Chawne M. Kimber**, Lafayette College
Kimberly A. Roth, Wheeling Jesuit University

Panelists: **Ezra A. Brown**, Virginia Polytechnic Institute & State University
Paul J. Campbell, Beloit College
Clifford A. Reiter, Lafayette College
Jody Sorensen, Augsburg College

AMS Special Presentation on Congressional Fellowships

9:30 AM – 10:55 AM

Learn about this program and speak with former Fellows.

Organizer: **Samuel M. Rankin, III**, AMS

Presenters: **David Weinreich**, AMS Congressional Fellow 2005-06
Dan Ullman, AMS Congressional Fellow 2006-07

Exhibits and Book Sales

9:30 AM – 5:30 PM

ASL Invited Address

10:00 AM – 10:50 AM

(1084) *Almost everywhere domination.* **Reed Solomon**, University of Connecticut, Storrs (1023-03-413)

Math on the Web, III

10:00 AM – 5:05 PM

10:00AM (1085) *Project CALC on the Web.* **David Smith**, Duke University

12:30PM (1086) *The MathFind search engine.* **Robert Miner**, Design Science, Inc.

1:15PM (1087) *Interactive math on the Web by Maplesoft.* **Mohamed Bendame**, Maplesoft

2:00PM (1088) *Online assessment and problem-solving environments: The advantages of using content MathML.* **Don DeLand**, Integre Technical Publishing Co.

2:45PM (1089) *PlanetMath and free mathematics.* **Aaron Krowne**, Emory University

3:15PM (1090) *Using MathML with Blackboard and WebCT.* **Bob Mathews**, Design Science, Inc.

4:00PM (1091) *WebALT online courses.* **Mika Seppälä**, WebALT

4:45PM (1092) *Techniques for using the equation editor in Blackboard and WebCT.* **Bob Mathews**, Design Science, Inc.

AMS Invited Address

10:05 AM – 10:55 AM

(1093) *Extensions of Hilbert's Tenth Problem.* **Bjorn Poonen**, University of California, Berkeley (1023-03-06)

AMS-MAA Invited Address

11:10 AM – NOON

(1094) *Statistics for smart people who don't know anything about statistics.*
Persi W. Diaconis, Stanford University (1023-62-32)

AMS Colloquium Lecture: Lecture III

1:00 PM – 2:00 PM

(1095) *Limit shapes, real and imagined, III: Instantons, and how random surfaces count them.*
Andrei Okounkov, Princeton University (1023-60-04)

ASL Invited Address

1:00 PM – 1:50 PM

(1096) *Independence and equiconsistency results in intuitionistic set theory.*
Michael Rathjen, Ohio State University and University of Leeds (1023-03-412)

MAA Student Lecture

1:00 PM – 1:50 PM

► (1097) *Mathematics: A Question of History.*
Della D. Fenster, University of Richmond (1023-A0-24)

AMS Current Events Bulletin

1:00 PM – 4:45 PM

Organizer: **David Eisenbud**, Mathematical Sciences Research Institute

1:00PM ► (1098) *Barcodes: The Persistent Topology of Data.*
Robert Ghrist, University of Illinois, Urbana-Champaign (1023-55-1038)

2:00PM ► (1099) *Flows on the space of lattices: work of Einsiedler, Katok and Lindenstrauss.*
Akshay Venkatesh, Courant Institute of Mathematical Sciences (1023-37-778)

3:00PM (1100) *From harmonic analysis to arithmetic combinatorics.*
Izabella Laba, UBC (1023-42-1431)

4:00PM (1101) *The structure of error terms in number theory and an introduction to the Sato-Tate Conjecture.*
Barry Mazur, Harvard University (1023-11-1245)

AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates, IV

1:00 PM – 5:55 PM

Organizers: **Darren A. Narayan**, Rochester Institute of Technology
Carl V. Lutzer, Rochester Institute of Technology
Bernard Brooks, Rochester Institute of Technology
Tamas I. Wiandt, Rochester Institute of Technology
Michael J. Fisher, California State University, Fresno

1:00PM ► (1102) *Computational Efficiency in Weyl Groups.* Preliminary report.
Patricia R Cahn*, **Juan Li**, Smith College, and **Jeremy Schwartz**, Brandeis University (1023-08-1056)

1:30PM ► (1103) *An equivalent characterization of half-factorial restricted block monoids over $\mathbb{Z}$ and torsion groups, with applications to factorization in Dedekind domains.* Preliminary report.
R D Kravitz, Williams College (1023-13-132)

2:00PM ► (1104) *Matrix Generation of the Diophantine Solutions to Sums of $3 \leq n \leq 9$ Squares that are Square.*
Jordan O Tirrell* and **Clifford A Reiter**, Lafayette College (1023-11-626)

2:30PM ► (1105) *Looking for Patterns in Multinomial Coefficients.* Preliminary report.
Igor Konfisakher*, Washington University in St. Louis, and **Michael Wijaya**, University of Rochester (1023-11-472)

3:00PM ► (1106) *Number Base Representations in the Gaussian Integers.* Preliminary report.
Heather J Langdon, St. Mary's College of Maryland (1023-11-854)

3:30PM ► (1107) *Orders at Infinity of Modular Forms with Heegner Divisors.*
Carl Erickson*, Stanford University, **Alison Miller**, Harvard University, and **Aaron Pixton**, Princeton University (1023-11-80)

4:00PM ► (1108) *The number of ways of expressing t as a binomial coefficient.*
Daniel Mertz Kane, Massachusetts Institute of Technology (1023-11-1083)

4:30PM ► (1109) *Realizations of subspaces of L_p, $p > 2$, with norm given by partitions and weights.*
Brandon P Barrette* and **Simei Tong**, University of Wisconsin-Eau Claire (1023-46-86)

5:00PM ► (1110) *Surfaces with Density and their Isoperimetric Regions.*
Robin S Walters, Harvard University (1023-53-898)

5:30PM ► (1111) *Self-similar periodic tilings of nilpotent Lie groups.* Preliminary report.
James J. Rohal*, College of Wooster, and **William P. Hudelson**, University of Notre Dame (1023-22-808)

AMS-MAA Special Session on History of Mathematics, II

1:00 PM – 5:55 PM

Organizers: **Joseph W. Dauben**, Lehman College
Patti Hunter, Westmont College
Victor J. Katz, University of the District of Columbia
Karen H. Parshall, University of Virginia

1:00PM ► (1112) *The ellipse seen from China.* Preliminary report.
Andrea Breard, Université des Sciences et Technologies de Lille; Laboratoire Paul Painlevé (1023-01-930)

1:30PM ► (1113) *The Other Book Nobody Read: Georg Rheticus and the Opus Palatinum.*
Glen R Van Brummelen, Quest University (1023-01-749)

2:00PM (1114) *Communicating Mathematics in the Journal des savants (1675-1737).*
Jeanne Peiffer, CNRS Paris (1023-01-1077)

2:30PM ► (1115) *Problems of Infinitesimals: Descartes, Leibniz, and Peirce.*
Maria Sol de Mora, University of Basque Country (1023-01-610)

3:00PM ► (1116) *Motivation and Context for B. Peirce's Linear Associative Algebra.* Preliminary report.
Deborah A. Kent, Simon Fraser University (1023-01-683)

3:30PM ► (1117) *Robert Leslie Ellis on the misuse of the principle of insufficient reason.*
Byron E. Wall, York University, Toronto, Canada (1023-01-946)

4:00PM ► (1118) *The Mittag-Leffler Theorem: Interpretation and Reception of a Mathematical Result, 1876-1884.* Preliminary report.
Laura E Turner* and **Thomas Archibald**, Simon Fraser University (1023-01-291)

4:30PM (1119) *A Political and Mathematical Unification: The Case of Nineteenth-Century Italy.*
Laura Martini, Siena, Italy (1023-01-296)

5:00PM (1120) *Mathematics in Brazil during the first half of the 20th century: institutionalization and professionalization.*
Sergio Nobre, UNESP - Rio Claro - Brazil (1023-01-722)

5:30PM ► (1121) *Mathematics and pacifism in Cambridge 1915-1916: a student perspective.*
June Barrow-Green, The Open University, Milton Keynes, UK (1023-01-226)

AMS Special Session on Frames and Wavelets in Harmonic Analysis, Geometry, and Applications, II

1:00 PM – 5:50 PM

Organizers: **Palle E. T. Jorgensen**, University of Iowa
David R. Larson, Texas A&M University
Peter R. Massopust, Institute of Biomathematics and Biometry, Neuherberg, and Technical University of Munich
Gestur Olafsson, Louisiana State University

1:00PM (1122) *Pointwise comparison of pulse code and Sigma-Delta modulation.*
John J Benedetto*, Norbert Wiener Center, University of Maryland, College Park, and **Onur Oktay**, University of Maryland, College Park (1023-42-437)

1:30PM (1123) *Maximally Equiangular Frames and Finite Wigner Distributions.*
Matthew Fickus, Air Force Institute of Technology (1023-42-843)

2:00PM (1124) *Causal Relationships Between Frames.* Preliminary report.
Troy Henderson*, United States Military Academy, and **David R Larson**, Texas A&M University (1023-47-978)

2:30PM (1125) *Orthogonal wavelets centered on an arbitrary knot sequence.*
Derek Bruff, Vanderbilt University, **Jeffrey Geronimo**, Georgia Institute of Technology, and **Doug Hardin***, Vanderbilt University (1023-41-1503)

3:00PM (1126) *Texture Identification of Tissues Using Directional Wavelet, Ridgelet and Curvelet Transforms.*
Ahmed I. Zayed* and **Lucia Dettori**, DePaul University (1023-42-320)

3:30PM (1127) *A characteristic equation of semiorthogonal Parseval wavelets.* Preliminary report.
Veronika Furst, University of Arizona (1023-43-1566)

4:00PM (1128) *Wavelet Sets with Nonexpanding Dilation Matrices.*
Yang Wang*, Georgia Institute of Technology, and **Eugene Ionascu**, Columbus State University (1023-42-468)

4:30PM (1129) *Surgery and push-outs on frames.* Preliminary report.
David R. Larson and **Nga Q Nguyen***, Texas A&M University (1023-46-695)

5:00PM (1130) *Isotropic Multiresolution Analysis.*
Simon K. Alexander, **Shika Baid**, **Saurabh Jain**, **Juan R. Romero** and **Manos Papadakis***, University of Houston (1023-42-885)

5:30PM (1131) *Gelfand triples and time frequency analysis.* Preliminary report.
Jens Gerlach Christensen* and **Gestur Olafsson**, Louisiana State University (1023-43-1762)

AMS Special Session on Group Representations, Ergodic Theory, and Mathematical Physics: Honoring the Memory of George W. Mackey, II

1:00 PM – 5:45 PM

Organizers: **Robert S. Doran**, Texas Christian University
Calvin C. Moore, University of California Berkeley
Robert J. Zimmer, The University of Chicago

1:00PM (1132) *Induced Actions.*
Robert J. Zimmer, University of Chicago (1023-22-68)

2:00PM (1133) *From Lorentzian dynamics to the decay of matrix coefficients.*
Scot Adams, University of Minnesota (1023-37-241)

2:30PM (1134) *Cohomology of measurable cocycles.* Preliminary report.
Alex Furman, University of Illinois at Chicago (1023-37-780)

3:00PM (1135) *The Work of G. W. Mackey on Unitary Representations of Group Extensions.*
Arlan Ramsay, University of Colorado, Boulder (1023-46-580)

3:30PM (1136) *The Mackey Dichotomy in Classification Problems.*
Edward G. Effros, UCLA (1023-46-233)

4:00PM (1137) *MASA's and certain type I closed faces of C^*-algebras.*
Lawrence G. Brown, Purdue University (1023-46-760)

4:30PM (1138) *Groupoid Methods in Wavelet Analysis.*
Marius Ionescu, Dartmouth College, and **Paul S. Muhly***, University of Iowa (1023-46-663)

5:00PM ► (1139) *Quantum Fields and George Mackey.*
Arthur Jaffe, Harvard University (1023-00-225)

AMS Special Session on Infinite Dimensional Analysis Honoring H.-H. Kuo, II

1:00 PM – 5:20 PM

Organizers: **Ambar N. Sengupta**, Louisiana State University
P. Sundar, Louisiana State University

1:00PM (1140) *Nonlinear maps of Wiener processes.*
Leonard Gross, Cornell University (1023-46-1511)

1:30PM (1141) *Examples of Stochastic Flows in Non-Commutative Manifolds.*
Kalyan B. Sinha, J.N.Centre for Advanced Scientific Research, Jakkur, Bangalore, India. (1023-60-1344)

2:00PM (1142) *Invariant Measures and Kolmogorov Equations for Stochastic PDEs.* Preliminary report.
Pao-Liu Chow, Wayne State University (1023-60-937)

2:30PM ► (1143) *Nonlinear Filtering Theory of Stochastic Navier-Stokes Equations.*
S. S. Sritharan, University of Wyoming (1023-60-274)

3:00PM (1144) *Empirical graph Laplacian approximation of Laplace-Beltrami operators.*
Evarist - Giné*, University of Connecticut, and **Vlaadimir Koltchinskii**, Geeorgia Institute of Technology (1023-60-457)

3:30PM (1145) *Infinite dimensional heat equation of convolution type, solutions and probabilistic interpretation.*
Habib Ouerdiane, University of Tunis El Manar, Tunisia (1023-60-747)

4:00PM ► (1146) *Best constants in norms of non-gaussian Wick products.* Preliminary report.
Aurel Iulian Stan, The Ohio State University at Marion (1023-60-926)

4:30PM (1147) *White Noise Delta Function for an Affine Subspace.*
Jeremy J Becnel, Stephen F. Austin State University (1023-46-837)

5:00PM Discussion.

AMS Special Session on Nonlinear Variational Inclusion Problems and Optimization Theory, II

1:00 PM – 3:45 PM

Organizer: **Ram U. Verma**, University of Toledo, and International Publications

1:00PM ► (1148) *The Minimax Inequality Inequality and Applications to Fixed Points, Nash Equilibrium Points and Some Links for Problems of Financial Mathematics in the Practice.* Preliminary report.
George X Yuan, Management School, Chinese Academy of Science , Beijing , China (1023-91-137)

2:00PM (1149) *Senistivity Analysis for Cocoercively Monotone Variational Inclusions.*
R N Mohapatra* and **Ram U Verma**, University of Central Florida (1023-49-972)

3:00PM (1150) *Identification of Nonlinearities in Divergence Type Elliptic Boundary Value Problems.*
Mircea D. Voisei, The University of Texas - Pan American (1023-49-55)

AMS Special Session on Nonsmooth Analysis in Inverse and Variational Problems, I

1:00 PM – 6:25 PM

Organizers: **M. Zuhair Nashed**, University of Central Florida
Otmar Scherzer, University of Innsbruck

1:00PM (1151) *Variational problems for measure-valued Lagrangeans.*
Umberto Mosco, Worcester Polytechnic Institute (1023-35-984)

1:30PM (1152) *Travel Time Tomography and Lens Rigidity.*
Gunther Uhlmann, University of Washington (1023-58-1401)

2:00PM (1153) *Ultrasound Absorption vs. Causality & Hyperbolicity.*
Sarah K Patch, Department of Physics, UW Milwaukee (1023-44-1239)

2:30PM (1154) *Sparsity- and continuity-promoting seismic image recovery with curvelet frames.*
Felix J. Herrmann, EOS, UBC, Vancouver, Canada (1023-86-555)

3:00PM ► (1155) *Multilayer segmentation and application to MRI brain imaging.* Preliminary report.
Ginmo Chung and **Luminita Aura Vese***, UCLA (1023-35-1914)

3:30PM (1156) *Parameter Identification in Elliptic Inverse Problems and in Variational and Quasi-variational Inequalities.*
Akhtar A Khan, University of Wisconsin-Barron County (1023-49-1885)

4:00PM (1157) *A segmentation algorithm based on convex duality.*
Selim Esedoglu, University of Michigan (1023-49-1898)

4:30PM (1158) *Regularization of systems of nonlinear ill-posed equations.*
Antonio Leitao, Federal Univ of St Catarina (1023-65-929)

5:00PM (1159) *Modified Back-Projection Methods for Synthetic Aperture Radar Imaging.*
Fengshan Liu*, Delaware State University, **Guoping Zhang**, University of Texas at Pan American, **Jiguang Sun** and **Xiquan Shi**, Delaware State University (1023-86-1465)

5:30PM (1160) *Electrical Impedance Tomography with Interior Measurements.*
Alexandru Tamasan, University of Central Florida (1023-35-1655)

6:00PM ► (1161) *On Stability of a Class of Nonsmooth Dynamic Systems.*
Chao Zhu*, **George Yin** and **Q. S. Song**, Wayne State University (1023-93-81)

AMS Special Session on Numerical Relativity, II

1:00 PM – 5:55 PM

Organizers: **Alexander M. Alekseenko**, California State University Northridge
Arup Mukherjee, Montclair State University

1:00PM ► (1162) *Binary Black Hole Simulations and the Hunt for Gravitational Waves.*
Pablo Laguna* and **Deirdre M. Shoemaker**, Penn State University (1023-83-1145)

2:00PM ► (1163) *A Proposal to Numerically Simulate a Cosmic Shock Wave by Use of a Locally Inertial Glimm Scheme.* Preliminary report.
Blake Temple, University of California, Davis (1023-65-1882)

2:30PM (1164) *A minimization problem for the lapse and the initial-boundary value problem for Einstein's field equations.*
Gabriel Nagy, University of California at San Diego, and **Olivier Sarbach***, Universidad Michoacana de San Nicolas de Hidalgo (1023-83-372)

3:00PM (1165) *Geometric discretisation of General Relativity.*
Jörg Frauendiener, Institut für Astronomie und Astrophysik, Universität Tübingen (1023-83-1014)

3:30PM ► (1166) *Towards absorbing outer boundaries in General Relativity.*
Luisa T. Buchman*, Center for Relativity, University of Texas at Austin, and **Olivier C. A. Sarbach**, Universidad Michoacana de San Nicolas de Hidalgo (1023-83-1265)

4:00PM (1167) *Some Results on Constraints in GR.*
Michael J. Holst, UC San Diego (1023-83-1861)

4:30PM (1168) *Simulations of Binary Black Hole Mergers.* **Dale Choi**, Supercomputing Center, Korea Institute of Science and Technology Information (1023-83-832)

5:00PM (1169) *Modifying the Einstein equations off the constraint hypersurface.* **J. David Brown**, North Carolina State University (1023-83-1548)

5:30PM (1170) *A method for covariant discretization of space-time using Shannon sampling theory.* **Achim Kempf*** and **Robert Martin**, University of Waterloo, Canada (1023-83-1751)

AMS Special Session on Arithmetic of Function Fields, II

1:00 PM – 5:55 PM

Organizers: **Allison M. Pacelli**, Williams College
Michael J. Rosen, Brown University

1:00PM (1171) *Isogenous elliptic factors in the Jacobians of curves.* **Jennifer Paulhus**, University of Illinois at Urbana-Champaign (1023-11-1216)

1:30PM (1172) *Special values of equivariant p-adic and global L-functions.* Preliminary report. **Cristian D. Popescu**, University of California at San Diego (1023-11-1065)

2:00PM (1173) *Hecke Operators and L-series in Characteristic p.* Preliminary report. **David M Goss**, Ohio State University (1023-11-451)

2:30PM (1174) *Simultaneous Prime Values of Polynomials in Positive Characteristic.* **Paul Pollack**, Dartmouth College (1023-11-1359)

3:00PM (1175) *Variations of the Sato-Tate Conjecture.* Preliminary report. **Ram Murty**, Queen's University, Kingston, Ontario, Canada (1023-11-794)

4:00PM (1176) *Biquadratic Function Fields.* **Qingquan Wu**, University of Illinois at Urbana-Champaign, and **Renate Scheidler***, University of Calgary (1023-11-1160)

4:30PM (1177) *Approximatiing Euler Products and Computing the Class Number of an Algebraic Function Field.* **Andreas Stein**, University of Wyoming (1023-11-1039)

5:00PM (1178) *Galois Theory for the line over finite fields.* **Jing Long Hoelscher**, University of Pennsylvania (1023-14-893)

5:30PM (1179) *The Euclidean Algorithm and Applications to Hyperbolic Geometry.* **Kathleen Petersen**, Queen's University (1023-11-1584)

AMS Special Session on Universal Algebra and Order, II

1:00 PM – 5:50 PM

Organizers: **John W. Snow**, Sam Houston State University
Japheth Wood, Bard College

1:00PM (1180) *Can We Change the Paradigm for Reconstruction?* **Bernd S. W. Schroeder**, Louisiana Tech University (1023-06-221)

1:30PM (1181) *Free Complete Extension of Distributive Lattices.* Preliminary report. **Aditya K. Nagrath**, University of Denver (1023-06-200)

2:00PM (1182) *The Coadunation of Generalized Crowns.* **Rebecca Garcia**, Sam Houston State University (1023-06-428)

2:30PM (1183) *Minimal extensions of bounded distributive lattices.* Preliminary report. **M. E. Adams***, State University of New York at New Paltz, and **Jürg Schmid**, University of Bern (1023-06-785)

3:00PM (1184) *Lyndon's algebras and the equational complexity of RRA.* Preliminary report. **Jeremy F Alm**, Department of Philosophy, Iowa State University (1023-03-495)

3:30PM (1185) *A result on Complete Hausdorffness in topological algebras.* **Wolfram Bentz**, University of Northern Britsh Columbia (1023-08-434)

4:00PM (1186) *Minimal generating band semigroups.* Preliminary report. **Japheth Wood**, Bard College (1023-08-380)

4:30PM (1187) *The free spectrum of the Perkins semigroup is sub-log-exponential.* **Steve Seif**, University of Louisville (1023-08-385)

5:00PM ► (1188) *There is no algorithm for deciding whether an equation is compatible with the real line.* Preliminary report. **George F McNulty**, University of South Carolina (1023-08-671)

5:30PM (1189) *Full natural dualities.* **David M. Clark**, SUNY New Paltz, **Brian A. Davey**, **Jane G. Pitkethly**, La Trobe University, and **Ross D. Willard***, University of Waterloo (1023-08-1355)

AMS Special Session on Microlocal Analysis and Singular Spaces, III

1:00 PM – 4:40 PM

Organizers: **Paul A. Loya**, Binghamton University
Andras Vasy, Massachusetts Institute of Technology

1:00PM (1190) *Elliptic boundary problems on a class of noncompact manifolds.* **Thomas Krainer**, Penn State Altoona (1023-35-1899)

2:00PM (1191) *On the heat trace for cone operators.* Preliminary report. **Juan B Gil**, Penn State Altoona (1023-58-1308)

3:00PM (1192) *Hypoellipticity of $\Box_b$ and vanishing of cohomology.* Preliminary report. **Gerardo A Mendoza**, Temple University (1023-58-685)

4:00PM Discussion.

AMS Special Session on Continuous and Discrete Integrable Systems and Their Applications, II

1:00 PM – 6:15 PM

Organizers: **Wen-Xiu Ma**, University of South Florida
Taixi Xu, Southern Polytechnic State University
Bao-Feng Feng, University of Texas-Pan American
Zhijun Qiao, University of Texas-Pan American

1:00PM (1193) *Chaotic and Periodic Asymptotics for q-Orthogonal Polynomials.*
Mourad E. H. Ismail*, University of Central Florida, and **Ruiming Zhang**, Guangxi Normal University, Guilin City (1023-41-1161)

1:30PM (1194) *Green's function for the second order Askey-Wilson operator.* Preliminary report.
Mizan Rahman, Carleton University (1023-33-386)

2:00PM (1195) *A class of superintegrable systems of Calogero-Moser type.*
Roman G. Smirnov*, Dalhousie University, and **Pavel Winternitz**, University of Montreal and Centre de Recherches Mathematiques (CRM) (1023-53-1024)

2:30PM (1196) *Some Methods for Generating Explicit Solutions to the Gnerlaized KDV Equation and an Associated Hierarchy.*
Paul F Bracken, University of Texas (1023-35-364)

3:00PM (1197) *Peaked Solitons Equations.* Preliminary report.
Zhijun Qiao, Univeristy of Texas - Pan American (1023-35-910)

3:30PM (1198) *Nonlinearization of spectral problem with reality condition.*
Ruguang Zhou, Xuzhou Normal University (1023-37-267)

4:00PM (1199) *Fractional derivatives of products of Airy functions and their applications.*
Vladimir V Varlamov, University of Texas - Pan American (1023-33-965)

4:30PM (1200) *New Finite-Dimensional Integrable Systems by Reduction.*
Taixi Xu, Southern Polytechnis State University (1023-35-1505)

5:00PM (1201) *A numerical method to Cammassa-Holm and Degasperis-Procesi equations.* Preliminary report.
Bao-Feng Feng, Univ. of Texas-Pan American (1023-45-1480)

5:30PM (1202) *Some properties of higher-order mappings and their ultra-discrete analogues.*
Kenichi Maruno, University of Texas-Pan American (1023-39-1391)

6:00PM (1203) *Integrable systems.*
Peter Lax, New York University, Courant Institute (1023-35-1920)

MAA Minicourse #15: Part A

1:00 PM – 3:00 PM

Geometry with history for teaching teachers.

Organizers: **David W. Henderson**, Cornell University
Daina Taimina, Cornell University

MAA Minicourse #2: Part B

1:00 PM – 3:00 PM

Some deterministic models in mathematical biology and their simulations.

Organizers: **James F. Selgrade**, North Carolina State University
Cammey E. Cole, Meredith College
Hüseyin Koçak, University of Miami, Coral Gables

MAA Minicourse #7: Part B

1:00 PM – 3:00 PM

Directing undergraduate research.

Organizer: **Aparna W. Higgins**, University of Dayton

AMS Session on Algebra and Group Theory, III

1:00 PM – 5:40 PM

1:00PM (1204) *Construction of the Irreducuble characters of the Heisenberg group and a similar special group.*
Mohammad Reza Darafsheh, University of Tehran, Iran, and **Manouchehr Misaghian***, Johnson C. Smith University (1023-20-1493)

1:15PM (1205) *Graph Braid Groups.*
Daniel S Farley*, Miami University of Ohio, and **Lucas Sabalka**, University of California, Davis (1023-20-1518)

1:30PM (1206) *On growth series of Coxeter groups.*
Patrick Bahls, University of North Carolina, Asheville (1023-20-1778)

1:45PM (1207) *Using Formations to Determine Factorizations.* Preliminary report.
Joseph Kirtland, Marist College (1023-20-219)

2:00PM (1208) *Almost pure subgroups of locally compact abelian groups.* Preliminary report.
Peter Loth, Sacred Heart University (1023-20-263)

2:15PM (1209) *The Strong Symmetric Genus of the Finite Coxeter Groups.*
Michael A Jackson, King College (1023-20-371)

2:30PM (1210) *Capability of p-nilpotent products of cyclic p-groups.*
Arturo Magidin, University of Louisiana at Lafayette (1023-20-38)

2:45PM (1211) *Zassenhaus Rings of Finite Rank.*
Joshua Buckner, Baylor University (1023-20-420)

3:00PM (1212) *Central Extensions and Unramified Brauer Groups.*
Fedor Bogomolov, CIMS-New York University, and **Jorge Maciel***, BMCC-The City University of New York (1023-20-519)

3:10PM Break.

3:30PM (1213) *Local Characterization of LFS-Groups of p-Type.* Preliminary report.
Stefaan D Delcroix, California State University, Fresno (1023-20-596)

3:45PM (1214) *For a given prime p, what is the smallest nonabelian simple group whose order is divisible by p?*
Gabriela Mendoza, State University of New York at Binghamton (1023-20-680)

4:00PM (1215) *Variations on a Theme by Desmond MacHale.*
Luise-Charlotte Kappe*, **Gabriela Mendoza**, State University of New York at Binghamton, and **Michael Ward**, Western Oregon University (1023-20-682)

4:15PM (1216) *Subgroups in a Direct Product that Satisfy the Strong Frattini Argument.*
Joseph Evan, King's College (1023-20-774)

4:30PM (1217) *On the Sources of Simple Modules in Certain Blocks.*
Adam D Salminen, University of Evansville (1023-20-99)

4:45PM (1218) *Small spherical nilpotent orbits and K-types of Harish Chandra modules.* Preliminary report.
Donald R King, Northeastern University (1023-22-1597)

5:00PM (1219) *Completions of altered topological subgroups of $\mathbb{R}^n$.*
Jon W. Short, Sam Houston State University (1023-22-1610)

5:15PM (1220) *Characterization of simplicity and cancellativity in βS.*
Neil Hindman*, Howard University, and **Dona Strauss**, University of Hull (1023-22-357)

5:30PM (1221) *The supremum of the set of pseudocompact group topologies.*
W. W. Comfort*, Wesleyan University, and **Jan van Mill**, Vrije Universiteit (1023-22-947)

AMS Session on Combinatorics, II

1:00 PM – 5:40 PM

1:00PM (1222) *Constructing m-articulate collections of de Bruijn sequences.*
Atoshi Chowdhury, Princeton University (1023-05-1383)

1:15PM ► (1223) *Magic labelings of directed graphs.* Preliminary report.
Alison M. Marr, Southern Illinois University (1023-05-1385)

1:30PM (1224) *Helly and Radon Independence in Clone-Free Multipartite Tournaments.* Preliminary report.
Darren B. Parker*, University of Dayton, **Randy F. Westhoff** and **Marty J. Wolf**, Bemidji State University (1023-05-1469)

1:45PM (1225) *Minimum cycle bases of direct products of bipartite graphs.*
Richard Hammack, Virginia Commonwealth University (1023-05-1472)

2:00PM ► (1226) *Enumeration of Orientable Embeddings of Odd Graphs.*
Brent N Stephens* and **Xiaoya Zha**, Middle Tennessee State University (1023-05-1512)

2:15PM ► (1227) *Extending the Freiman $3k-3$ Theorem to distinct sets.* Preliminary report.
David J. Grynkiewicz*, **Oriol Serra**, Universitat Politecnica de Catalunya, Spain, and **Yahya Hamidoune**, Universite de Paris VI (1023-05-1526)

2:30PM ► (1228) *Density Relations in Simple Graphs.*
Daniel Felix, University of California, San Diego (1023-05-1602)

2:45PM (1229) *Generating tree isomorphisms for pattern-avoiding involutions.*
Aaron D. Jaggard*, Tulane University, and **Joseph J. Marincel**, Washington University (1023-05-1618)

3:00PM ► (1230) *Combinatorial Methods in Coordinate Percolation.* Preliminary report.
Elizabeth Moseman, Dartmouth College (1023-05-1619)

3:15PM ► (1231) *Geometric structure of sumsets within their convex hulls.*
Jaewoo Lee, Borough of Manhattan Community College, The City University of New York (1023-05-1412)

3:30PM ► (1232) *Intersection Graphs Generated By An Edge Decomposition.*
Robert A. Beeler, Clemson University (1023-05-1651)

3:45PM (1233) *G-Multiparking Functions and Dirichlet Configurations.*
Dimitrije N Kostic, Texas A&M University (1023-05-1705)

4:00PM (1234) *Interval Avoidance in the Symmetric Group.*
Isaiah P. Lankham* and **Alexander K. Woo**, UC Davis (1023-05-1711)

4:15PM ► (1235) *The Jump Number of a Split Graph.*
Mike Fisher, California State University, Fresno (1023-05-1842)

4:30PM ► (1236) *On the Likelihood of Comparability in Bruhat Order.*
Adam J Hammett* and **Boris G Pittel**, The Ohio State University (1023-05-189)

4:45PM ► (1237) *Properties of Permutation Tableaux.*
Ariel R Levavi, Carnegie Mellon University (1023-05-236)

5:00PM Break.

► (1238) *The Moebius transform of the triangular numbers.*
Steve Butler, University of California, San Diego (1023-05-435)

5:15PM (1239) *Applications of hypergraph zeta functions.*
Christopher K. Storm, Dartmouth College (1023-05-286)

5:30PM ► (1240) *Combinatorial Sums via Finite Differences.*
Michael Z. Spivey, University of Puget Sound (1023-05-304)

AMS Session on Analysis and Functional Analysis, II

1:00 PM – 5:25 PM

1:00PM (1241) *Rellich type inequality on Carnot Groups.*
Ismail Kombe, Oklahoma City University (1023-43-1180)

1:15PM (1242) *Characterization Of bounded/compact composition operators on the 'Hardy–Simirnov' spaces.* Preliminary report.
Abebaw Tadesse, Langston University (1023-43-336)

1:30PM (1243) *Transference of Maximal Multiplier Operators on Local Hardy-Lorentz Spaces.*
Daning Chen, Jackson State University (1023-43-873)

1:45PM (1244) *A Discrepancy Principle for Local Regularization.*
Cara D. Brooks* and **Patricia K. Lamm**, Michigan State University (1023-45-1622)

2:00PM (1245) *Local Regularization Methods for Nonlinear Volterra Integral Equations of Hammerstein Type.*
Xiaoyue Luo* and **P. K. Lamm**, Michigan State University (1023-45-1685)

2:15PM (1246) *A Poincaré inequality on the complex sphere in CR setting.*
Lijing Sun, Wayne State University (1023-46-104)

2:30PM (1247) *Almost Weakly Compact Operators.*
Ioana Ghenciu*, University of Wisconsin, River Falls, and **Paul Lewis**, University of North Texas, TX (1023-46-1223)

2:45PM ► (1248) *A Dynamic Equation on a Time Scale.*
Allan C. Peterson*, University of Nebraska-Lincoln 68588-0130, **Lynn Erbe**, University of Nebraska, and **Samir Saker**, Mansoura University (1023-39-748)

3:00PM (1249) *Topological Structure of the Unitary Group of Certain C*-Algebras.*
Bogdan Costin Visinescu, University of Cincinnati (1023-46-1408)

3:15PM (1250) *On the Rellich inequality.*
Ritva M. Hurri-Syrjanen*, University of Helsinki, and **David E. Edmunds**, Cardiff University (1023-46-1496)

3:30PM (1251) *On Ergodic type theorems for finite Jordan algebras.*
Genady Ya. Grabarnik, T.J. Watson IBM Reserach Center, **Alexander A. Katz***, St. John's University, and **Laura Shwartz**, University of South Africa (1023-46-1737)

3:45PM (1252) *Isometries on A^{Φ}.* Preliminary report.
Nadia J Gal, University of Memphis (1023-46-1897)

4:00PM (1253) *On the "Multiple of the Inclusion plus Compact" Problem.*
G. Androulakis and **F. Sanacory***, University of South Carolina (1023-46-212)

4:15PM (1254) *On the existence of eigenvalues of Toeplitz operators associated with representing measures on multiply connected planar regions.*
Cyrus P. Aryana, Saginaw Valley State University (1023-46-540)

4:30PM (1255) *On the properties of endogenous mortgage rates.* Preliminary report.
Yevgeny Goncharov, Florida State University (1023-46-63)

4:45PM (1256) *Flows of weights associated with AFD real factors of type III.* Preliminary report.
Shukhrat M. Usmanov, Ashford University (1023-46-812)

5:00PM (1257) *The q-concavity and q-convexity constants in Lorentz spaces.*
Anna Kamińska and **Anca M Parrish***, University of Memphis (1023-46-895)

5:15PM (1258) *On Gelfand-Naimark type theorems for representations of nuclear barelled real locally C*- and locally JB-algebras.*
Alexander A. Katz, St. John's University, **Oleg Friedman***, University of South Africa, and **Roman Kushnir**, St. John's University (1023-46-980)

AMS Session on Geometry and Topology, IV

1:00 PM – 5:55 PM

1:00PM (1259) *The locally finite functor and the Steenrod algebra.* Preliminary report.
Hayden Harker, Vassar College (1023-55-1590)

1:15PM (1260) *Khovanov Type Categorification for the Tutte Polynomial.*
Edna Fanny Jasso-Hernandez* and **Yongwu Rong**, The George Washington University (1023-55-1604)

1:30PM (1261) *Local Conditions for a 2-dimensional Duality Group.* Preliminary report.
Risto Atanasov, Binghamton University (1023-55-1696)

1:45PM (1262) *Relative Homotopy Groups of Modules - from a Different Viewpoint.*
C. Joanna Su, Providence College (1023-55-1787)

2:00PM ► (1263) *Periodic Dold Sequences.*
Micah W. Chrisman, University of Hawaii at Manoa (1023-55-344)

2:15PM (1264) *Rank of the fundamental group of any component of a function space.*
Samuel B. Smith*, Saint Joseph's University, and **Gregory Lupton**, Cleveland State University (1023-55-40)

2:30PM (1265) *Comparing self-avoiding walks and polygons on hyperbolic Coxeter groups.*
Jason S. Bode, Cornell University (1023-55-795)

2:45PM Break.

3:00PM (1266) *Kauffman-Harary Conjecture for Virtual Knots.*
Mathew Williamson, University of South Florida (1023-55-911)

3:15PM ► (1267) *Polynomial knots.* Preliminary report.
Alan Durfee, Mount Holyoke College (1023-57-1159)

3:30PM ► (1268) *Menasco normal form and recognizing unknot diagrams.*
Chan-Ho Suh, University of California at Davis (1023-57-1335)

3:45PM ► (1269) *Coloring Random Knots.* Preliminary report.
Enver Karadayi, University of South Florida (1023-57-1386)

4:00PM (1270) *Stable Ribbon Graphs and Quantum Master Equation.* Preliminary report.
J. Javier Zuniga, University of Minnesota (1023-57-1698)

4:15PM (1271) *Turaev torsion and cohomology determinants for 3–manifolds with boundary.* Preliminary report.
Christopher B. Truman, University of Maryland (1023-57-1755)

4:30PM ► (1272) *Statistical methods for studying spatial properties of random polygonal knots.*
Eric J Rawdon, University of St. Thomas (1023-57-939)

4:45PM (1273) *Residue Formulation of the Chern Character on Smooth Manifolds.*
Dmitry M Gerenrot, Georgia Institute of Technology (1023-58-1471)

5:00PM (1274) *Singularities of equivariant lagrangian mean curvature flow.*
Konrad Groh, Institut fuer Differentialgeometrie, Hannover (1023-58-339)

5:15PM (1275) *Dehn surgery on singular knots.*
Simrat M Ghuman, San Francisco, California, **Larry M Granda*** and **Chichen M Tsau**, Saint Louis University (1023-57-74)

5:30PM ► (1276) *Generalized Coloring and n-String Tangles.*
Isabel K Darcy, University of Iowa, and **Junalyn P Navarra-Madsen***, Texas Woman's University (1023-57-111)

5:45PM ► (1277) *Upper Bounds for Regular Stick Numbers of Torus Knots.* Preliminary report.
Timothy D. Comar* and **Debra Witczak**, Benedictine University (1023-57-113)

MAA Session on Teaching Innovations in Real Analysis, II

1:00 PM – 3:35 PM

Organizers: **Robert W. Vallin**, Slippery Rock University
Erik O. Talvila, University College of the Fraser Valley

1:00PM ► (1278) *Getting students to prove theorems in analysis.*
William S. Mahavier, Emory University (1023-Q1-1572)

1:20PM ► (1279) *When I switched from Lecturing to using the Moore Method...*
Bernd E. Rossa, Xavier University (Cincinnati) (1023-Q1-1127)

1:40PM ► (1280) *Facilitating Student Understanding of Concepts in Real Analysis.* Preliminary report.
Michael L. Berry, West Virginia Wesleyan College (1023-Q1-1296)

2:00PM (1281) *Technical illustration for second semester real analysis.*
Mark McClure, University of North Carolina at Asheville (1023-Q1-844)

2:20PM ► (1282) *Using History to Understand How To Teach Real Analysis.*
David M Bressoud, Macalester College (1023-Q1-618)

2:40PM (1283) *Introductory Real Analysis - Let Series be Your Guide.*
Robert Rogers, SUNY Fredonia (1023-Q1-758)

3:00PM ► (1284) *Using Calculus to Motivate Compactness and Connectedness.*
Michael J. Schramm, Le Moyne College (1023-Q1-1272)

3:20PM ► (1285) *Using a Laboratory Approach in the Teaching of Real Analysis.*
Kirk Weller*, University of Michigan Flint, and **Joanne Snow**, Saint Mary's College (1023-Q1-1130)

MAA Session on Mathematics Experiences in Business, Industry and Government

1:00 PM – 4:30 PM

Organizers: **Philip E. Gustafson**, Mesa State College
Michael Monticino, University of North Texas

1:00PM Opening Remarks and BIG SIGMAA Announcements.

1:15PM ► (1286) *Teller Staffing in Retail Banks.* Preliminary report.
Travis Cogdill* and **Michael Monticino**, University of North Texas (1023-L1-1405)

1:35PM ► (1287) *Statistics of the Peak Sidelobe Distribution for Binary Codes.* Preliminary report.
Matthew Ferrara, **Michael Kupferschmid**, RPI, and **Gregory E Coxson***, Technology Service Corporation (1023-L1-1812)

1:55PM ► (1288) *Fractal measures to quantify agent-based combat with EINSTein.*
David S. Mazel*, Technology Service Corporation, and **Andy Ilachinski**, The CNA Corporation (1023-L1-500)

2:15PM (1289) *Characterizing internal stress states in advanced ceramics using fractal analysis.* Preliminary report.
Leigh L Noble, United States Military Academy & Army Research Lab (1023-L1-1753)

2:35PM ► (1290) *Number Theory and a New GPS Signal.*
Joseph J. Rushanan, The MITRE Corporation (1023-L1-976)

2:55PM ► (1291) *Norbert Wiener Center - mission and methods.*
John J Benedetto* and **Ioannis Konstantinidis**, Norbert Wiener Center, University of Maryland, College Park (1023-L1-1455)

3:15PM ► (1292) *Statistics to Detect Danger Underground.* Preliminary report.
George W Heine, Bureau of Land Management (1023-L1-1902)

3:35PM (1293) *Why Consulting Firms need Mathematicians.*
Carla D Martin, James Madison University (1023-L1-223)

3:55PM (1294) *My Experiences as a Summer Contract Employee at a Pharmaceutical Company.*
Paul R. Coe, Dominican University (1023-L1-1857)

4:15PM ► (1295) *A Model of Randomized Drug Testing.* Preliminary report.
Paul H Schuette, Meredith College (1023-L1-1352)

MAA Session on Building Diversity in Advanced Mathematics: Models that Work, II

1:00 PM – 3:55 PM

Organizers: **Patricia Hale**, California State Polytechnic University, Pomona
Abbe H. Herzig, University of Albany, SUNY

1:00PM ► (1296) *Successful Practices on Integrating Diversity into the Teaching of General Education Mathematics courses at Northern State University.*
A. S. Elkhader, Northern State University (1023-E1-1211)

1:20PM (1297) *Project SMART III - Characteristics of a Successful NREUP at a Two-Year Institution.*
John J Morrell, Atlanta Metropolitan College (1023-E1-1636)

1:40PM ► (1298) *A "DeVry-Style" REU: The Outcome of a Summer Semester of Undergraduate Research in Probability and Networking at DeVry.* Preliminary report.
Dov N Chelst, DeVry University (1023-E1-1835)

2:00PM ► (1299) *Strategies for Inclusion in the UC Davis Math Modeling Experience for Undergraduates and High School Students.* Preliminary report.
Sarah A. Williams, Graduate Group in Applied Mathematics, University of California, Davis (1023-E1-1739)

2:20PM ► (1300) *Academic Excellence Workshops, Why They Work at Cal Poly Pomona.*
Patricia Hale, California State Polytechnic University, Pomona (1023-E1-1176)

2:40PM ► (1301) *Native American-based Materials for Undergraduate Mathematics Courses.*
Charles Peter Funkhouser*, University of Montana Missoula, and **A. Duane Porter**, University of Wyoming (1023-E1-59)

3:00PM ► (1302) *A Diversity Perspective.*
Satish C Bhatnagar, University of Nevada Las Vegas (1023-E1-283)

3:20PM (1303) *The Impact of Departmental Leadership on the Success of Women in Doctoral Level Mathematical Sciences.*
Orpha K. Ongiti* and **Abbe H. Herzig**, University at Albany (1023-E1-804)

3:40PM ► (1304) *From the Perspective of Lee Lorch.*
Lee Lorch, York University (1023-E1-1552)

MAA Session on Countering "I Can't Do Math": Strategies For Teaching Under-Prepared, Math-Anxious Students, II

1:00 PM – 5:15 PM

Organizers: **Winston Crawley**, Shippensburg University
Kim Presser, Shippensburg University

1:00PM (1305) *How Can I Help My Students Enjoy Learning Mathematics Instead of Being Afraid of It? Fostering Positive Mathematics Experiences With Special Needs and English Language Learner Populations.*
Joyce F. Fischer, Texas State University-San Marcos (1023-G5-1312)

1:20PM ► (1306) *Linking Polynomials to Whole Numbers to Ease the Anxiety of the Under-Prepared Students.*
Murray H. Siegel, SC GSSM (1023-G5-210)

1:40PM ► (1307) *Engaging Developmental Mathematics Students with Activities: A First Look at Quadratics.*
Gary Simundza*, Wentworth Institute of Technology, and **Nancy Crisler**, Washington University (1023-G5-66)

2:00PM (1308) *How to improve student's performance in Developmental Mathematics course with the use of computer-aided instruction and a personal touch.*
Wendiann Sethi, Seton Hall University (1023-G5-1168)

2:20PM (1309) *Changing Paradigms: A department in a state of flux leading to technology transitions which affect student learning.* Preliminary report.
Hassan Moore* and **Gerald Y. Agbegha**, Johnson C. Smith University (1023-G5-1638)

2:40PM (1310) *The Math "Journal" Assignment: Finding Applications, Seeing Connections, and Getting Over that Seventh Grade Algebra Class.*
Carrie Muir, University of Colorado - Boulder (1023-G5-1777)

3:00PM (1311) *Improving Student Performance in a College Core Math Program by Emphasizing Fundamental Mathematical Skills.* Preliminary report.
Heather Stevenson* and **Gerald Kobylski**, United States Military Academy (1023-G5-1714)

► 3:20PM (1312) *The Thrill of Victory: Conquering Anxiety with Mastery Grading.*
Penelope H Dunham, Muhlenberg College (1023-G5-1113)

► 3:40PM (1313) *Transitioning to College Mathematics - Creating a Program to Help Developmental Level Students Succeed in College Level Mathematics.* Preliminary report.
J. Winston Crawley* and **Kimberly J. Presser**, Shippensburg University (1023-G5-881)

4:00PM (1314) *Strategies for Reaching Under-prepared Math Students.*
Ann C Hanson, Columbia College (1023-G5-621)

► 4:20PM (1315) *Learning Disabilities and the Post-Secondary Math Student.*
Mary Rack, Johnson County Community College (1023-G5-101)

► 4:40PM (1316) *Elementary Teachers' Perceptions of the Nature of Mathematics and Math Anxiety: Implications for Teaching Mathematics.*
Teodora B Cox, SUNY Fredonia (1023-G5-1759)

► 5:00PM (1317) *For Victims Of The Mathematics-Distress Syndrome: A Radical Alternative Curriculum.* Preliminary report.
Clyde Greeno, The MALEI Mathematics Institute (1023-G5-925)

MAA Session on Innovative Examples of Using Graphs in Statistics

1:00 PM – 5:30 PM

Organizers: **Christopher J. Lacke**, Rowan University
Ginger Holmes Rowell, Middle Tennessee State University

► 1:00PM (1318) *Statistics Before Your Eyes: Photographs of Statistical Concepts.*
Robert W. Jernigan, American University (1023-J5-834)

► 1:25PM (1319) *Sampling + Simulation = Statistical Understanding: Graphical Simulations in Excel for Introductory Statistics.*
Sheldon P. Gordon, Farmingdale State University of New York, and **Florence S. Gordon***, New York Institute of Technolgy (Retired) (1023-J5-452)

► 1:50PM (1320) *What is R^2? Using Dynamic Graphs to Illustrate Ideas in Regression.*
Robin H. Lock, St. Lawrence Uinversity (1023-J5-1451)

► 2:15PM (1321) *Using Boxplots and Histograms to Draw Inferences.*
Kris H, Green, St. John Fisher College (1023-J5-509)

► 2:40PM (1322) *Using Graphs To Assess Normality When Performing a t-Test for a Population Mean.*
Christopher J Lacke, Rowan University (1023-J5-1459)

► 3:05PM (1323) *Using Dynamic, Interactive Models to Teach Statistical Concepts.*
Michael T. Marsh, Shippensburg University of Pennsylvania (1023-J5-572)

► 3:30PM (1324) *Graphical Methods for Teaching and Assessing the IID Assumption.*
Mark H Inlow, Rose-Hulman Institute of Technology (1023-J5-1784)

► 3:55PM (1325) *Creating Graphs for Better Analyses, Explanations, and Presentations.*
John D McKenzie*, Babson College, and **Robert N Goldman**, Simmons College (1023-J5-1746)

► 4:20PM (1326) *Graphing Data Badly, or Things I Swear my Statistics Teacher Never Told Me!*
Patricia B Humphrey, Georgia Southern University (1023-J5-1564)

► 4:45PM (1327) *Examples of Misdisplaying Statistical Graphs in Presentations.* Preliminary report.
Jialing Dai, Dept. of Mathematics, University of the Pacific (1023-J5-1694)

5:10PM (1328) *Graphs: Different Faces of Data.*
Madhuri S. Mulekar, University of South Alabama (1023-J5-1627)

MAA Session on The Mathematics of Sudoku and Other Puzzles, II

1:00 PM – 3:35 PM

Organizer: **Laura A. Taalman**, James Madison University

► 1:00PM (1329) *Some Observations on the Sudoku Puzzle.* Preliminary report.
Louis M. Beaugris, Kean University (1023-M1-1824)

► 1:20PM (1330) *Proofs, Equivalence Classes and Groups Sudoku-Style.*
Cynthia J. Woodburn, Pittsburg State University (1023-M1-1460)

► 1:40PM (1331) *One-and-one-third orthogonal Latin squares.* Preliminary report.
W D Wallis, Southern Illinois University, Carbondale, IL (1023-M1-1905)

► 2:00PM (1332) *Partial Latin Squares with the Sudoku Structure.* Preliminary report.
Rommel G. Regis, Cornell University (1023-M1-1795)

► 2:20PM (1333) *On Mutually Orthogonal Sudokus.* Preliminary report.
Michael Anthony Pohl, University of Richmond (1023-M1-886)

► 2:40PM (1334) *Two methods for counting small sudoku puzzles.*
John Lorch* and **Crystal Lorch**, Ball State University (1023-M1-1916)

► 3:00PM (1335) *Beaucoup de Sudoku.*
Carlos Arcos, **Gary Brookfield** and **Mike Krebs***, California State University, Los Angeles (1023-M1-70)

► 3:20PM (1336) *Book Embeddings of Sudoku Graphs.* Preliminary report.
Joyce Maxine Music* and **Robin Blankenship**, Morehead State University (1023-M1-1267)

MAA General Contributed Paper Session, VI

1:00 PM – 4:55 PM

Organizers: **Eric S. Marland**, Appalachian State University
Jay A. Malmstrom, Oklahoma State Community College

1:00PM ► (1337) *A new proof of a theorem on the closure ordering on nilpotent orbits of algebraic groups of Type A.* Preliminary report.
Joseph A Fox*, Salem State College, **Terrell L Hodge**, Western Michigan University, and **Brian J Parshall**, University of Virginia (1023-Z1-1286)

1:15PM ► (1338) *Ideals in Dorroh Extensions of Rings.*
Kent M. Neuerburg* and **G. Alan Cannon**, Southeastern Louisiana University (1023-Z1-214)

1:30PM (1339) *Primes and twin primes near some large numbers.*
Balakrishnan Variyath Uckath, Eritrea Institute of Technology (1023-Z1-1586)

1:45PM (1340) *The Syllogism Needed to Negate the Definition of a Converging Sequence.*
Chokri Cherif* and **Avraham Goldstein**, BMCC-City University of New York (1023-Z1-587)

2:00PM ► (1341) *A Note on Weighted Identric and Logarithmic Means.*
Kendall C Richards and **Hilari Celeste Tiedeman***, Southwestern University (1023-Z1-522)

2:15PM ► (1342) *Inversion Cosets in Music Theory.*
Craig M. Johnson, Marywood University (1023-Z1-58)

2:30PM ► (1343) *Developing a successful undergraduate colloquium course.*
Darren E Mason* and **David A Reimann**, Albion College (1023-Z1-1695)

2:45PM ► (1344) *Success Stories from a First Semester Seminar for Math Majors.*
Melvin G. Royer, Indiana Wesleyan University (1023-Z1-1171)

3:00PM ► (1345) *Redesigning the first course of differential equations.* Preliminary report.
Pangyen Ben Weng, Ramapo College of New Jersey (1023-Z1-1199)

3:15PM ► (1346) *Writing in the Vector Calculus class.*
Constantin Dorin Dumitraşcu, University of Arizona, Tucson AZ (1023-Z1-1363)

3:30PM ► (1347) *Some Determinants of Student Performance in the Course of Introductory Statistics.*
Jen-Ting Wang*, SUNY-Oneonta, NY, and **Shu-Yi Tu**, University of Michigan – Flint (1023-Z1-1764)

3:45PM ► (1348) *Come on down! Learn about the probability of winning a car on* The Price is Right*!*
Joe A. Stickles, Jr., Millikin University (1023-Z1-1147)

4:00PM (1349) *Developmental Mathematics Program at the University of Maryland: 5 years of Success.*
Denny Gulick, MD (1023-Z1-974)

4:15PM ► (1350) *A team-teaching (Math and CS) approach to a Discrete Mathematics course.*
Rachelle C. DeCoste, United States Military Academy, West Point (1023-Z1-470)

4:30PM ► (1351) *Incorporating Software in College Algebra: Five Years Later.*
Michelle R DeDeo, Univ. of North Florida (1023-Z1-208)

4:45PM ► (1352) *A π-less Buffon's Needle Problem.*
David Richeson, Dickinson College (1023-Z1-1121)

NAM Granville-Brown-Haynes Session of Presentations by Recent Doctoral Recipients in the Mathematical Sciences

1:00 PM – 3:35 PM

Organizer: **Dawn A. Lott**, University of Maryland

1:00PM ► (1353) *Elements belonging to 2-element cocircuits in connected matroids.*
Joe Anderson*, Mississippi Valley State University, and **Haidong Wu**, University of Mississippi (1023-05-648)

1:20PM (1354) *Clones and Minors in Matroids.*
Carla D Cotwright, Wake Forest University (1023-05-690)

1:40PM ► (1355) *Finding Optimal Orbits on Chaotic Systems.*
Angela E Grant, Northwestern University (1023-37-647)

2:00PM ► (1356) *The Semiparametric Exchangeable Model.*
Stephine L Keeton*, U.S. Food and Drug Administration, and **Hanxiang Peng**, The University of Mississippi (1023-00-1606)

2:20PM (1357) *The Mathematics Coach and the Implementation of Performance Standards.*
Samuel Obara, Texas State University, San Marcos (1023-97-1179)

2:40PM (1358) *Large Circuit Pairs in Matroids.*
Bryan L Williams, Hampton University (1023-05-646)

3:00PM (1359) *Graph Groupoids and their topology.*
Adrian A Wilson, The University of Mississippi (1023-54-568)

3:20PM (1360) *Knots With Infinitely Many Incompressible Seifert Surfaces.*
Robin Todd Wilson, UC Santa Barbara (1023-57-504)

MAA Committee on the Undergraduate Program in Mathematics Panel Discussion

1:00 PM – 2:20 PM

The "bridge" course.

Organizer: **George R. Exner**, Bucknell University
Moderator: **George R. Exner**
Panelists: **David M. Bressoud**, Macalester College
Amy Cohen, Rutgers University
Barbara E. Edwards, Oregon State University
Annie Selden, New Mexico State University

ASL Contributed Papers

2:00 PM – 4:50 PM

Organizer: **Marcia Groszek**, Dartmouth College

2:00PM (1361) *On the failure of Craig interpolation in dynamic logics.*
Katalin Bimbó, Indiana University

2:25PM (1362) *Proof theory for admissible rules.*
George Metcalfe*, Vanderbilt University, and **Rosalie Iemhoff**, Utrecht University

2:50PM (1363) *Symmetric propositions and logical quantifiers.*
R. Gregory Taylor, Manhattan College

3:15PM (1364) *Hypersets with a universal set—two axiomatizations for Bi-AFA˜ set theories.*
Stephen Harnish, Bluffton University

3:40PM (1365) *The notion of 1-consistency and Gödel polynomials.*
Yvon Gauthier, University of Montreal

4:05PM (1366) *On Computer robots recognizing their own geometric self-consistency.*
Dan E Willard, SUNY Albany

4:30PM (1367) *A note on the definition of a multisubset.*
Dasharath Singh*, Ahmadu Bello University, and **J.N. Singh**, Barry University

RMMC Board of Directors

2:15 PM – 4:10 PM

MAA Presentations by Teaching Award Recipients

2:30 PM – 4:00 PM

(1368) *My practice of mathematics.*
Jennifer J. Quinn, Association for Women in Mathematics (1023-A0-1188)

(1369) *Title to be announced.*
Michael Starbird, University of Texas at Austin

AMS Committee on Science Policy Panel Discussion

2:30 PM – 4:00 PM

NSF funding for mathematics.

Organizer: **De Witt L. Sumners**, Florida State University

Panelists: **Tony Chan**, NSF
Peter March, NSF

MAA Panel Discussion

2:30 PM – 3:50 PM

Attracting underrepresented students to graduate study through research.

Organizers: **William Hawkins, Jr**, MAA and the University of the District of Columbia
Robert E. Megginson, University of Michigan, Ann Arbor

Panelists: **Carlos Castillo-Chavez**, Arizona State University
Dennis Davenport, Miami University of Ohio
Lloyd E. Douglas, National Science Foundation
Herbert A. Medina, Loyola Marymount University
Ivelisse M. Rubio, University of Puerto Rico
Michelle D. Wagner, National Security Agency
Robert E. Megginson

MAA Minicourse #14: Part B

3:30 PM – 5:30 PM

Contemporary college algebra: A refocused college algebra course.

Organizers: **Donald B. Small**, U. S. Military Academy
Laurette Foster, Prairie View A&M University

MAA Minicourse #3: Part B

3:30 PM – 5:30 PM

A tool to implement quantitative literacy (QL): Spreadsheets Across the Curriculum.

Organizers: **Semra Kiliç-Bahi**, Colby-Sawyer College
Gary T. Franchy, Davenport University
Cheryl Coolidge, Colby-Sawyer College
William A. Thomas, Colby-Sawyer College

MAA Minicourse #9: Part B

3:30 PM – 5:30 PM

Evaluating student presentations in mathematics.

Organizers: **Suzanne Dorée**, Augsburg College
Richard J. Jardine, Keene State College
Thomas J. Linton, Central College

MAA Undergraduate Poster Session

3:30 PM – 5:30 PM

Organizer: **Diana M. Thomas**, Montclair State University

MAA Session on Integrating Mathematics and Biology in Undergraduate Education, II

4:15 PM – 6:10 PM

Organizers: **Glenn W. Ledder**, University of Nebraska-Lincoln
Yajun Yang, Farmingdale State University of New York
Jack Bookman, Duke University
James P. Fulton, Suffolk County Community College

4:15PM ► (1370) *Balancing Selection and The Evolution of Color Variation in Pacific Treefrogs (Hyla regilla) - An Interactive Lively Activity Project (ILAP).*
Timothy F Englund* and **R. Steven Wagner**, Central Washington University (1023-K1-1578)

4:35PM ► (1371) *Using Tic-Tacs to Freshen up Carbon Dating.*
Preliminary report.
Shawnee McMurran, US Military Academy (1023-K1-1733)

4:55PM ► (1372) *Leslie Matrices: A Biological Application to Matrices and Difference Equations.*
Robert E. Burks* and **Joseph Lindquist**, United States Military Academy (1023-K1-1153)

5:15PM ► (1373) *Discrete Logistic Model in Calculus II.*
Talitha M Washington, University of Evansville (1023-K1-1713)

5:35PM (1374) *Biological Applications Across the Mathematics Curriculum at Appalachian State University.*
Katrina M Palmer* and **Rene Salinas**, Appalachian State University (1023-K1-1218)

5:55PM ► (1375) *CoMBiNe: Teaching modules to encourage cross-education in mathematics and biology classrooms.*
Elsa Schaefer, Marymount University (1023-K1-187)

AMS Mathematical Reviews Reception

6:00 PM – 7:00 PM

NAM Cox-Talbot Address

8:30 PM – 9:15 PM

(1376) *Why "Mathematicians of the African Dispora"?*
Scott Williams, University at Buffalo, SUNY (1023-01-417)

MAA-Project NExT Reception

8:30 PM – 10:30 PM

Organizers: **T. Christine Stevens**, St. Louis University
Joseph A. Gallian, University of Minnesota Duluth
Aparna W. Higgins, University of Dayton

Monday, January 8

MAA Minority Chairs Breakfast Meeting

7:00 AM – 8:45 AM

Joint Meetings Registration

7:30 AM – 4:00 PM

ASL Invited Address

8:00 AM – 8:50 AM

(1377) *Countable group actions and hyperfinite equivalence relations.*
Su Gao, University of North Texas (1023-03-409)

AMS-MAA-MER Special Session on Mathematics and Education Reform, I

8:00 AM – 10:55 AM

Organizers: **William H. Barker**, Bowdoin College
Dale R. Oliver, Humboldt State University
Bonnie S. Saunders, University of Illinois at Chicago
Michael Starbird, University of Texas, Austin

8:00AM ► (1378) *Building a Community of Mathematicians, Teachers, and Educators.*
Al Cuoco, Center for Mathematics Educaiton, and **Glenn Stevens***, Boston University (1023-97-665)

8:30AM ► (1379) *Creating Math Learning Communities Locally and using ITV.*
Max Warshauer*, **Hiroko Warshauer**, **Alex White**, **Terry McCabe** and **Alejandra Sorto**, Texas State University (1023-97-395)

9:00AM (1380) *Connecting Teacher Learning to Classroom Practice: The Story of a Large-scale Professional Community.*
Tom Evitts* and **Kate McGivney**, Shippensburg University (1023-97-625)

9:30AM ► (1381) *Building and Sustaining Communities of Mathematicians and Teachers.*
Joan Ferrini-Mundy, Michigan State University (1023-97-1641)

10:00AM ► (1382) *A Teacher's Perspective on Communities of Mathematicians and Teachers.*
Benjamin J. Sinwell, Montgomery Country Public Schools and Park City Mathematics Institute (1023-97-1214)

10:30AM ► (1383) *A Project-Based Re-Engineering of Business Calculus Focusing on Solving Real Problems Using Models and Technology: Change "Will I Ever Use This?" to "Wow! Math Can Really Help Me!".* Preliminary report.
Bruce Pollack-Johnson, Villanova University (1023-00-871)

AMS-MAA Special Session on History of Mathematics, III

8:00 AM – 10:55 AM

Organizers: **Joseph W. Dauben**, Lehman College
Patti Hunter, Westmont College
Victor J. Katz, University of the District of Columbia
Karen H. Parshall, University of Virginia

8:00AM (1384) *Proof (without Words) in 17th-18th Century China.*
Jiang-Ping Jeff Chen, St. Cloud State University (1023-01-335)

8:30AM ► (1385) *Cramer's Paradox from Euler to Bézout.*
Robert E. Bradley, Adelphi University (1023-01-694)

9:00AM ► (1386) *Publishing Mathematics in 18th-Century France.* Preliminary report.
Robin E. Rider, University of Wisconsin-Madison (1023-01-801)

9:30AM ► (1387) *An Exceedingly Beautiful Theorem: Halley's 1706 edition of Apollonius'* De Sectione Rationis *and his discovery of the anharmonic tangent ratio property for a parabola.* Preliminary report.
Eisso J Atzema, University of Maine (1023-01-262)

10:00AM ► (1388) *Geometric constructions and algebra: Wanzel's impossibility proof.* Preliminary report.
John McCleary, Vassar College (1023-01-762)

10:30AM (1389) *A Delicate Collaboration: A. Adrian Albert and Helmut Hasse and the Principal Theorem in Division Algebras in the Early 1930's.*
Della D. Fenster*, University of Richmond, and **Joachim Schwermer**, University of Vienna (1023-01-922)

AMS Special Session on Group Representations, Ergodic Theory, and Mathematical Physics: Honoring the Memory of George W. Mackey, III

8:00 AM – 10:55 AM

Organizers: **Robert S. Doran**, Texas Christian University
Calvin C. Moore, University of California Berkeley
Robert J. Zimmer, The University of Chicago

8:00AM (1390) *Recent Applications of Induced Representations.*
Roger Howe, Yale University (1023-22-62)

9:00AM (1391) *Broken symmetry.*
Palle E. T. Jorgensen, University of Iowa (1023-47-29)

9:30AM (1392) *Complex methods in harmonic analysis on symmetric spaces.*
Gestur Olafsson, Louisiana State University (1023-22-981)

10:00AM (1393) *Projective representations and the Mackey obstruction.* Preliminary report.
Judith A. Packer, University of Colorado, Boulder (1023-22-918)

10:30AM (1394) *Inducing Primitive Ideals.*
Siegfried Echterhoff, Westfälische Wilhelms-Universität Münster, and **Dana P Williams***, Dartmouth College (1023-46-338)

AMS Special Session on Mapping Class Groups and Handlebodies, I

8:00 AM – 10:55 AM

Organizers: **Tara E. Brendle**, Louisiana State University
William R. Vautaw, Southeastern Louisiana University

8:00AM (1395) *Injective Simplicial Maps of the Arc Complex.*
Elmas Irmak, Bowling Green State University, and **John D. McCarthy***, Michigan State University (1023-57-1146)

8:30AM (1396) *Automorphisms of the disk complex.*
Saul Schleimer, Rutgers - New Brunswick (1023-57-997)

9:00AM (1397) *Infinite Presentations of the Torelli Group.*
Andrew Putman, University of Chicago (1023-57-1303)

9:30AM (1398) *Comparing bridge surfaces.*
Martin Scharlemann, University of California, Santa Barbara, and **Maggy Tomova***, University of Iowa (1023-57-1388)

10:00AM (1399) *Dimension of Torelli groups.*
Mladen Bestvina, University of Utah, **Kai-Uwe Bux**, University of Virginia, and **Dan Margalit***, University of Utah (1023-20-533)

10:30AM (1400) *Applications of the disk complex of the genus-2 handlebody to knot theory.* Preliminary report.
Sangbum Cho and **Darryl McCullough***, University of Oklahoma (1023-57-301)

AMS Special Session on Recent Advances in Mathematical Biology, Ecology, and Epidemiology, I

8:00 AM – 10:55 AM

Organizers: **Lih-Ing Roeger**, Texas Tech University
Linda J. Allen, Texas Tech University
Sophia Jang, University of Louisiana at Lafayette

8:00AM (1401) *Multiple attractors and non-equilibrium competitive coexistence.*
J. M. Cushing*, University of Arizona, **Shandelle M. Henson**, Andrews University, **Lih-Ing Roeger**, Texas Tech University, and **Chantel C. Blackburn**, University of Arizona (1023-92-908)

8:30AM (1402) *Difference Approximation for Measure-Valued Solutions to a Hierarchically Size-Structured Population Model.* Preliminary report.
Azmy S Ackleh*, University of Louisiana at Lafayette, and **Kazufumi Ito**, North Carolina State University (1023-92-772)

9:00AM (1403) *On a nonlocal reaction-diffusion population model.*
Keng Deng, University of Louisiana at Lafayette (1023-35-792)

9:30AM ► (1404) *Attractors in nonautonomous systems and Applications to population models.* Preliminary report.
Saber N Elaydi, Trinity University (1023-39-1704)

10:00AM (1405) *Numerical Integration of Population Models Satisfying Conservation Laws: NSFD Methods.*
Ronald E Mickens, Clark Atlanta University (1023-92-329)

10:30AM (1406) *Multiple Attractors and Their Basins of Attraction in a Periodically Forced Discrete-time SIS Epidemic Model.* Preliminary report.
John E Franke*, North Carolina State University, and **Abdul-Aziz Yakubu**, Howard University (1023-92-941)

AMS Special Session on Recent Developments in Floer Homology, I

8:00 AM – 10:55 AM

Organizers: **Scott J. Baldridge**, Louisiana State University
Ronald A. Fintushel, Michigan State University
Thomas E. Mark, Southeastern Louisiana University
Brendan E. Owens, Louisiana State University

8:00AM (1407) *Singular Relative Gromov-Witten Invariants.*
Joshua R. Davis, Duke University (1023-53-1332)

8:30AM ► (1408) *Construction of new symplectic cohomolgy $S^2 \times S^2$.* Preliminary report.
Anar Akhmedov, Georgia Institute of Technology (1023-57-943)

9:00AM (1409) *Torsion in Heegaard Floer homology.*
Stanislav Jabuka*, University of Nevada Reno, and **Thomas Mark**, University of Virginia (1023-57-1205)

9:30AM (1410) *A combinatorial description to some Heegaard Floer homologies.*
Jiajun Wang, UC Berkeley & Columbia Univ (1023-51-178)

10:00AM (1411) *Knot Floer homology detects fibred knots.*
Yi Ni, Princeton University (1023-57-425)

10:30AM (1412) *The SU(3) Casson invariant and spliced sums.* Preliminary report.
Hans U. Boden*, McMaster University, and **Benjamin Himpel**, University of Bonn (1023-57-1249)

AMS Special Session on Representation Theory and the Theta Correspondence, I

8:00 AM – 10:55 AM

Organizers: **Wee Teck Gan**, University of California San Diego
Hongyu He, Louisiana State University
Annegret Paul, Western Michigan University

8:00AM (1413) *Preservation principle of local theta correspondence and supercuspidal representations of p-adic groups.* Preliminary report.
Shu-Yen Pan, National Tsing Hua University (1023-22-1488)

8:30AM Discussion.

9:00AM (1414) *Special cohomology classes arising from the Weil representation.*
Jens P Funke, New Mexico State University (1023-22-1323)

9:30AM (1415) *Transfer of unitary representations.*
Nolan Wallach, University of California at San Diego, and **Chen-Bo Zhu***, National University of Singapore (1023-22-1350)

10:00AM (1416) *Methods for studying complementary series of split groups.* Preliminary report.
Dan Barbasch and **Alessandra Pantano***, Cornell University (1023-22-612)

10:30AM (1417) *On the unitary dual of Iwahori-Hecke algebras.* Preliminary report.
Dan Ciubotaru, M.I.T. (1023-22-1579)

AMS Special Session on Structure Theory for Matroids and Graphs, I

8:00 AM – 10:55 AM

Organizers: **Joseph P. Kung**, University of North Texas
Bogdan S. Oporowski, Louisiana State University
James G. Oxley, Louisiana State University

8:00AM (1418) *Distinguishability of Locally Finite Trees.*
Xiangqian Zhou*, the University of Mississippi, and **Mark Watkins**, Syracuse University (1023-05-687)

8:30AM (1419) *Stabilizers for matroids over finite fields.*
Sandra Kingan, Clayton State University (1023-05-1090)

9:00AM ► (1420) *Coloring graphs on surfaces with all faces even.* Preliminary report.
Daniel Kral, Charles University, Czech Republic, and **Robin Thomas***, Georgia Institute of Technology (1023-05-1125)

10:00AM (1421) *Negative correlations for spanning forests of graphs.*
David G. Wagner, University of Waterloo (1023-05-327)

10:30AM ► (1422) *Unavoidable Minors in Graphs.* Preliminary report.
Carolyn Chun*, **Guoli Ding**, **Bogdan Oporowski** and **Dirk Vertigan**, Louisiana State University (1023-05-1321)

AMS Special Session on Time Scales: Dynamic Equations with Applications, I

8:00 AM – 10:55 AM

Organizers: **Martin J. Bohner**, University of Missouri-Rolla
Allan C. Peterson, University of Nebraska-Lincoln

8:00AM (1423) *Delay Dynamic Equations.* Preliminary report.
Lynn H Erbe* and **Allan C Peterson**, University of Nebraska, Lincoln, Nebraska (1023-39-888)

8:30AM (1424) *Fractional q-calculus on a time scale.*
Ferhan M Atici, Western Kentucky University, and **Paul W Eloe***, University of Dayton (1023-39-441)

9:00AM ► (1425) *A generalized upper and lower solution method for singular boundary value problems for the one-dimensional p-Laplacian on time scales.* Preliminary report.
Elvan Akin-Bohner*, University of Missouri-Rolla, and **Ravi Agarwal**, Florida Institute of Technology (1023-34-1234)

9:30AM ► (1426) *Solvability of some nonlinear boundary value problems.*
Christopher C. Tisdell, The University of New South Wales (1023-34-433)

10:00AM (1427) *Convergence of Solutions of Dynamic Equations on Time Scales.*
Bonita A. Lawrence and **Ralph W. Oberste-Vorth***, Marshall University (1023-34-1298)

10:30AM (1428) *Feasible Approximations of Hybrid Dynamic Derivatives on Time Scales.* Preliminary report.
Qin Sheng, Baylor University (1023-39-979)

AMS Special Session on Arithmetic Geometry, I

8:00 AM – 10:55 AM

Organizers: **Matthew H. Baker**, Georgia Institute of Technology
Bjorn Poonen, University of California Berkeley

8:00AM (1429) *Improvements on the Index of Cyclotomic Units.*
Mairead Greene, University of Massachusetts (1023-11-109)

8:30AM (1430) *Finding large Selmer groups over Galois extesions of number fields.*
Barry Mazur, Harvard University, and **Karl Rubin***, UC Irvine (1023-11-1011)

9:00AM (1431) *Bounds for torsion in class groups.*
Jordan S Ellenberg*, University of Wisconsin, and **Akshay Venkatesh**, New York University (1023-11-423)

9:30AM (1432) *There exist infinitely many rational Diophantine 6-tuples – almost.* Preliminary report.
Edray Herber Goins, Purdue University (1023-11-456)

10:00AM (1433) *Galois Covers of the Open p-adic Disc.* Preliminary report.
Scott Corry, University of Pennsylvania (1023-12-103)

10:30AM (1434) *On uniqueness of p-adic period morphisms.*
Wieslawa Niziol, University of Utah (1023-11-1789)

AMS Special Session on Computational Algebraic and Analytic Geometry for Low-Dimensional Varieties, I

8:00 AM – 10:55 AM

Organizers: **Mika K. Seppälä**, Florida State University
Tanush T. Shaska, Oakland University
Emil J. Volcheck, Association for Computing Machinery

8:00AM (1435) *The p-torsion of hyperelliptic curves with extra automorphisms.*
Darren B Glass, Gettysburg College (1023-14-1337)

8:30AM (1436) *Cantor Versus NUCOMP on Hyperelliptic Curves.*
Michael J. Jacobson Jr., **Renate Scheidler***, University of Calgary, and **Andreas Stein**, University of Wyoming (1023-11-1191)

9:00AM ► (1437) *What is NUCOMP?* Preliminary report.
Andreas Stein*, University of Wyoming, **Michael J Jacobson** and **Renate Scheidler**, University of Calgary (1023-11-1042)

9:30AM (1438) *Genus calculations for towers of function fields arising from equations of C_{ab} curves.*
Caleb M. Shor, Bates College (1023-14-953)

10:00AM (1439) *Endomorphism algebras of hyperelliptic jacobians.*
Arsen Elkin*, Colorado State University, and **Yuri Zarhin**, Pennsylvania State University (1023-14-1175)

10:30AM (1440) *Bernstein Sato polynomial in low dimension.*
Darren Salven Tapp, Purdue University (1023-14-942)

AMS Special Session on Commutative Algebra and Algebraic Geometry, I

8:00 AM – 10:55 AM

Organizers: **Paul C. Roberts**, University of Utah
Anurag K. Singh, University of Utah
Oana Veliche, University of Utah

8:00AM (1441) *The Newton Polytope of the Implicit Equation.* **Bernd Sturmfels**, UC Berkeley, **Jenia Tevelev**, University of Massachusetts, Amherst, and **Josephine Yu***, UC Berkeley (1023-14-285)

8:30AM (1442) *Resultant formula for the $A-$ discriminant and dual defect toric varieties.* **Raymond P Curran**, Metropolitan State College of Denver (1023-14-1697)

9:00AM (1443) *Generalized Green's Theorem.* **Irena Peeva***, Cornell Univ., and **Jeff Mermin**, Univ. of Kansas (1023-13-302)

9:30AM ► (1444) *Resolutions of square-free monomial ideals.* **Tai Huy Ha**, Tulane University (1023-13-1144)

10:00AM (1445) *The homogeneous coordinate rings of some Del Pezzo surfaces.* **Mike Stillman**, **Damiano Testa** and **Mauricio Velasco***, Cornell University (1023-13-1020)

10:30AM (1446) *Relative and Tate Cohomology for modules of fintie G_C-dimension.* Preliminary report. **Diana M White***, University of Nebraska, and **Ryo Takahashi**, Meiji University (1023-13-957)

AMS Session on Probability and Statistics, I

8:00 AM – 10:55 AM

8:00AM (1447) *Convergence in Distribution of Random Compact Sets in Polish Spaces.* **Hussain Elalaoui-Talibi***, Tuskegee University, and **Lisa D. Peterson**, Auburn, Alabama (1023-60-1285)

8:15AM (1448) *On the compact support property of solutions of hyperbolic SPDE.* **Hassan Allouba** and **Oleksiy Ignatyev***, Kent State University (1023-60-1319)

8:30AM (1449) *A New Look at Stopping Times Related to Trading Techniques.* **Vilen Abramov*** and **Kazim M Khan**, Kent State University (1023-60-1328)

8:45AM (1450) *On the Replicator Dynamics behavior under Stratonovich type random perturbations.* **R. Khasminskii** and **N. Potsepun***, Wayne State University (1023-60-1394)

9:00AM (1451) *Using the pmf of the time to reach a subset of states in an irreducible finite Markov chain for clustering.* Preliminary report. **Maxim J. Goldberg***, Ramapo College of NJ, and **Seonja Kim**, Fairleigh Dickinson University (1023-60-1400)

9:15AM (1452) *From Random Matrices to Stochastic Operators.* **Brian D. Sutton***, Randolph-Macon College, and **Alan Edelman**, Massachusetts Institute of Technology (1023-60-149)

9:30AM ► (1453) *The Theory of Lumpness: A Geometric Approach to the Expected Distance Between Two Points in a Probability Distribution Function in R^n.* Preliminary report. **George A Khachatryan**, University of Chicago (1023-60-1568)

9:45AM (1454) *Evaluation formulas for conditional functional space integrals II.* **Seung Jun Chang**, Dankook University, **Jae Gil Choi**, Dankook University, Cheonan, Korea, and **David L. Skoug***, University of Nebraska-Lincoln (1023-60-1674)

10:00AM (1455) *Maximum queue length for a Gaussian queueing model.* **Yasong Jin*** and **Tyrone E. Duncan**, University of Kansas (1023-60-171)

10:15AM (1456) *Asymptotic Decay of the Ruin Probability in a Renewal Risk Process with Uncertain Investments.* Preliminary report. **Corina D. Constantinescu*** and **Enrique A. Thomann**, Oregon State University (1023-60-1765)

10:30AM (1457) *Fractional Stability Of Functional CLT.* **Yuriy V Kolomiets**, Kent State University (1023-60-1769)

10:45AM ► (1458) *On the relationship between Spearman's rho and Kendall's tau for continuous random variables.* **Gregory A. Fredricks** and **Roger B. Nelsen***, Lewis & Clark College (1023-62-144)

AMS Session on Numerical Analysis and Computer Science, I

8:00 AM – 10:55 AM

8:00AM (1459) *A W-Cycle Multigrid Algorithm for a New NIPG Method.* **Susanne C Brenner**, Louisiana State University and the Unversity of South Carolina, and **Luke N Owens***, University of South Carolina (1023-65-1049)

8:15AM (1460) *Binomial tau-leap Spatial Stochastic Simulation Algorithm.* **Tatiana T Marquez-Lago*** and **Kevin Burrage**, Advanced Computational Modelling Centre, University of Queensland (1023-65-1066)

8:30AM (1461) *Is symplectic-energy-momentum integration well-posed?* **Yosi Shibberu**, Rose-Hulman Institute of Technology (1023-65-1367)

8:45AM ► (1462) *Electromagnetic-Thermal Model of Microwave Processing.* Preliminary report. **Erin M Kiley*** and **Dena Feldman**, WPI Center for Industrial Mathematics and Statistics (1023-65-1513)

9:00AM (1463) *solving polynomial systems by parallel polyhedral homotopies.* **Jan Verschelde**, University of Illinois at Chicago, and **Yan Zhuang***, UIC (1023-65-1520)

9:15AM ► (1464) *High-order, compact difference schemes of heat-conducting problems.* Preliminary report. **Jennifer Zhao***, University of Michigan-Dearborn, **Weizhong Dai** and **Suyang Zhang**, Louisiana Tech. University (1023-65-1541)

9:30AM (1465) *Restarted Nonsymmetric Lanczos and Two-Sided Arnoldi.* Preliminary report. **Dywayne A Nicely**, Baylor University (1023-65-1603)

9:45AM (1466) *The quality of approximation bases for the Helmholtz equation.* Preliminary report. **Timo Betcke**, TU Braunschweig (1023-65-166)

10:00AM ► (1467) *Mathematical Modeling of Elastic Snap Through.* Preliminary report. **Mark S. Korlie**, Montclair State University (1023-65-1669)

10:15AM (1468) *Numerical Methods for the Stochastic Landau-Lifshitz Navier-Stokes Equations.* **John B. Bell**, Center for Computational Science and Engineering, Lawrence Berkeley National Laboratory, **Sarah A. Williams***, Graduate Group in Applied Mathematics, University of California, Davis, and **Alejandro L. Garcia**, Department of Physics, San Jose State Univesity (1023-65-1702)

10:30AM (1469) *Global multiscale finite element methods for elliptic equations.* **Lijian Jiang**, Texas A&M University (1023-65-1893)

10:45AM (1470) *A Cayley transformed Lanczos-Schur algorithm for large unitary eigenproblems.* **Roden J. A. David**, Washington State University (1023-65-784)

MAA Session on Applications of Discrete Mathematics, I

8:00 AM – 10:55 AM

Organizers: **Thomas Koshy**, Framingham State College
Thomas Moore, Bridgewater State College

8:00AM ► (1471) *Community Structure in the United States Congress.* **Mason A Porter**, California Institute of Technology (1023-D1-48)

8:20AM ► (1472) *Computer Science, Stong Induction and Pile-Splitting.* **Bill Marion**, Valparaiso University (1023-D1-52)

8:40AM ► (1473) *Matching Columns in a Cyclically Repeated Pattern of 3 Colors.* **Ashish K. Srivastava*** and **Steve Szabo**, Ohio University (1023-D1-98)

9:00AM (1474) *Network Flow Problems with Path Capacities.* Preliminary report. **Maren Martens*** and **Martin Skutella**, Dortmund University (1023-D1-128)

9:20AM ► (1475) *A Real-World Scheduling Problem in the Undergraduate Algorithms Course.* Preliminary report. **Yana Kortsarts**, Widener University, Computer Science Department (1023-D1-172)

9:40AM ► (1476) *Discrete Approximation to a Steady-State Temperature Distribution.* **Jenny Switkes***, **Gordon Safely** and **Anh Tran**, Cal Poly Pomona (1023-D1-353)

10:00AM ► (1477) *Integrating Programming into Discrete Mathematics.* Preliminary report. **Keith E Howard**, Mercer University (1023-D1-439)

10:20AM ► (1478) *Jacobsthal Compositions.* **Ralph P. Grimaldi**, Rose-Hulman Institute of Technology (1023-D1-488)

10:40AM (1479) *The Spectral Radius of Submatrices of Laplacian Matrices for Graphs.* Preliminary report. **Jason J Molitierno**, Sacred Heart University (1023-D1-561)

MAA Session on Assessment of Student Learning in Undergraduate Mathematics, I

8:00 AM – 10:55 AM

Organizers: **William Martin**, North Dakota State University
Bernard L. Madison, University of Arkansas

8:00AM ► (1480) *Assessing Student Attitudes On the Value of Introductory Statistics.* Preliminary report. **Milo Schield**, Augsburg College (1023-D5-76)

8:15AM ► (1481) *Assessment as a Vehicle for Change.* **Jill Shahverdian**, Quinnipiac University (1023-D5-1361)

8:30AM (1482) *Building an Assessment Program for a Liberal Arts Math Major from Scratch.* **Sarah Hutcheson Jahn** and **Robert J. Krueger***, Concordia University, St. Paul (1023-D5-592)

8:45AM ► (1483) *Programmatic Assessment of Proof Writing.* Preliminary report. **Karen Batt Stanish**, Keene State College (1023-D5-1686)

9:00AM ► (1484) *Implementing Assessment Plans for Programs in Mathematics and Computer Science: What We Have Learned through Two Cycles.* **Ken Luther*** and **Bill Marion**, Valparaiso University (1023-D5-51)

9:15AM ► (1485) *The Calculus Concept Inventory, Validation and Analysis of Results Correlated with Teaching Methodology.* **Jerome S. Epstein**, Polytechnic University (1023-D5-394)

9:30AM ► (1486) *A Case Study of Assessment of the Academic Major and the Quantitative Reasoning Component of the Liberal Learning Curriculum at The College of New Jersey and Its Possible Application Elsewhere.* Preliminary report. **Edward J. Conjura*** and **Cathy Liebars**, The College of New Jersey (1023-D5-701)

9:45AM ► (1487) *The Mathematics Core: A Question of Fairness.* **Barbara M Moskal***, **Scott Strong** and **Graeme Fairweather**, Colorado School of Mines (1023-D5-717)

10:00AM (1488) *Assessment of the Major Made Simple.* **Pamela B. Pierce*** and **James L. Hartman**, The College of Wooster (1023-D5-1519)

10:15AM ► (1489) *Teaching to the Test (or how I stopped worrying and learned to love the Major Field Achievement Test.).* **William P Abrams*** and **Jeffery Peden**, Longwood University (1023-D5-354)

10:30AM (1490) *Undergraduate Assessment in Mathematics at a Four-Year Comprehensive University.* Preliminary report. **Kevin E. Charlwood**, Washburn University (1023-D5-415)

10:45AM ► (1491) *A Follow-up on Using Portfolios in Mathematics Education Programs to Assess Content and Connect to Future Practice.* **Janet A. White*** and **Dorothee J. Blum**, Millersville University of PA (1023-D5-427)

MAA Session on College Algebra: Concepts, Data, and Models, II

8:00 AM – 10:55 AM

Organizers: **Florence S. Gordon**, New York Institute of Technology
Mary Robinson, University of New Mexico Valencia Campus
Norma Agras, Miami Dade Community College
Laurette Foster, Prairie View A&M University

8:00AM ► (1492) *Integrating Applications, Modeling, and Technology in a College Algebra Course.* **Ronald J Harshbarger***, University of South Carolina Beaufort, and **Lisa S Yocco**, Georgia Southern University (1023-F1-497)

8:15AM ► (1493) *"Search for Meaning" in a College Algebra Course.* Preliminary report. **Kyong-Hee M Lee**, Colby-Sawyer College (1023-F1-120)

8:30AM (1494) *Designing, Teaching, and Researching Contemporary Based College Algebra Courses.* **Erick Brian Hofacker**, University of Wisconsin - River Falls (1023-F1-1855)

8:45AM ► (1495) *Data Exploration and Modeling in a College Algebra Course: Use of Heart Rate Data to Investigate Recovery Time of Athletes.* **Erica Slate Young**, United States Military Academy at West Point (1023-F1-1718)

9:00AM (1496) *Beginning with a 21st Century View: Mathematical Modeling and Problem Solving Courses with Interdisciplinary Applications in College Algebra.* **William P Fox**, Naval Postgraduate School (1023-F1-624)

9:15AM ► (1497) *College Algebra across the City.* **Elizabeth Jane Kreston**, University of the Incarnate Word (1023-F1-388)

9:30AM (1498) *An Excel-lent Approach to College Algebra.* **Eric Gaze**, Alfred University (1023-F1-754)

9:45AM ► (1499) *Mathematics, Geography, and Data:Introducing Geographic Concepts in Mathematics Classes.* **Robert J Hickey*** and **Stuart Boersma**, Central Washington University (1023-F1-1271)

10:00AM (1500) *Understanding Algebra while Learning Calculus: A successful integrated course.* **Alicia Sevilla*** and **Kay Somers**, Moravian College (1023-F1-688)

10:15AM ► (1501) *Steroids, Alcohol and Birth Control: Precalculus Investigations of Current Health Issues.* **Theresa Laurent**, St. Louis College of Pharmacy (1023-F1-896)

10:30AM ► (1502) *The Optimal Origami Box.* **Shelly Smith**, Grand Valley State University (1023-F1-589)

10:45AM (1503) *The Traveling Salesman Solves a Meals on Wheels Problem: Utilizing Academic Service Learning in an Integrated Algebra and Computer Science Course.* **Joanne C. Caniglia*** and **Krish Narayanan**, Eastern Michigan University (1023-F1-18)

MAA General Contributed Paper Session, VII

8:00 AM – 10:55 AM

Organizers: **Eric S. Marland**, Appalachian State University
Jay A. Malmstrom, Oklahoma State Community College

8:00AM ► (1504) *Perfect Matchings in Pruned Grid Graphs.* **David R Guichard**, Whitman College (1023-Z1-697)

8:15AM ► (1505) *Disjunctive Rado Numbers for a pair of Schur Like Equations.* **Dusty E. Sabo***, Southern Oregon University, **Daniel Schaal**, South Dakota State University, and **Jacent Tokaz**, National Security Agency (1023-Z1-1336)

8:30AM ► (1506) *Cantor's Set and the Continuum Hypothesis.* **H Vic Dannon**, California (1023-Z1-17)

8:45AM ► (1507) *Computational Exercises on Carmichael Numbers and Pollard Rho Factorization.* **William R. Harris**, Georgetown College (1023-Z1-507)

9:00AM (1508) *An Explicit Plancherel Formula for Certain Completely Solvable Homogeneous Spaces.* **Katrina Ashford Cunningham**, Southern University and A&M College (1023-Z1-1040)

9:15AM ► (1509) *Natural Parameterizations of a Region.* **William Freed**, Concordia University College of Alberta (1023-Z1-387)

9:30AM ► (1510) *An Introduction to Product Calculus.* **Michael Z. Spivey**, University of Puget Sound (1023-Z1-303)

9:45AM ► (1511) *When Is The Derivative Of A Composition The Composition Of The Derivatives?* Preliminary report. **Marcus Pendergrass**, Hampden-Sydney College (1023-Z1-1783)

10:00AM ► (1512) *Using mnemonic and Ausubelian concept mapping to teach "and/or" probability problems.* Preliminary report. **M. A. Hamid**, Temple University (1023-Z1-1380)

10:15AM ► (1513) *Whad'Ya Know?: Classroom Voting in a Liberal Arts Mathematics Course.* Preliminary report. **Jean M McGivney-Burelle*** and **Raymond J. McGivney**, University of Hartford (1023-Z1-1184)

10:30AM ► (1514) *More than Just Math: A Study of Collaboration and Community Building in the Undergraduate Math Classroom.* Preliminary report. **Janet Thiel**, Villa Julie College, Stevenson, MD & Towson University (1023-Z1-653)

10:45AM ► (1515) *Teaching Optimization at a Liberal Arts College to Math and CS Majors.* **William P Fox**, Naval Postgraduate School (1023-Z1-622)

AMS Session on Operator Theory and Optimal Control, I

8:15 AM – 10:25 AM

8:15AM (1516) *On The Commutator Ideal of the Toeplitz Algebra on the Bergman Space of the Unit Ball in $\mathbb{C}^n$.* **Trieu Le**, University at Buffalo (1023-47-114)

8:30AM (1517) *Composition operators on Banach spaces of analytic functions of the unit ball.* **Matthew A Pons**, University of Virginia (1023-47-1185)

8:45AM (1518) *Determining the Membership of Hankel Operators in the Symmetrically-Normed Ideals of the Segal-Bargmann Space.* Preliminary report. **D K Farnsworth**, University at Buffalo (1023-47-1194)

9:00AM (1519) *Compact quantum group actions on C*-algebras.* **Raluca Dumitru**, University of Cincinnati (1023-47-1397)

9:15AM (1520) *Invariant subspaces of parabolic non-automorphisms in the Hardy space.* Preliminary report. **Alfonso Montes-Rodriguez**, **Manuel Ponce-Escudero*** and **Stanislav A. Shkarin**, Universidad de Sevilla (1023-47-1434)

9:30AM (1521) *Basic sequencies, non-cyclicity and quasinilpotent supercyclic operators.* Preliminary report. **Alfonso Montes-Rodriguez**, **Alejandro Rodriguez-Martinez*** and **Stanislav Shkarin**, Universidad de Sevilla (1023-47-1435)

9:45AM Break.

10:00AM ► (1522) *Operator Means and its appllication in solving a class of operator equation.* **Mohammad Khadivi**, Jackson State University (1023-47-1675)

10:15AM (1523) *Hyperinvariant Subspaces for some Operator-Weighted Bilateral Shifts.* **Sami M. Hamid***, University of North Florida, and **Carl Pearcy**, Texas A&M University (1023-47-1883)

AMS Session on Combinatorics, III

8:15 AM – 10:40 AM

8:15AM ► (1524) *On the expected height of t-ary trees under random edge compression.* Preliminary report. **Joshua Zahl**, California Institute of Technology (1023-05-424)

8:30AM (1525) *Splitter Theorems for 4-regular Planar Graphs.* **Guoli Ding**, Louisiana State University, and **Jinko Kanno***, Louisiana Tech University (1023-05-431)

8:45AM Break.

9:00AM (1526) *Muti-restrained Stirling numbers.* Preliminary report. **Ji Young Choi**, Shippensburg University of PA (1023-05-478)

9:15AM ► (1527) *An Analysis of Random Words of Fixed Length.* Preliminary report. **Gerald Y. Agbegha**, Johnson C. Smith University (1023-05-571)

9:30AM ► (1528) *A Variation on Binomial Coefficients and an Application to Probability.* **Michael J. J. Barry**, Allegheny College (1023-05-598)

9:45AM ► (1529) *Line graphs, average degree, and percolation threshold approximation formulas.* Preliminary report. **John C Wierman**, Johns Hopkins University (1023-05-602)

10:00AM (1530) *Some results on graphs with non-surjective optimal $L(2,1)$-labelings.* **John P. Georges**, **David Mauro** and **Yan Wang***, Trinity College (1023-05-655)

10:15AM (1531) *Obtaining a uniformly dense graph from a non-uniformly dense graph.* **Lavanya Kannan***, Texas A&M University, **Hong-Jian Lai**, West Virginia University, and **Hongyuan Lai**, School craft College (1023-05-709)

10:30AM ► (1532) *On Fully Orientability of Graphs.* Preliminary report. **H. H. Lai**, National Taiwan University, and **K. W. Lih***, Academia Sinica (1023-05-721)

AWM Workshop

8:20 AM – 4:30 PM

This session has several parts listed separately by time in the program. Listed Workshop presentations are open to all JMM participants.

AWM Workshop: Research Presentations by Recent Ph.D.'s, I

8:30 AM – 10:20 AM

8:30AM ► (1533) *Categorical Self-Distributivity.* **Alissa S. Crans***, Loyola Marymount University, **J. Scott Carter**, University of South Alabama, **Mohamed Elhamdadi** and **Masahico Saito**, University of South Florida (1023-81-1268)

9:00AM (1534) *Optimal Harvesting of a Semilinear Elliptic Fishery Model.* **Wandi Ding*** and **Suzanne Lenhart**, University of Tennessee-Knoxville (1023-49-857)

9:30AM (1535) *Thirteen ways of looking at a topological group.* **Julie Bergner**, Kansas State University (1023-55-753)

10:00AM (1536) *Nonpositively curved decompositions of Coxeter groups.* **Angela Kubena Barnhill**, The Ohio State University (1023-20-1284)

AMS Committee on Education Panel Discussion

8:30 AM – 10:00 AM

A panel on the National Math Panel.

Organizer: **William G. McCallum**, University of Arizona

Presenters: **Francis Fennell**, National Council of Teachers of Mathematics

Larry R. Faulkner, University of Texas at Austin

MAA Session on Integrating Mathematics and Biology in Undergraduate Education, III

8:40 AM – 10:35 AM

Organizers: **Glenn W. Ledder**, University of Nebraska-Lincoln

Yajun Yang, Farmingdale State University of New York

Jack Bookman, Duke University

James P. Fulton, Suffolk County Community College

8:40AM ► (1537) *Biology Content in Calculus Labs.* Preliminary report. **Joseph F. Kolacinski***, Elmira College, and **John E. Beam**, University of Wisconsin Oshkosh (1023-K1-1826)

9:00AM (1538) *Bringing Life to Biocalculus: Lab Projects and Seminar Series.* **Timothy D. Comar**, Benedictine University (1023-K1-161)

9:20AM ► (1539) *Computing with Bacteria: The New Wave of Synthetic Biology.* Preliminary report. **Laurie J Heyer*** and **A. Malcolm Campbell**, Davidson College (1023-K1-617)

9:40AM ► (1540) *An "Experimental" Interdisciplinary Course in Mathematical Ecology.* **Glenn Ledder***, University of Nebraska-Lincoln, and **Brigitte Tenhumberg**, School of Biological Sciences, Univesity of Nebraska-Lincoln (1023-K1-272)

10:00AM ► (1541) *Symbiosis: Integrating Mathematics and Statistics with an Introductory Biology Sequence.* **Jeff R. Knisley***, East Tennessee State University, and **Istvan Karsai**, Dept. of Biological Sciences, East Tennessee State University (1023-K1-1462)

10:20AM (1542) *Integrating Mathematics into the Introductory Biology Laboratory Course.* **James D White*** and **Jenna P Carpenter**, Louisiana Tech University (1023-K1-899)

AMS Invited Address

9:00 AM – 9:50 AM

(1543) *New combinatorics from the invariant theory of reflection groups.* **Victor S. Reiner**, School of Mathematics, University of Minnesota (1023-05-09)

ASL Invited Address

9:00 AM – 9:50 AM

(1544) *Recent Uses of Proof Theory in Nonlinear Analysis and Geodesic Geometry.*
Ulrich Kohlenbach, Darmstadt University of Technology (1023-03-411)

MAA Minicourse #10: Part B

9:00 AM – 11:00 AM

A beginner's guide to the scholarship of teaching and learning in mathematics.
Organizers: **Curtis D. Bennett**, Loyola Marymount University
Jacqueline M. Dewar, Loyola Marymount University

MAA Minicourse #16: Part B

9:00 AM – 11:00 AM

More music and mathematics.
Organizer: **Leon Harkleroad**, Wilton, ME

MAA Minicourse #4: Part B

9:00 AM – 11:00 AM

Creating visual mathematics applets using flash programming.
Organizers: **Douglas E. Ensley**, Shippensburg University
Barbara Kaskosz, University of Rhode Island

MAA Session on Mathematics of Chemistry

9:00 AM – 10:55 AM

Organizer: **George Rublein**, The College of William and Mary

9:00AM (1545) *A Combustion Model Exhibiting Metastability.*
Ronald E. Mickens, Clark Atlanta University (1023-L5-33)

► 9:20AM (1546) *Use of Singular Value Decomposition Theorem and Principal Component Analysis in Environmental Research—Research with Undergraduate Students.* Preliminary report.
Umesh P. Nagarkatte* and **Wilbert W. Hope**, Medgar Evers College, CUNY (1023-L5-1735)

► 9:40AM (1547) *Inquiry-based Exercises for Physical Chemistry: Hydrogenic Model.* Preliminary report.
Katie White*, **Megan Boyle**, **Toni L O Barstis**, **Joanne Snow** and **Jennifer Herdman**, Saint Mary's College, Notre Dame (1023-L5-1482)

10:00AM Break.

► 10:20AM (1548) *Total Differential and Partial Derivatives - A Different Perspective for Chemistry Students.* Preliminary report.
Lynn S. Bennethum, University of Colorado DHSC (1023-L5-773)

► 10:40AM (1549) *Calculus of Chemical Engineering Thermodynamics.*
Youyu Phillips, Keystone College (1023-L5-703)

MAA-YMN Panel Discussion

9:00 AM – 10:20 AM

Undergraduate career paths in mathematics.
Organizers: **Dov N. Chelst**, DeVry University
Vanessa Garcia, Texas State University, San Marcos
Panelists: **Ellen Pierce**, Casualty Actuarial Consultants, Inc.
Robert J. Frey, Stony Brook University
Kathy Lange, SAS Institute Inc.

MAA Panel Discussion

9:00 AM – 10:20 AM

Teaching and learning mathematics in a Computer Algebra Systems (CAS) enriched environment: College algebra to real analysis.
Organizer: **Wade Ellis, Jr.**, West Valley College
Panelists: **William C. Bauldry**, Appalachian State University

MAA Special Report

9:00 AM – 10:20 AM

Algebra: Gateway to a technological future.
Organizer: **Michael Pearson**, MAA

NAM Panel Discussion

9:00 AM – 9:50 AM

HBCUs prepare to reform college algebra courses.
Organizer: **Dennis Davenport**, U. S. Military Academy

Exhibits and Book Sales

9:00 AM – 1:00 PM

ASL Invited Address

10:00 AM – 10:50 AM

(1550) *Back and forth through computable model theory.*
Valentina S. Harizanov, George Washington University (1023-03-410)

NAM Business Meeting

10:00 AM – 10:50 AM

MAA Invited Address

10:05 AM – 10:55 AM

(1551) *Big waves on deep water.*
Jerry L. Bona, University of Illinois at Chicago (1023-A0-22)

AWM Workshop: Poster Session with Presentations from Women Recent Ph.D.s and Graduate Students

10:30 AM – 11:00 AM

10:30AM (1552) *High Order Fully Coupled Discontinuous Finite Element Methods For Two-Phase Flow.*
Yekaterina Epshteyn* and **Beatrice Riviere**, University of Pittsburgh (1023-65-765)

10:30AM (1553) *Spectral averaging in von Neumann algebras.* Preliminary report.
Vadim Kostrykin, Technische Universität Clausthal, **Konstantin A. Makarov** and **Anna Skripka***, University of Missouri-Columbia (1023-47-800)

10:30AM ► (1554) *Modeling Wormlike Micellar Solutions.* Preliminary report.
Paula A. Vasquez* and **L. Pamela Cook**, University of Delaware (1023-76-802)

10:30AM ► (1555) *Representations of the Braid Group via the Yang Baxter Equation.* Preliminary report.
Jennifer M. Franko, Indiana University, Bloomington (1023-54-842)

10:30AM (1556) *Large scale Bayesian parameter estimation and sensitivity analysis for the cardiac metabolism during ischemia.*
Rachael S Hageman*, Case Western Reserve University, Center for Modeling Integrated Metabolic Systems, **Erkki Somersalo**, Helsinki University of Technology, and **Daniela Calvetti**, Case Western Reserve University, Center for Modeling Integrated Metabolic Systems (1023-92-950)

10:30AM (1557) *Transmission Boundary Value Problems in Non-Smooth Domains.*
Katharine Ott* and **Irina Mitrea**, University of Virginia (1023-35-1025)

10:30AM ► (1558) *Visibility of Point Clouds and Mapping of Unknown Environments.*
Yanina Landa, University of California Los Angeles (1023-49-1069)

10:30AM (1559) *Semilinear Actions of Galois Groups and Descent in Algebraic K-Theory.*
G K Lyo, University of California, Berkeley (1023-55-1076)

10:30AM (1560) *Topological Properties of a DNA Computing Model.*
Daniela Genova, University of South Florida, Tampa, Florida (1023-68-1128)

10:30AM (1561) *Universal abelian covers of normal surface singularities of the form $\{z^n = f(x, y)\}$.*
Elizabeth A. Sell, University of North Carolina at Chapel Hill (1023-14-1374)

10:30AM (1562) *Localized Operators and the Construction of Localized Frames.* Preliminary report.
Akram Aldroubi and **Fumiko Futamura***, Vanderbilt University (1023-42-1508)

10:30AM ► (1563) *"Ramanujan's very interesting functions": mock theta functions and vector-valued Maass-Poincare series.*
Sharon Anne Garthwaite, University of Wisconsin - Madison (1023-11-1540)

MAA Business Meeting

11:10 AM – 11:40 AM

Organizer: **Martha J. Siegel**, Towson University
Moderator: **Carl C. Cowen**, IUPUI

AMS Business Meeting

11:45 AM – 12:15 PM

NAM Claytor-Woodard Lecture

1:00 PM – 1:50 PM

(1564) *Some mathematical models for modeling blood flow in the kidney.*
Nathaniel Whitaker, University of Massachusetts, Amherst (1023-76-416)

ASL Invited Address

1:00 PM – 1:50 PM

(1565) *Classifying Measure Preserving Transformations.*
Matthew D. Foreman, University of California Irvine (1023-03-407)

AMS-MAA-MER Special Session on Mathematics and Education Reform, II

1:00 PM – 5:55 PM

Organizers: **William H. Barker**, Bowdoin College
Dale R. Oliver, Humboldt State University
Bonnie S. Saunders, University of Illinois at Chicago
Michael Starbird, University of Texas, Austin

1:00PM ► (1566) *The Institute for Mathematics and Education at the University of Arizona.* Preliminary report.
William McCallum, University of Arizona (1023-97-1687)

1:30PM ► (1567) *A National Conference on Doctoral Programs in Mathematics Education: What issues should be addressed?* Preliminary report.
Robert Reys, University of Missouri (1023-97-544)

2:00PM ► (1568) *Enhancing the Teaching of Euclidean Geometry.*
Charlene E. Beckmann, Grand Valley State University (1023-97-1501)

2:30PM ► (1569) *Mathematicians and Teachers: From Summer Institutes to the School Year.*
James R King, University of Washington (1023-97-1322)

3:00PM ► (1570) *Report on Calculus at Macalester College.* Preliminary report.
David M Bressoud, Macalester College (1023-97-777)

3:30PM ► (1571) *Preparing Prospective Teachers to Teach AP Calculus.* Preliminary report.
Scott Baldridge, Louisiana State University (1023-97-355)

4:00PM ► (1572) *Teaching Calculus with Future Middle School Teachers.*
Bonnie S Saunders, University of Illinois at Chicago (1023-97-1608)

4:30PM ► (1573) *What is the effect of implementing a content/methods Calculus I course into a university science and mathematics secondary teacher preparation program?* Preliminary report.
Mark L. Daniels, University of Texas (1023-97-11)

5:00PM ► (1574) *An Interactive Online Calculus Text.*
David A. Smith* and **Lawrence C. Moore**, Duke University (retired) (1023-97-1653)

5:30PM ► (1575) *Calculus for the Public.*
Michael Starbird, University of Texas at Austin (1023-97-833)

AMS-MAA Special Session on History of Mathematics, IV

1:00 PM – 5:55 PM

Organizers: **Joseph W. Dauben**, Lehman College
Patti Hunter, Westmont College
Victor J. Katz, University of the District of Columbia
Karen H. Parshall, University of Virginia

1:00PM ► (1576) *Euler Incorporated in the United States: Textbooks, Mathematical Instruments, and Telescopes.* Preliminary report.
Peggy Aldrich Kidwell, National Museum of American History, Smithsonian Institution (1023-01-351)

1:30PM ► (1577) *"The Acknowledged National Standard": Charles Davies, A. S. Barnes, and Textbooks as Teaching Tools.*
Amy Ackerberg-Hastings, University of Maryland University College (1023-01-458)

2:00PM ► (1578) *Janos Bolyai's American supporter, G. B. Halsted.* Preliminary report.
Albert C. Lewis, Indiana Univ. - Purdue Univ. Indianapolis (1023-01-240)

2:30PM ► (1579) *Peirce's Cantor.* Preliminary report.
Matthew E Moore, Brooklyn College of the City University of New York (1023-01-787)

3:00PM (1580) *The other American mathematical congress.*
David E. Zitarelli, Temple University (1023-01-378)

3:30PM ► (1581) *Volterra in America.*
Judith R. Goodstein, California Institute of Technology (1023-01-645)

4:00PM ► (1582) *A punishment tour for "P" Echols.* Preliminary report.
Shawnee McMurran, California State University, San Bernardino, and U. S. Military Academy, and **V. Frederick Rickey***, U. S. Military Academy (1023-01-868)

4:30PM ► (1583) *Frege's Diary and Frege's Politics.*
Martin D Davis, UC Berkeley (visitor); NYU-Courant (Emeritus) (1023-01-276)

5:00PM ► (1584) *Applied Mathematics in Nazi Germany.*
Sanford L Segal, University of Rochester (1023-01-444)

5:30PM ► (1585) *World War II and After: Impact on American Women in Mathematics.* Preliminary report.
Judy Green, Marymount University, and **Jeanne LaDuke***, DePaul University (1023-01-586)

AMS Special Session on Group Representations, Ergodic Theory, and Mathematical Physics: Honoring the Memory of George W. Mackey, IV

1:00 PM – 3:45 PM

Organizers: **Robert S. Doran**, Texas Christian University
Calvin C. Moore, University of California Berkeley
Robert J. Zimmer, The University of Chicago

1:00PM (1586) *George W. Mackey's work on representation theory and foundations of physics.*
V S Varadarajan, University of California, Los Angeles, CA 90095-1555 (1023-22-273)

2:00PM (1587) *Induced representations, vector bundles, and projections.*
Marc A. Rieffel, University of California, Berkeley (1023-46-177)

2:30PM (1588) *Characters of tame supercuspidal representations.* Preliminary report.
Fiona Murnaghan, University of Toronto (1023-22-1588)

3:00PM (1589) *Counting intertwining operators for real reductive groups.*
David A. Vogan, MIT (1023-22-654)

AMS Special Session on Mapping Class Groups and Handlebodies, II

1:00 PM – 5:55 PM

Organizers: **Tara E. Brendle**, Louisiana State University
William R. Vautaw, Southeastern Louisiana University

1:00PM (1590) *Straightening tube sums.*
Martin Scharlemann, U. C. Santa Barbara (1023-57-670)

1:30PM (1591) *Mapping class groups of Heegaard splittings.* Preliminary report.
Jesse E Johnson*, Yale University, and **Hyam Rubinstein**, University of Melbourne (1023-57-921)

2:00PM (1592) *On some relations and homology of the Dehn twist quandle.*
Joel Zablow, Rochester Institute of Technology, Rochester N.Y. (1023-57-553)

2:30PM (1593) *Some homological properties on a handlebody group.*
Susumu Hirose, Saga University (1023-57-811)

3:00PM (1594) *Right-Veering Diffeomorphisms of Bordered Surfaces and the Burau Representation of B_3.*
Emille K. Davie, University of Georgia (1023-57-1050)

3:30PM (1595) *Heegaard splitting and 3-manifold invariants from the Johnson-Morita homomorphims.* Preliminary report.
Joan S. Birman, Columbia University, **Tara E Brendle**, Louisiana State University, and **Nathan D. Broaddus***, University of Chicago (1023-57-1243)

4:00PM (1596) *A Presentation For The Automorphisms Of The 3-Sphere That Preserve A Genus Two Heegaard Splitting.* Preliminary report.
Erol Akbas, University of Arkansas (1023-57-1033)

4:30PM (1597) *Surface homeomorphisms that do not extend to any handlebody.* Preliminary report.
Jamie Bradley Jorgensen, Rice University (1023-57-1172)

5:00PM (1598) *From handlebodies to closed 3-manifolds: a geometric approach.*
Hossein Namazi, Princeton University (1023-57-945)

5:30PM (1599) *A classification of automorphisms of 3–manifolds.* Preliminary report.
Leonardo N. Carvalho*, Universidade Federal Fluminense - Brazil, and **Ulrich Oertel**, Rutgers University - Newark (1023-57-1212)

AMS Special Session on Nonsmooth Analysis in Inverse and Variational Problems, II

1:00 PM – 5:55 PM

Organizers: **M. Zuhair Nashed**, University of Central Florida
Otmar Scherzer, University of Innsbruck

1:00PM (1600) *Asymptotic Convergence Analysis of a New Class of Proximal Point Methods.*
William W. Hager* and **Hongchao Zhang**, University of Florida (1023-49-530)

1:30PM (1601) *Slant Differentiability of Nonlinear Operators with Applications to Ill-Posed Inverse Problems.*
M. Zuhair Nashed, University of Central Florida (1023-49-1664)

2:00PM (1602) *Generalized gradient methods for non-linear inverse problems with sparsity constraints.* **Kristian Bredies**, University of Bremen (1023-49-1117)

2:30PM (1603) *TV Regularization versus Taut String for Density Estimation.* **Otmar Scherzer**, Computer Science (1023-35-1912)

3:00PM (1604) *Convergence rates for non-quadratic regularization of nonlinear inverse problems.* **Elena Resmerita***, Johann Radon Institute for Computational and Applied Mathematics, and **Otmar Scherzer**, University of Innsbruck (1023-49-1688)

3:30PM (1605) *Nonlinear Generalized Functions as a tool for Nonsmooth Nonlinear Problems in Mathematics and Physics.* **J.F. Colombeau**, Université de Grenoble 1 (1023-46-480)

4:00PM (1606) *Existence of multiple solutions of nonlinear elliptic equations driven by the p-Laplacian.* **Nikolaos S. Papageorgiou**, National Technical University, Athens, Greece (1023-35-1921)

4:30PM (1607) *Dual settings for total variation regularization.* **Markus Grasmair**, Department of Computer Science, University of Innsbruck, Austria (1023-49-1498)

5:00PM (1608) *Detecting Interfaces in a Parabolic-Elliptic Problem.* **Florian Frühauf**, University of Innsbruck, Austria, **Bastian Gebauer***, Joh. Gutenberg-Universität Mainz, Germany, and **Otmar Scherzer**, University of Innsbruck, Austria (1023-35-716)

5:30PM (1609) *On Nonsmooth Approximate Maximum Principle.* **Ilya Shvartsman***, Miami University, and **Boris S Mordukhovich**, Wayne State University (1023-49-782)

AMS Special Session on Recent Advances in Mathematical Biology, Ecology, and Epidemiology, II

1:00 PM – 5:55 PM

Organizers: **Lih-Ing Roeger**, Texas Tech University
Linda J. Allen, Texas Tech University
Sophia Jang, University of Louisiana at Lafayette

1:00PM ► (1610) *Dynamics of a Discontinuous Discrete Model of West Nile-Like Epidemics.* **Vlajko L. Kocic**, Xavier University of Louisiana (1023-39-365)

1:30PM ► (1611) *Control of an Epidemic Model of Rabies in Raccoons.* Preliminary report. **Suzanne Lenhart**, University of Tennessee (1023-92-249)

2:00PM (1612) *Dynamic Reduction, the Periodic Ricker Map and Genetically Altered Mosquitos.* **Robert J. Sacker***, University of Southern California, and **Hubertus F. von Bremen**, California State Polytechnic University (1023-92-1255)

2:30PM (1613) *Disease extinction and persistence in spatially heterogeneous host-parasite models with inter-patch travel.* Preliminary report. **Thanate Dhirasakdanon**, **Horst R. Thieme***, Arizona State University, and **Pauline van den Driessche**, University of Victoria (1023-92-1282)

3:00PM (1614) *Modeling relapse in infectious diseases.* **P. van den Driessche**, Department of Mathematics and Statistics, University of Victoria (1023-92-593)

3:30PM (1615) *Effect of the introduction of refractory vectors in a vector-borne disease.* **Julien Arino**, University of Manitoba (1023-92-1642)

4:00PM (1616) *The Final Size of a SARS Epidemic Model Without Quarantine.* Preliminary report. **Sze-Bi Hsu**, National Tsing Hua University, and **Lih-Ing W. Roeger***, Texas Tech University (1023-92-515)

4:30PM (1617) *Comparative estimation of the reproduction number for pandemic influenza from daily case notification data.* **Gerardo Chowell***, Los Alamos National Laboratory, **Hiroshi Nishiura**, Institut fuer Medizinische Biometrie, Universitaet Tuebingen, and **Luis MA Bettencourt**, Los Alamos National Laboratory (1023-92-816)

5:00PM (1618) *Optimal Flooding and Native-Invasive Plant Population Dynamics.* **Daniel L Kern***, University of Nevada, Las Vegas, and **Suzanne M Lenhart**, University of Tennessee (1023-92-110)

5:30PM (1619) *On a discrete West Nile epidemic model.* **Sophia R.-J. Jang**, University of Louisiana at Lafayette (1023-92-1140)

AMS Special Session on Recent Developments in Floer Homology, II

1:00 PM – 5:55 PM

Organizers: **Scott J. Baldridge**, Louisiana State University
Ronald A. Fintushel, Michigan State University
Thomas E. Mark, Southeastern Louisiana University
Brendan E. Owens, Louisiana State University

1:00PM (1620) *Compactness for folded holomorphic maps.* **Jens von Bergmann**, University of Notre Dame (1023-58-1593)

1:30PM (1621) *Computations of Floer Homology for certain Lagrangian Tori in closed 4-manifolds.* **Adam C Knapp**, Michigan State University (1023-53-1691)

2:00PM (1622) *On knot Floer homology.* **Peter S Ozsvath**, Columbia University (1023-57-1129)

3:00PM (1623) *Topological triviality of smoothly knotted surfaces in 4-manifolds.* **Hee Jung Kim***, McMaster University, and **Daniel Ruberman**, Brandeis University (1023-57-636)

3:30PM (1624) *Open Book Decompositions of Torus Bundles over S^1.* **Jeremy Van Horn-Morris**, University of Texas at Austin (1023-54-1555)

4:00PM (1625) *Thurston-Bennequin bounds for knots in more general contact manifolds.* Preliminary report. **Matthew E Hedden**, Massachusetts Institute of Technology (1023-51-558)

4:30PM (1626) *Heegaard Floer homology and Periodic Knots.* Preliminary report. **Sridhar Rajagopalan**, Brandeis University (1023-55-1509)

5:00PM (1627) *Generalizations of symplectic structures and Lefschetz fibrations on smooth 4-manifolds.* **R Inanc Baykur**, Michigan State University (1023-53-341)

5:30PM (1628) *Floer homology and gluing three-manifolds along torus boundary.*
E Eftekhary, Harvard University (1023-55-1538)

AMS Special Session on Representation Theory and the Theta Correspondence, II

1:00 PM – 6:00 PM

Organizers: **Wee Teck Gan**, University of California San Diego
Hongyu He, Louisiana State University
Annegret Paul, Western Michigan University

1:00PM (1629) *An approach to the local theta correspondence through invariants?*
Roger Howe, Yale University (1023-22-307)

2:00PM (1630) *Signatures of invariant Hermitian forms on irreducible highest weight modules and signed Kazhdan-Lusztig polynomials.*
Wai Ling Yee, University of Windsor (1023-22-1525)

2:30PM (1631) *Lifting of characters on $p-$adic orthogonal and metaplectic groups.*
Tatiana K Howard, University of Maryland College Park (1023-22-436)

3:00PM (1632) *Bernstein's center for real groups.*
Gordan Savin*, University of Utah, and **Goran Muic**, University of Zagreb (1023-22-464)

3:30PM (1633) *On the global non-vanishing of theta lifts from even orthogonal groups.*
Shuichiro Takeda, University of California, San Diego (1023-11-1289)

4:00PM (1634) *Minimal polynomials and elementary divisors for simple highest weight modules.* Preliminary report.
Victor Protsak, University of Oklahoma (1023-22-1432)

4:30PM (1635) *Small principal series and representations of rank two.*
Hadi Salmasian, Queen's University, Kingston, Ontario, Canada (1023-22-1108)

5:00PM (1636) *Topology of Siegel modular threefolds and theta lifting.* Preliminary report.
Hongyu He and **Jerome William Hoffman***, Louisiana State University (1023-14-692)

5:30PM Discussion.

AMS Special Session on Structure Theory for Matroids and Graphs, II

1:00 PM – 5:55 PM

Organizers: **Joseph P. Kung**, University of North Texas
Bogdan S. Oporowski, Louisiana State University
James G. Oxley, Louisiana State University

1:00PM (1637) *Towards a structure theory for matroids.*
Bert Gerards, Centrum voor Wiskunde en Informatica, Amsterdam & Technische Universiteit Eindhoven (1023-05-1266)

2:00PM (1638) *Ore-Type and Dirac-Type Theorems for Matroids.*
Sean McGuinness, Dartmouth College (1023-05-752)

2:30PM (1639) *Transversal Lattices.*
Joseph E. Bonin, The George Washington University (1023-05-220)

3:00PM (1640) *Non-separating cocircuits in 3-connected binary matroids.*
Haidong Wu, University of Mississippi (1023-05-788)

3:25PM Break

4:00PM (1641) *On Kung's Growth-Rate Conjecture.*
Jim Geelen, University of Waterloo (1023-05-1277)

5:00PM (1642) *Conjectures on clones, connectivity, and cycles in matroids.*
Talmage J Reid, The University of Mississippi (1023-05-520)

5:30PM (1643) *Can anything general be said about minor-closed classes of matroids?* Preliminary report.
Joseph P Kung, University of North Texas (1023-05-333)

AMS Special Session on Time Scales: Dynamic Equations with Applications, II

1:00 PM – 5:55 PM

Organizers: **Martin J. Bohner**, University of Missouri-Rolla
Allan C. Peterson, University of Nebraska-Lincoln

► 1:00PM (1644) *A Nonlinear Sturm–Picone Comparison Theorem for Dynamic Equations on Time Scales.*
Boris Belinskiy, **John R Graef***, University of Tennessee at Chattanooga, and **Sonja Petrovic**, University of Kentucky (1023-39-1131)

1:30PM (1645) *Asymptotic Behavior of Solutions for Neutral Dynamic Equations on Time Scales.*
Douglas Anderson, Concordia College–Moorhead (1023-34-316)

2:00PM (1646) *Oscillatory Criteria for a Three Dimensional System on a Time Scale.* Preliminary report.
E. Akin-Bohner, University of Missouri Rolla, **Z. Dosla**, Masarykova Univerzita, and **B Lawrence***, Marshall University (1023-34-1263)

► 2:30PM (1647) *Asymptotic stability for 2x2 dynamic systems on time scales.* Preliminary report.
Gro Hovhannisyan, Kent State University (1023-34-369)

3:00PM (1648) *Boundedness in Functional Dynamic Equations On Time Scales.*
Elvan Bohner, University of Missouri-Rolla, and **Youssef Naim Raffoul***, University of Dayton (1023-34-475)

3:30PM (1649) *Oscillation and nonoscillation for impulsive dynamic equations on certain time scales.*
Mouffak Benchohra, **Samira Hamani**, Universite de Sidi Bel Abbes, and **Johnny Henderson***, Baylor University (1023-34-26)

4:00PM (1650) *On the number of positive periodic solutions of functional dyanamic equations on time scales and population models.*
Jo Hoffacker*, Clemson University, and **Doug Anderson**, Concordia College (1023-34-803)

4:30PM (1651) *A Fourier Transform on a Basic Adaptive Grid.*
Andreas L. Ruffing, Munich University of Technology (1023-39-820)

5:00PM (1652) *The Time Scale Fourier Transform.* Preliminary report.
John M. Davis*, **Ian A. Gravagne**, **Billy J. Jackson**, **Robert J. Marks** and **Alice A. Ramos**, Baylor University (1023-42-1290)

5:30PM ► (1653) *The Time Scale Fourier Transform.* Preliminary report.
John M. Davis, Baylor University, **Ian Gravagne**, Dept. of Electrical and Computer Engineering, Baylor University, **Billy J. Jackson***, Baylor University, **Robert J. Marks**, Dept. of Electrical and Computer Engineering, Baylor University, and **Alice Ramos**, Dept. of Mathematics, Baylor University (1023-39-751)

AMS Special Session on Arithmetic Geometry, II

1:00 PM – 5:55 PM

Organizers: **Matthew H. Baker**, Georgia Institute of Technology
Bjorn Poonen, University of California Berkeley

1:00PM (1654) *Another n-point abc Conjecture.*
Robert L Benedetto, Amherst College (1023-11-720)

1:30PM (1655) *Arithmetic of dynamical Green's functions.*
Matthew H. Baker, Georgia Institute of Technology (1023-11-631)

2:00PM (1656) *Stable Reduction of $X_0(p^n)$, a Progress Report.*
Ken McMurdy, Rose-Hulman Institute of Technology (1023-11-988)

2:30PM (1657) *Multiplying Modular Forms.*
Martin H. Weissman, University of California, Santa Cruz (1023-11-556)

3:00PM (1658) *A family of K3 surfaces associated to a series for 1/pi.* Preliminary report.
H A Verrill*, Louisiana State University, and **Heng Huat Chan**, National University of Singapore (1023-11-1304)

3:30PM (1659) *A nef cone volume for generalized Del Pezzo surfaces.* Preliminary report.
Michael O Joyce*, Tulane University, and **Zachariah C Teitler**, Southeastern Louisiana University (1023-14-574)

4:00PM (1660) *Drinfeld modular varieties as varieties with many rational points over finite fields.*
Mihran Papikian, Stanford University (1023-11-337)

4:30PM (1661) *Average twin prime conjecture for elliptic curves.*
Alina Carmen Cojocaru*, University of Illinois at Chicago, **Antal Balog**, Hungarian Academy of Sciences, and **Chantal David**, Concordia University (1023-11-1768)

5:00PM (1662) *Explicit computations of Hecke operators on automorphic forms.*
Lloyd J Kilford, University of Oxford (1023-11-693)

5:30PM (1663) *The abc conjecture implies Vojta's height inequality for curves.*
Machiel van Frankenhuijsen, Utah Valley State College (1023-11-889)

AMS Special Session on Computational Algebraic and Analytic Geometry for Low-Dimensional Varieties, II

1:00 PM – 5:55 PM

Organizers: **Mika K. Seppälä**, Florida State University
Tanush T. Shaska, Oakland University
Emil J. Volcheck, Association for Computing Machinery

1:00PM (1664) *The 100th anniversary of the Uniformization theorem.*
Peter Buser*, EPF Lausanne, and **Mika Seppälä**, Florida State University and University of Helsinki (1023-30-718)

1:30PM (1665) *Myrberg Numerical Uniformization of Elliptic and Hyperelliptic Curves.*
Robert S Todd, Florida State University (1023-30-1570)

2:00PM ► (1666) *Speciale identities for cyclic covers of order 3 and representation theory of Symmetric group.*
Yaacov Kopeliovich, New York, NY (1023-32-247)

2:30PM (1667) *Curves generated on surfaces by the G-M algorithm.*
Vidur Malik, Rutgers University, Newark (1023-51-1382)

3:00PM (1668) *The Rees Algebra and the Moving Curve Ideal.*
David A. Cox, Amherst College (1023-14-952)

3:30PM (1669) *Syzygies of toric varieties.*
Milena S Hering*, Institute of Mathematics and its Applications, **Henry Schenck**, Texas A&M, and **Gregory Smith**, Queen's University (1023-14-1673)

4:00PM (1670) *Toric surface codes and Minkowski sums.*
H Schenck*, Texas A&M University, and **John Little**, College of the Holy Cross (1023-14-1123)

4:30PM (1671) *Simultaneous Surface Resolution.*
Nan Gu, Purdue University (1023-14-1029)

5:00PM ► (1672) *Linear precision for parametric patches.* Preliminary report.
Luis D Garcia-Puente* and **Frank Sottile**, Texas A&M University (1023-14-1716)

5:30PM (1673) *Equations for the space of rational curves on the Lagrangian Grassmannian.* Preliminary report.
James Ruffo, Texas A&M University (1023-14-1589)

AMS Special Session on Commutative Algebra and Algebraic Geometry, II

1:00 PM – 5:55 PM

Organizers: **Paul C. Roberts**, University of Utah
Anurag K. Singh, University of Utah
Oana Veliche, University of Utah

1:00PM (1674) *Extended modules.* Preliminary report.
W. Hassler, Karl-Franzens-Universitaet Graz, **R. Karr**, **L. Klingler**, Florida Atlantic University, and **R. Wiegand***, University of Nebraska (1023-13-1139)

1:30PM (1675) *A criterion for integral dependence of modules.*
Javid Validashti* and **Bernd Ulrich**, Purdue University (1023-13-466)

2:00PM (1676) *Assymptotic Castelnuovo-Mumford Regularity.* Preliminary report.
David Eisenbud, University of California, Berkeley and MSRI (1023-13-1456)

2:30PM (1677) *Ideal Class Semigroups of Overrings.*
Lucian F Sega, West Lafayette, IN (1023-13-817)

3:00PM (1678) *Failure of Tameness for Local Cohomology.*
Steven Dale Cutkosky*, University of Missouri, and **Juergen Herzog**, University of Duisburg-Essen, Campus Essen (1023-13-1224)

3:30PM (1679) *A counterexample to an open problem concerning a comparison between the quasicoherent and étale cohomological dimension of a scheme.*
Gennady Lyubeznik, University of Minnesota (1023-14-681)

4:00PM (1680) *Adams operations and New Intersection.*
Greg Piepmeyer* and **Mark E Walker**, University of Nebraska, Lincoln (1023-19-1237)

4:30PM (1681) *Non-commutative desingularization of the generic determinant.* Preliminary report.
Ragnar-Olaf Buchweitz, University of Toronto, **Graham J Leuschke***, Syracuse University, and **Michel Van den Bergh**, Universiteit Hasselt (1023-13-1297)

5:00PM (1682) *On the intersection of the curves through a set of points in* $\mathbb{P}^2$.
Z. Teitler, Southeastern Louisiana University (1023-14-42)

5:30PM (1683) *Cayley-Bacharach schemes and their cores.* Preliminary report.
Claudia Polini, University of Notre Dame (1023-13-851)

MAA Minicourse #11: Part B

1:00 PM – 3:00 PM

Origami in undergraduate mathematics courses.
Organizer: **Thomas C. Hull**, Merrimack College

MAA Minicourse #15: Part B

1:00 PM – 3:00 PM

Geometry with history for teaching teachers.
Organizers: **David W. Henderson**, Cornell University
Daina Taimina, Cornell University

MAA Minicourse #5: Part B

1:00 PM – 3:00 PM

Wavelets and applications: A multidisciplinary undergraduate course with emphasis on scientific computing.
Organizer: **Patrick J. Van Fleet**, University of St. Thomas

AMS Session on Operator Theory and Optimal Control, II

1:00 PM – 5:25 PM

1:00PM (1684) *Simplicity of* C^**-algebras using unique eigenstates.*
Lon H. Mitchell, University of Kansas (1023-47-322)

1:15PM (1685) *On a class of Integral Operators related to the Fock Spaces.*
Ovidiu Furdui, Western Michigan University (1023-47-36)

1:30PM (1686) *Weighted shifts whose* p*th root shifts are subnormal.* Preliminary report.
George R. Exner, Bucknell University (1023-47-498)

1:45PM (1687) *Monotone variational inequalities revisited.*
Dan D. Pascali, Courant Institute, New York University (1023-47-508)

2:00PM (1688) C^**-Algebras of Inverse Semigroups: Amenability and Weak Containment.* Preliminary report.
David Milan, University of Nebraska (1023-47-582)

2:15PM (1689) *Topological Degree Theories and Nonlinear Operator Equations in Banach Spaces.*
Dhruba R Adhikari* and **Athanassios G Kartsatos**, University of South Florida (1023-47-643)

2:30PM (1690) *Rank Preserving Maps on CSL Algebras.*
Jaedeok Kim*, Jacksonville State University, and **Robert L Moore**, University of Alabama (1023-47-793)

2:45PM (1691) *Using the Leray-Schauder Degree for a Degree Involving Maximal Monotone Perturbations of (S+)-operators.*
Boubakari Ibrahimou* and **Athanassios G. Kartsatos**, University of South Florida (1023-47-932)

3:00PM (1692) *Position Registration From Voltage Samples.*
Fadil Santosa and **Carl Toews***, IMA (1023-49-757)

3:15PM Break.

3:30PM (1693) *Existence Theorems for Thin Inflated Wrinkled Membranes Subjected to a Hydrostatic Pressure Load.* Preliminary report.
Frank Baginski, **Michael Barg***, The George Washington University, and **William Collier**, Washington, DC (1023-49-308)

3:45PM ► (1694) *Minimax Approach to Feedback Control of Distributed-Parameter Systems.*
Ilya Shvartsman*, Miami University, and **Boris S Mordukhovich**, Wayne State University (1023-49-779)

4:00PM (1695) *Optimization of Traveling Wave Tubes using Large Signal Codes and Optical Beam Analysis.*
Adam R Attarian*, North Carolina State University, **Jeremy Zuckero**, Wilkes University, **Laura Tarko**, Mt. Holyoke University, **John David**, North Carolina State University, and **Lawrence Ives**, Calabazas Creek Research, Inc. (1023-49-1489)

4:15PM Break.

4:30PM (1696) *Exact subdifferential calculus and optimality conditions in nondifferentiable programming.*
Boris Mordukhovich and **Mau Nam Nguyen***, Wayne State University (1023-49-134)

4:45PM ► (1697) *A regularity theory for multiple-valued Dirichlet minimizing maps.* Preliminary report.
Wei Zhu, Rice University (1023-49-897)

5:00PM (1698) *The onset problem for a thin superconducting loop in a large magnetic field.*
Tien-Tsan Shieh* and **Peter Sternberg**, Indiana University (1023-49-1506)

5:15PM ► (1699) *Convergence Rate of an Interior Point Gradient Method for the Totally Non-Negative Least Squares Problem.* Preliminary report.
Elaine T. Hale* and **Yin Zhang**, Rice University (1023-49-1647)

AMS Session on Numerical Analysis and Computer Science, II

1:00 PM – 4:25 PM

1:00PM ► (1700) *Immersed Interface Method for wave equations.* Preliminary report.
Miguel A. Dumett, University of Southern California (1023-65-206)

1:15PM (1701) *Calculating Symmetric Modes of Motion in Molecular Dynamics.*
Mili Shah* and **Danny C Sorensen**, Rice University (1023-65-463)

1:30PM ► (1702) *On the Fixed Points of a Function and its Corresponding Composite Functions.*
Mohammad K. Azarian, University of Evansville (1023-65-513)

1:45PM (1703) *A fast iterative numerical method for the free boundary Bernoulli problem.*
Christopher M Kuster, North Carolina State University (1023-65-514)

2:00PM (1704) *Robustness of the Multivariate Spline Method for numerical solution of partial differential equations.* Preliminary report.
Gerard Awanou, Northern Illinois University (1023-65-538)

2:15PM (1705) *A New Wavelet Multigrid Method.*
Doreen De Leon, California State University, Fresno (1023-65-644)

2:30PM (1706) *Defect-correction methods for finite element computations of viscoelastic fluid flow.*
Vincent J Ervin, **Jason S Howell*** and **Hyesuk Lee**, Clemson University (1023-65-759)

2:45PM Break.

3:15PM (1707) *Newton's method with deflation for isolated singularities of polynomial systems.*
Anton Leykin, **Jan Verschelde** and **Ailing Zhao***, University of Illinois at Chicago (1023-65-849)

3:30PM Break.

3:45PM ► (1708) *A Linearization of a Backward Euler Scheme for the Saturation Equation: A Regularity Result.* Preliminary report.
Koffi B. Fadimba, University of South Carolina Aiken (1023-65-915)

4:00PM ► (1709) *Wavelet, Ridgelet, and Curvelet-Based Texture Classification of Normal Tissues in Computed Tomography Images.*
Lucia Dettori* and **Lindsay Semler**, DePaul University, School of Computer Science, Telecommunications, and Information Systems (1023-68-121)

4:15PM (1710) *Composition of comparison based algorithms as an algebraic operation.*
Homeira Pajoohesh, Georgia Southern University (1023-68-1736)

AMS Session on Applications of Mathematics, IV

1:00 PM – 5:25 PM

1:00PM ► (1711) *A bifurcation analysis of pattern formation in the developing ear.* Preliminary report.
K A Montgomery, University of Utah (1023-92-1643)

1:15PM (1712) *Control of synchronization in coupled oscillatory networks.*
Menaka Bandara Navaratna, Florida Gulf Coast University (1023-92-1738)

1:30PM ► (1713) *Agent-based model of therapeutic intervention following exposure to botulinum neurotoxin.* Preliminary report.
Keith A Erickson, United States Military Academy (1023-92-1749)

1:45PM (1714) *A Monotone Approximation for a Size-Structured Population Model with a Generalized Environment.*
Azmy S. Ackleh, **Keng Deng** and **Jeremy J. Thibodeaux***, University of Louisiana at Lafayette (1023-92-1767)

2:00PM ► (1715) *Generalized Trojan Gene Hypothesis.*
Juan B. Gutierrez, Florida State University (1023-92-1788)

2:15PM ► (1716) *An Enzyme Kinetic Model of Tumor Dormancy; Regulation and Control of Secondary Metastases by Plasmin, Intratumoral Distance and Surgical Removal of the Primary Tumor.* Preliminary report.
Andrew Lewis Matteson, Texas A&M University (1023-92-1904)

2:30PM (1717) *The influence of segregation from reproduction in the long term dynamics of persistent sexually transmitted diseases.*
Daniel Maxin* and **Fabio A. Milner**, Purdue University (1023-92-469)

2:45PM (1718) *A Situation in which a Local Nontoxic Refuge Promotes Pest Resistance To Toxic Crops.*
Jemal Said Mohammed-Awel*, Valdosta State University, GA, **Karen Kopecky**, Dept. of Economics, University of Western Ontario,Canada, and **John Ringland**, SUNY Buffalo (1023-92-702)

3:00PM Break.

3:15PM (1719) *A computational model of tumor therapy.*
Jin Wang, Duke University (1023-92-707)

3:30PM ► (1720) *Do implicit measures for female associations with mathematics display cultural or regional biases?* Preliminary report.
Rosa A. Del Angel* and **Diana W. Verzi**, San Diego State University-Imperial Valley Campus (1023-92-920)

3:45PM (1721) *Effect of Input Noise on a Magnetometer with Quantum Feedback.*
Zhigang Zhang, Texas A&M University (1023-93-1645)

4:00PM (1722) *An ergodic control problem of a diffusion with jumps.* Preliminary report.
Cristin Buescu* and **Michael I. Taksar**, University of Missouri-Columbia (1023-93-1740)

4:15PM ► (1723) *The Pivotal Role of Commutators in Action.* Preliminary report.
Dov J Rhodes*, Indiana University, Bloomington, and **Nathan Olson**, Cal Poly, Pomona (1023-93-1815)

4:30PM ► (1724) *Electromagnetic Analysis of a MEMS Integrated Frequency Reconfigurable Antenna.*
Toby Ann Hale* and **Bedri A. Cetiner**, Morehead State University, Morehead, KY (1023-94-1436)

4:45PM ► (1725) *Resistor Networks with Finitely Many Solutions to the Discrete Inverse Boundary Problem.* Preliminary report.
Ilya Grigoriev, University of Chicago, Chicago, IL (1023-94-1846)

5:00PM ► (1726) *Agreement in Circular Societies.* Preliminary report.
Christopher S. Hardin, Smith College (1023-91-1629)

5:15PM ► (1727) *From RNA Molecules to Brain Structures: Geometric Measures as Shape Descriptors.* Preliminary report.
Christian Laing, Florida State University FSU (1023-92-125)

AMS Session on Combinatorics, IV

1:00 PM – 3:25 PM

1:00PM (1728) *Incidence Matrices and Inequalities for Combinatorial Designs.*
D. Raghavarao, Dept. of Statistics, Temple University, **S. S. Shrikhande**, Mt. Pleasant, MI, and **M. S. Shrikhande***, Central Michigan University (1023-05-724)

1:15PM (1729) *On Long Cycles in Triangle-Free Graphs.*
Doug Bauer, Stevens Institute of Technology, **Nathan Kahl***, Seton Hall University, **Linda McGuire**, Muhlenberg College, and **Edward Schmeichel**, San Jose State University (1023-05-77)

1:30PM (1730) *Cycles in the Cartesian Product of Two Directed Cycles.*
Sherry Xiaohua Wu, Cornell University (1023-05-790)

1:45PM (1731) *A Relationship between the Robinson-Schenstead-Knuth Correspondence (RSK) and Permutation Containment.*
Yan Zhang, Harvard University (1023-05-919)

2:00PM (1732) *On the Minimum Number of Subsums of a Zero-Sum-Free Sequence.*
N J Ince, Massachusetts Institute of Technology (1023-05-924)

2:15PM ► (1733) *A New Ore-Condition for H-linked Graphs.* Preliminary report.
Ron J. Gould, Emory University, **Jeffrey S. Powell***, Samford University, and **Thor Whalen**, Methodic Solutions; Atlanta, GA (1023-05-960)

2:30PM (1734) *The directed case of decompositions of edge-colored complete digraphs.*
Anna Draganova*, University of California, Los Angeles, CA, **Yukiyasu Mutoh**, Keio University, Japan, and **Richard M. Wilson**, California Institute of Technology, Pasadena, CA (1023-05-962)

2:45PM (1735) *Fall Coloring of Cartesian Products of Graphs.* Preliminary report.
S. Jeremy Lyle* and **Renu Laskar**, Clemson University (1023-05-968)

3:00PM ► (1736) *DNA Codewords and De Bruijn Sequences.* Preliminary report.
Stephen G. Hartke, University of Illinois at Urbana-Champaign (1023-05-975)

3:15PM ► (1737) *Restricted Symmetric Permutations.*
Eric S Egge, Carleton College (1023-05-986)

MAA Session on Applications of Discrete Mathematics, II

1:00 PM – 4:55 PM

Organizers: **Thomas Koshy**, Framingham State College
Thomas Moore, Bridgewater State College

1:00PM (1738) *Dynamic service scheduling on directed graphs.* Preliminary report.
D. Jacob Wildstrom, University of California, San Diego (1023-D1-633)

1:20PM ► (1739) *Borderline Behavior for $2x2$ Iteratve Systems.*
Samer Habre*, Lebanese American University, Beirut, and **Jean Marie McDill**, California Polytechnic State University, San luis Obispo (1023-D1-879)

1:40PM ► (1740) *Derangements, Probability, and Calculus.*
Thomas Koshy, Framingham State College, Framingham, MA 01702 (1023-D1-1126)

2:00PM (1741) *Approximative policies for Preemptive Stochastic Online Scheduling.*
Nicole Megow*, TU Berlin, and **Tjark Vredeveld**, Maastricht University (1023-D1-1226)

2:20PM ► (1742) *Generating Functions and the Prisoner's Dilemma on Graphs.*
Stephen Devlin* and **Reza Dibadj**, University of San Francisco (1023-D1-1327)

2:40PM ► (1743) *Counting Point-Determining Graphs Using Joyal's Theory of Species.*
Ji Li, Brandeis University (1023-D1-1357)

3:00PM ► (1744) *The Geometry Behind Paradoxes of Voting Power.*
Michael A. Jones, Montclair State University (1023-D1-1419)

3:20PM ► (1745) *Visualizing Binomial Identities using PascGaloisJE.* Preliminary report.
Michael J. Bardzell, Salisbury University (1023-D1-1601)

3:40PM ► (1746) *Dependence Among Random Binary Vectors.* Preliminary report.
Neil J. Calkin and **Shannon R. Lockard***, Clemson University (1023-D1-1625)

4:00PM ► (1747) *Exploring Graph Theory Using a Comprehensive Database of Graphs.*
Jason Grout, Brigham Young University (1023-D1-1700)

4:20PM ► (1748) *The Hat Problem and Coding Theory.* Preliminary report.
Ann E Moskol, Rhode Island College (1023-D1-1811)

4:40PM (1749) *Designing the right mix for DNA self-assembly.*
N Jonoska, **G L McColm** and **Ana Staninska***, University of South Florida (1023-D1-1878)

MAA Session on Assessment of Student Learning in Undergraduate Mathematics, II

1:00 PM – 2:40 PM

Organizers: **William Martin**, North Dakota State University
Bernard L. Madison, University of Arkansas

1:00PM (1750) *Program Assessment - What Worked and What Did Not Work.*
Jim Fulmer*, University of Arkansas at Little Rock, and **Tom McMillan**, State University of New York at Utica (1023-D5-1793)

1:15PM ► (1751) *Learning-focused Exam Construction.*
James S. Rolf*, **Michael A. Brilleslyper** and **R. Scott Callihan**, United States Air Force Academy (1023-D5-1837)

1:30PM (1752) *From Pre-tests to Capstones.* Preliminary report.
Therese Shelton, Southwestern University (1023-D5-1633)

1:45PM ► (1753) *Students Assessing Other Students: Competition is the Great Motivator to Learn.* Preliminary report.
Barbra S. Melendez* and **Tasha Williams**, United States Military Academy (1023-D5-438)

2:00PM (1754) *Assessing Student Performance in College Algebra with WeBWorK.*
Alberto Candel*, CSUN, and **Juana Sanchez**, UCLA (1023-D5-1420)

2:15PM (1755) *Using Cumulative Assessment to Enhance the Mathematics Experience of College Students at the Entry Level.*
Blanche S. Presley* and **Barry J. Monk**, Macon State College (1023-D5-123)

2:30PM (1756) *A Misadventure with a Web-based Assessment Method.*
Louis M. Beaugris, Kean University (1023-D5-1816)

MAA General Contributed Paper Session, VIII

1:00 PM – 4:25 PM

Organizers: **Eric S. Marland**, Appalachian State University
Jay A. Malmstrom, Oklahoma State Community College

1:00PM ► (1757) *Primordial Black Holes and Large Scale Structure.* Preliminary report.
Adam Drake, University of Houston-Downtown (1023-Z1-1096)

1:15PM ► (1758) *The Aeroacoustics of Turbulent Coanda Jet Flows.*
Jason C Fox* and **Caroline P Lubert**, James Madison University (1023-Z1-317)

1:30PM ► (1759) *Three Dimensional Computational Model of Water Movement in Plant Root Growth Zone.* Preliminary report.
Brandy S. Wiegers*, **Angela Y. Cheer**, University of California Davis, and **Wendy K. Silk**, Department of Land, Air and Water Resources, University of California, Davis (1023-Z1-1689)

1:45PM (1760) *Verifying hydraulic design of the water-conducting networks taking into account the maintenance of the reliability.*
Boli Yarkulov, Samarkand State Civil Engineering and Architectural Institute (1023-Z1-230)

2:00PM (1761) *Keeping the Doors Open: A Summer Algebra Camp for Underrepresented Minority Middle Schoolers.* Preliminary report.
John B Fink, Kalamazoo College (1023-Z1-835)

2:15PM ► (1762) *Models in my head "How a blind student sees graphs and their equations".*
Aldo R Maldonado, Park University (1023-Z1-517)

2:30PM ► (1763) *What do business students need to know about math?* Preliminary report.
Julia Darby Head*, **G. Brock Williams** and **Amanda Michelle Wheeler**, Texas Tech University (1023-Z1-1731)

2:45PM ► (1764) *Journeys in Mathematics: Courses in Problem Solving, Number and Operation, Algebra, Geometry and Measurement, Probability and Data Analysis, and Concepts of Trig and Calculus for K-8 teachers.*
Cora Neal*, Sonoma State University, and **Deborah Narang**, University of Alaska Anchorage (1023-Z1-306)

3:00PM ► (1765) *Mathematics Courses for Future Grade 1-6 Teachers at Louisiana State University Shreveport.*
Judith Covington, Louisiana State University Shreveport (1023-Z1-852)

3:15PM ► (1766) *K-5 teachers explore the nature of rational numbers: A case for inquiry in a mathematics specialist program.*
Aimee J Ellington* and **Joy W Whitenack**, Virginia Commonwealth University (1023-Z1-359)

3:30PM ► (1767) *Professors in the Schools at Morehead State University.* Preliminary report.
Mike Dobranski, Morehead State University (1023-Z1-1761)

3:45PM ► (1768) *Inequalities Through Geometry.*
Anand Kumar, Ramanujan School of Mathematics (1023-Z1-606)

4:00PM ► (1769) *Sharing Triangles, Geometric Triangles, and Pascal's Triangle.* Preliminary report.
Charles J Kicey*, Valdosta State University, **Jun Ji**, Kennesaw State University, and **Arsalan Wares**, Valdosta State University (1023-Z1-1091)

4:15PM ► (1770) *Circles, Diamonds, and Squares: A New Trigonometry for a New π.* Preliminary report.
Robert D. Poodiack, Norwich University (1023-Z1-1395)

MAA General Contributed Paper Session, IX

1:00 PM – 4:25 PM

Organizers: **Eric S. Marland**, Appalachian State University
Jay A. Malmstrom, Oklahoma City Community College

1:00PM ► (1771) *Enhancing student interest in mathematics with the course related multimedia tools.*
Atul N. Roy, Montgomery College (1023-Z1-1210)

1:15PM ► (1772) *WvEB Math: College Algebra and Trigonometry for High School Students.*
Michael Mays* and **Laura Pyzdrowski**, West Virginia University (1023-Z1-315)

1:30PM ► (1773) *ORICUT: Proposal of teaching in Basic Education (Level K4 and K5).*
Alberto de León de León* and **Lineth Alejandra De León Torres**, Instituto Tecnológico de Cd. Madero (1023-Z1-1611)

1:45PM ► (1774) *Using WeBWorK to foster reading.* Preliminary report.
George R. Exner, Bucknell University (1023-Z1-499)

2:00PM ► (1775) *Pre-calculus ILAPs as a path to QL.*
Aaron Montgomery, Central Washington University (1023-Z1-1398)

2:15PM (1776) *A Guideline for Students to Master the Skills of Writing Equations for Words Problems.* Preliminary report.
Shumei C Richman, Midlands Technical College (1023-Z1-1258)

2:30PM ► (1777) *Couple Interactive Computer Based Math Games.*
Hongbiao Zeng, Fort Hays State University (1023-Z1-1233)

2:45PM ► (1778) *Who Are the Best Sluggers in Baseball?*
Steve Alan Krevisky*, Middlesex Community College, **Randy Taylor**, Las Positas College, and **Rodrigo Faria**, university of Sao Paulo Western (1023-Z1-1786)

3:00PM ► (1779) *Placement Made Personal.* Preliminary report.
John C Nardo and **Judith L Gieger***, Oglethorpe University (1023-Z1-672)

3:15PM ► (1780) *Helping First-Semester Freshmen Mathematics Majors Develop Proofs.* Preliminary report.
Bonnie Gold, Monmouth University (1023-Z1-632)

3:30PM ► (1781) *Getting Students to Learn from their Mistakes.*
Vera Cherepinsky, Fairfield University (1023-Z1-1724)

3:45PM (1782) *Navigational Mathematics Instructology: A Scientific Scholarship Of Teaching And Learning.* Preliminary report.
Clyde L. Greeno, The MALEI Mathematics Institute (1023-Z1-927)

4:00PM ► (1783) *Mathematics and the TBR Teacher Preparation Collaborative.* Preliminary report.
Anant P Godbole, East Tennessee State University (1023-Z1-567)

4:15PM (1784) *Pre-service Teachers enhance their Mathematical Understanding Through Journal writing.* Preliminary report.
Barba Patton* and **Carol Klages**, University of Houston-Victoria (1023-Z1-1818)

MAA Panel Discussion

1:00 PM – 2:20 PM

Knowing mathematics for teaching: Issues in assessment and teacher preparation.

Organizers: **Joan Ferrini-Mundy**, Michigan State University
Raven McCrory, Michigan State University

Presenters: **Michael Frasier**, University of Tennessee
Joan Ferrini-Mundy
Raven McCrory
Sharon Senk, Michigan State University
William Schmidt, Michigan State University

Gail Burrill, Michigan State University

MAA Panel Discussion

1:00 PM – 2:20 PM

MathNerds, Moore Method, and mathematics education: What do they have in common?

Organizers: **W. Ted Mahavier**, Lamar University
Laurie O. Cavey, James Madison University

Panelists: **Terry McCabe**, Texas State University
G. Edgar Parker, James Madison University
Hiroko K. Warshauer, Texas State University
Max L. Warshauer, Texas State University
Alexander White, Texas State University
Laurie O. Cavey

AWM Workshop Panel Discussion

1:00 PM – 2:15 PM

Critical career decision stages: Research and funding opportunities.

Moderator: **Claudia Polini**, University of Notre Dame

Panelists: **Valentina S. Harizanov**, The George Washington University
Kathleen O'Hara, Mathematical Sciences Research Institute
Barbara Lee Keyfitz, Fields Institute and University of Houston
Michelle D. Wagner, National Security Agency

AMS Session on Probability and Statistics, II

1:30 PM – 4:55 PM

1:30PM ► (1785) *Gambler's Ruin with Catastrophes and Windfalls.* **Blake Hunter**, University of California, Davis, **Alan Krinik***, **Chau Nguyen**, **Jenny Switkes** and **Hubertus von Bremen**, California State Polytechnic University, Pomona (1023-60-1863)

1:45PM (1786) *A Single-server Poisson Queueing System with Delayed-Service.* **Aliakbar Montazer Haghighi***, **Dimitar P Mishev**, Prairie View A&M University, and **Stefanka S Chukova**, Victoria University of Wellington (1023-60-239)

2:00PM (1787) *Laws of Large Numbers in D[0, 1].* **Paul H Bezandry**, Howard University (1023-60-658)

2:15PM (1788) *The submartingale problem for a class of degenerate elliptic operators.* **Richard F. Bass**, University of Connecticut, and **Alexander Lavrentiev***, University of Wisconsin - Fox (1023-60-708)

2:30PM ► (1789) *Mutual Information for a Multivariate T-Distribution.* Preliminary report. **Walfredo R Javier***, Southern University-BR, and **Arjun K Gupta**, Bowling Green State University (1023-60-970)

2:45PM ► (1790) *Pedagogical Utilization and Assessment of the Statistic Online Computational Resource in Introductory Probability and Statistics Courses.* **Ivo D Dinov***, **Juana Sanchez** and **Nicolas Christou**, UCLA Statistics (1023-62-01)

3:00PM ► (1791) *Statistical Modeling of Terrain Profiles.* **Tze-Chien Sun** and **Jinfeng Wei***, Wayne State University (1023-62-809)

3:15PM (1792) *Comparing Control Charts With Estimated Parameters.* **Maria E. Calzada*** and **Stephen M, Scariano**, Loyola University New Orleans (1023-62-1326)

3:30PM Break.

3:45PM (1793) *Linear Dimension Reduction of Images Using Geometrical Tools.* Preliminary report. **Evgenia Rubinshtein***, University of Central Arkansas, and **Anuj Srivastava**, Florida State University (1023-62-1492)

4:00PM ► (1794) *Impact of exogeneous factors on patients expiratory volume.* Preliminary report. **Rachid Bekralas**, BMCC City University (1023-62-1681)

4:15PM ► (1795) *Sample Size Issues in Resource Selection Studies.* **Ashraf F ELHoubi**, Lamar University (1023-62-377)

4:30PM ► (1796) *A Comparison of Data Mining Courses Taught Across Disciplines.* Preliminary report. **Alan M Safer**, California State University, Long Beach (1023-62-379)

4:45PM (1797) *Smooth Inference for Survival Functions with Arbitrarily Censored Data.* **Kirsten Doehler***, University of North Carolina Greensboro, and **Marie Davidian**, North Carolina State University (1023-62-676)

ASL Contributed Papers

2:00 PM – 4:00 PM

Organizer: **Marcia Groszek**, Dartmouth College

2:00PM (1798) *Effective Souslin trees and degrees in α-recursion theory.* **François Dorais**, Dartmouth College

2:25PM (1799) *The strength of the rainbow Ramsey theorem.* **Joe Mileti***, University of Chicago, and **Barbara Csima**, University of Waterloo

2:50PM (1800) *Turing computable embeddings into equivalence structures.* **Sara Miller**, University of Notre Dame

3:15PM (1801) *Classification of a family of countably universal H-free graphs.* **Rehana Patel**, St. John's University

3:40PM (1802) *The Boltzmann principle and protein primary structure.* **Dennis F. Cudia**, Rockford, IL

AWM Workshop: Research Presentations by Recent Ph.D.'s, II

2:30 PM – 4:20 PM

2:30PM (1803) *Nonvariational Methods for Semilinear Elliptic Equations of Critical Growth.* **Sarah G Raynor**, Wake Forest University (1023-35-755)

3:00PM (1804) *The Role of the Jacobson Radical in the Baer-Kaplansky Theorem for Torsion-Free Modules over a Complete Discrete Valuation Domain.* **Mary K. Flagg**, University of Houston (1023-20-845)

3:30PM *Diffusion Flame Stability.*
(1805) **Amy B. Moore***, Alma College, and **Milan Miklavcic**, Michigan State University
(1023-35-1082)

4:00PM *Petite K-types and Unitary Representations.*
(1806) **Allessandra Pantano**, Cornell University
(1023-22-901)

MAA Minicourse #6: Part B

3:30 PM – 5:30 PM

WeBWorK 2: An Internet-based system for generating and delivering homework.
Organizers: **Arnold K. Pizer**, University of Rochester
Michael E. Gage, University of Rochester
Vicki Roth, University of Rochester

AMS Banquet Reception

6:30 PM – 7:30 PM

AMS Banquet

7:30 PM – 10:30 PM

Susan J. Friedlander
AMS Associate Secretary
Chicago, Illinois

James J. Tattersall
MAA Associate Secretary
Providence, Rhode Island