
Program of the Sessions

Phoenix, Arizona, January 7-10, 2004

Monday, January 5

AMS Short Course on Trends in Optimization

8:00 AM – 5:00 PM

Organizers: **Serkan Hosten**, San Francisco State University
Rekha Thomas, University of Washington

- 8:00AM Registration (Hyatt Regency Ballroom Foyer).
10:45AM *Graphs and combinatorial optimization.*
(1) **Gerard Cornuejols**, Carnegie Mellon University
2:00PM *Polyhedral method in optimization.*
(2) **Alper Atamturk**, University of California at Berkeley
3:45PM *Integer-programming duality.*
(3) **Jean-Bernard Lasserre**, LAAS-CNRS

MAA Short Course on the History of Mathematical Technologies: Exploring the Material Culture of Mathematics

8:00 AM – 4:00 PM

Organizers: **Amy Shell-Gellasch**, SIAM-Germany
Glenn Van Brummelen, Bennington College

- 8:00AM Registration (Hyatt Regency Ballroom Foyer).
9:15AM *Instruments of the ancient astronomers:*
(4) *Mathematics and history.*
Lennart Berggren*, Simon Fraser University, and
James Evans*, University of Puget Sound
12:30PM Hands on demonstration of models.
2:30PM *What linkages have to do with mathematics.*
(5) **Ed Sandifer**, Western Connecticut State University
3:45PM Hands on demonstration of models.

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.

Tuesday, January 6

MAA Board of Governors

8:30 AM – 4:00 PM

AMS Short Course on Trends in Optimization

9:00 AM – 5:00 PM

Organizers: **Serkan Hosten**, San Francisco State University
Rekha Thomas, University of Washington

- 9:00AM *Nonlinear and semidefinite programming.*
(6) **Steve Wright**, University of Wisconsin
10:45AM *Approximation algorithms.*
(7) **David Shmoys**, Cornell University
2:00PM *Lattice basis reduction in optimization.*
(8) **Karen Aardal**, Georgia Institute of Technology
3:45PM *Algebraic methods in optimization.*
(9) **Bernd Sturmfels**, University of California at Berkeley

MAA Short Course on the History of Mathematical Technologies: Exploring the Material Culture of Mathematics

9:00 AM – 5:00 PM

Organizers: **Amy Shell-Gellasch**, SIAM-Germany
Glenn Van Brummelen, Bennington College

- 9:00AM *What linkages have to do with mathematics.*
(10) **Daina Tainima**, Cornell University
10:15AM Hands on demonstration with models.
11:00AM *Early computing devices.*
(11) **David Weil**, Computer Museum of America
12:30PM Hands on demonstration with models.
2:30PM *Mathematical instruments at the fairs.*
(12) **Peggy Aldrich Kidwell**, National Museum of American History
4:15PM Panel Discussion/Question and Answer period.

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 25, Issue 1 of *Abstracts of papers presented to the American Mathematical Society*, ordered according to the numbers in parentheses following the listings.

4:45PM Closing statements.

AMS Council

1:30 PM – 10:00 PM

Joint Meetings Registration

3:00 PM – 7:00 PM

Wednesday, January 7

Joint Meetings Registration

7:30 AM – 4:00 PM

Employment Center

7:30 AM – 5:00 PM

MAA Session on Uses of the WWW that Enrich and Promote Learning, I

7:40 AM – 10:55 AM

Organizers: **Marcelle Bessman**, Jacksonville University
Marcia P. Birken, Rochester Institute of Technology
Mary L. Platt, Salem State College
Brian E. Smith, McGill University

- 7:40AM ▶ (13) *Appropriate Use of Web Materials in Math Classes.* Preliminary report.
Ping Wang* and **Michael Gallis**, Penn State University (993-C1-297)
- 8:00AM ▶ (14) *Student Use of and Benefit From an Online Preparation Website For a Qualifying Exams.*
Jeff A Suzuki, Bard College (993-C1-256)
- 8:20AM (15) *Web-based Graphing Tutorial.* Preliminary report.
Evelyn C Bailey and **Fang Chen***, Oxford College of Emory University (993-C1-556)
- 8:40AM ▶ (16) *Loading the Bases: Teaching a Statistics Course With the WWW, the Smart Board, and Baseball.*
Michael R Huber* and **Gabriel Costa**, United States Military Academy (993-C1-222)
- 9:00AM (17) *Online Interactive Workshops: Communications Software and MathDL Resources.*
Lawrence C. Moore*, Duke University, **David A. Smith**, Durham, NC, and **Frank Wattenberg**, US Military Academy (993-C1-159)
- 9:20AM ▶ (18) *Using the World Wide Web to Disseminate Focused, Compressed Video Tutorials.* Preliminary report.
Brian H. Felkel*, **Richard E. Klima**, **William C. Bauldry**, **Eric S. Marland** and **Mary Beth Searcy**, Appalachian State University (993-C1-180)
- 9:40AM ▶ (19) *Web-based exploration of discrete mathematics concepts.* Preliminary report.
Doug Ensley* and **Carolyn Dahl**, Shippensburg University (993-C1-166)
- 10:00AM ▶ (20) *Improving Calculus and Linear Algebra Pedagogy using Multiple Web Based Computer Tools.* Preliminary report.
Thomas R. Hagedorn* and **Karen Clark**, The College of New Jersey (993-C1-580)
- 10:20AM ▶ (21) *A web-based tool for creating practice calculus exams.* Preliminary report.
Mark R. Woodard, Furman University (993-C1-298)

- 10:40AM ▶ (22) *Using JavaSketchpad to Create Interactive Geometry Webpages.*
Catherine A. Gorini, Maharishi University of Management (993-C1-349)

AMS-MAA-MER Special Session on Mathematics and Education Reform, I

8:00 AM – 10:20 AM

Organizers: **William H. Barker**, Bowdoin College
Jerry L. Bona, University of Illinois at Chicago
Naomi Fisher, University of Illinois at Chicago
Kenneth C. Millett, University of California Santa Barbara
Bonnie Saunders, University of Illinois at Chicago

- 8:00AM ▶ (23) *An overview of strategies for utilizing CUPM Guide 2004, and a closer look at two.*
Harriet Pollatsek, Mount Holyoke College (993-97-1356)
- 8:30AM (24) *Using the Illustrative Resources, I.*
David M Bressoud, Macalester College (993-97-1299)
- 9:00AM (25) *Using the Illustrative Resources, II.*
William E Haver, Virginia Commonwealth University (993-97-1316)
- 9:30AM (26) *Making Mathematics Intellectually Enlivening.*
Michael Starbird, The University of Texas at Austin (993-97-1396)
- 10:00AM ▶ (27) *Panel Discussion on Improving Undergraduate Mathematics Programs: Utilizing the CUPM Curriculum Guide 2004.*
William Barker*, Bowdoin College, **David Bressoud**, Macalester College, **William Haver**, Virginia Commonwealth University, **Harriet Pollatsek**, Mt. Holyoke College, and **Michael Starbird**, University of Texas at Austin (993-97-1653)

AMS-ASL Special Session on Infinite Combinatorics and Inner Model Theory, I

8:00 AM – 10:50 AM

Organizers: **Matthew D. Foreman**, University of California Irvine
Martin Zeman, University of California Irvine

- 8:00AM (28) *The Proper Forcing Axiom implies all gammas in $L(R)$ are determined.* Preliminary report.
John R Steel, University of California, Berkeley (993-03-1282)
- 9:00AM (29) *Forcing, combinatorics and inner models.*
William J. Mitchell, University of Florida (993-03-1698)
- 9:30AM ▶ (30) *The Canonical Function Game.*
Paul B. Larson, Miami University (993-03-1040)
- 10:00AM (31) *Almost isometric embeddings of metric spaces in the set theoretic lens.*
Menachem Kojman, Ben Gurion University of the Negev (993-03-1107)
- 10:30AM (32) *More on non-tame mice from CH and an ω_1 -dense ideal on ω_1 .* Preliminary report.
Richard O Ketchersid, University of North Texas (993-03-1431)

AMS Special Session on Celestial Mechanics, I

8:00 AM – 10:50 AM

Organizers: **Samuel R. Kaplan**, University of North Carolina at Asheville
Gareth E. Roberts, College of the Holy Cross

- 8:00AM *Bifurcations out of the eight.*
 (33) **Richard Montgomery**, University of California Santa Cruz (993-70-764)
- 9:00AM *Connecting orbits and invariant manifolds in the spatial three-body problem.*
 (34) **Shane D. Ross**, Caltech (993-37-1680)
- 9:30AM *Rethinking central configurations.*
 ► (35) **Donald G. Saari**, University of California, Irvine (993-70-1493)
- 10:00AM *Some Counterexamples to a Generalized Saari's Conjecture.* Preliminary report.
 (36) **Gareth E Roberts**, College of the Holy Cross (993-70-1586)
- 10:30AM *Characterization of Instabilities in the Tidal Deformation of a Planetary Body.*
 ► (37) **Sarah E. Frey**, University of Arizona (993-74-1144)

AMS Special Session on Mathematics in Natural Resource Modeling, I

8:00 AM – 10:50 AM

Organizers: **Catherine A. Roberts**, College of the Holy Cross
Suzanne M. Lenhart, University of Tennessee

- 8:00AM *Chaos in ecosystem dynamics: the role of the strong Allee effect.*
 (38) **Andrew Y Morozov***, University of California, Riverside, **Sergei V Petrovskii**, Russian Academy of Sciences, and **Bai-Lian Li**, University of California, Riverside (993-35-896)
- 8:30AM *Competition in Two-Dimensional Heterogeneous Environments.*
 (39) **Daniel L Kern***, University of Nevada, Las Vegas, and **Aurelia Minut**, Rochester Institute of Technology (993-35-1248)
- 9:00AM *Spatial Control of Harvesting on a Metapopulation Model.*
 ► (40) **Rene A. Salinas***, **Suzanne Lenhart** and **Louis J. Gross**, University of Tennessee (993-92-696)
- 9:30AM *Risk Averse Approaches to Resource Exploration Modeling.*
 ► (41) **Ben G Fitzpatrick**, Loyola Marymount University (993-91-1095)
- 10:00AM *Optimal Harvesting of a Fish Population modeling by a Parabolic PDE.*
 (42) **Hem Raj Joshi***, Xavier University, **Suzanne Lenhart**, University of Tennessee, and **Mike G. Neubert**, Woods Hole Oceanographic Institute (993-49-915)
- 10:30AM *Sensitivity Analysis by Plackett-Burman Method.*
 ► (43) **Diane L Beres**, Ripon College (993-92-1109)

AMS Special Session on Discrete Dynamics and Difference Equations, I

8:00 AM – 10:50 AM

Organizers: **Saber N. Elaydi**, Trinity University
Jim M. Cushing, University of Arizona

Gerasimos Ladas, University of Rhode Island

James A. Yorke, University of Maryland, College Park

- 8:00AM *Positivity and persistence in spatially structured populations.*
 ► (44) **Alan Hastings*** and **Louis W Botsford**, University of California, Davis (993-92-1193)
- 8:30AM *Multiple Attractors in Age-Structured Population Models.*
 ► (45) **Abdul-Aziz Yakubu**, Howard University (993-92-308)
- 9:00AM *Equilibrium and nonequilibrium attractors for a discrete, selection-migration model.* Preliminary report.
 (46) **James F Selgrade***, North Carolina State University, and **James H Roberds**, USDA Forest Service (993-92-1326)
- 9:30AM *Some new oscillation results for a class of a neutral difference equations.*
 ► (47) **S. Elizabeth**, Peryiar University, **John R. Graef***, University of Tennessee at Chattanooga, **P. Sundaram**, Kandaswami Kandari's College, and **E. Thandapani**, Peryiar University (993-39-625)
- 10:00AM *Anatomy of a chaotic attractor: subtle model-predicted patterns revealed in biological population data.*
 ► (48) **Aaron A. King***, Ecology & Evolutionary Biology, University of Tennessee, **R. F. Costantino**, Ecology & Evolutionary Biology, University of Arizona, **S. M. Henson**, Andrews University, **J. M. Cushing**, University of Arizona, **R. A. Desharnais**, California State University, Los Angeles, and **Brian Dennis**, University of Idaho (993-92-611)
- 10:30AM *Difference equations from discretization of continuous epidemic models with immigration of infectives.*
 (49) **Sophia R.-J. Jang***, University of Louisiana at Lafayette, and **Saber Elaydi**, Trinity University (993-39-527)

AMS Special Session on Time Scales and Applications, I

8:00 AM – 10:50 AM

Organizers: **Martin J. Bohner**, University of Missouri at Rolla
Billur Kaymakcalan, Georgia Southern University
Allan C. Peterson, University of Nebraska

- 8:00AM *Boundedness and uniqueness of solutions to dynamic equations on time scales.*
 ► (50) **Allan C. Peterson***, University of Nebraska-Lincoln, and **Chris C. Tisdell**, The University of New South Wales (993-39-191)
- 8:30AM *Even-order delta nabla boundary value problems.* Preliminary report.
 (51) **Douglas R. Anderson**, Concordia College (993-34-105)
- 9:00AM *From Wound Healing to the West Nile Virus: Time Scale Applications.*
 (52) **Diana M Thomas**, Montclair State University (993-37-1042)
- 9:30AM *Maximum principles for a family of nonlocal boundary value problems.*
 (53) **Paul W Eloë**, University of Dayton (993-34-951)

- 10:00AM *High Gain Adaptive Stabilization for Linear Dynamic Systems on Time Scales*. Preliminary report.
(54) **John M Davis**, Baylor University (993-93-1376)
- 10:30AM *Stability for Time Varying Linear Dynamic Systems on Time Scales*. Preliminary report.
(55) **Jeffrey J. DaCunha**, Baylor University (993-39-1277)

AMS Special Session on Theory and Applications of Orthogonal Polynomials, I

8:00 AM – 10:40 AM

Organizers: **Mourad E. H. Ismail**, University of South Florida
Barry Simon, California Institute of Technology

- 8:00AM *Tridiagonal pairs and finite dimensional $U_q(\widehat{sl}_2)$ -modules*.
(56) **Paul M Terwilliger***, University of Wisconsin-Madison, and **Tatsuro Ito**, Kanazawa University (993-33-1538)
- 9:00AM *Three q -Hermite polynomials*. Preliminary report.
(57) **Dennis W Stanton**, University of Minnesota (993-33-1378)
- 10:00AM *Generating functions for moments of orthogonal polynomials*. Preliminary report.
(58) **Ira M. Gessel***, Brandeis University, and **Jiang Zeng**, University of Lyon, I (993-33-902)

AMS Special Session on Topological Dynamics and Ergodic Theory, I

8:00 AM – 10:20 AM

Organizers: **Alica Miller**, University of Illinois at Urbana-Champaign
Joseph Rosenblatt, University of Illinois at Urbana-Champaign

- 8:00AM *Some recent links of topological transformation groups with geometric functional analysis and Ramsey theory*.
(59) **Vladimir Pestov**, University of Ottawa (993-37-601)
- 9:00AM *Polynomial Averages Converge to the Product of Integrals*.
(60) **Nikos Frantzikinakis*** and **Bryna Kra**, Penn State University (993-37-1031)
- 9:30AM *Almost everywhere convergence of series in Ergodic Theory*.
(61) **Ciprian Demeter**, University of Illinois (993-37-1333)
- 10:00AM *Proximity, regional proximity, and a combination*.
(62) **Joseph Auslander**, University of Maryland (993-37-842)

AMS Special Session on The Many Lives of Lattice Theory and the Theory of Ordered Sets, with Connections to Combinatorics, I

8:00 AM – 10:50 AM

Organizers: **Jonathan D. Farley**, Massachusetts Institute of Technology
Stefan E. Schmidt, New Mexico State University

- 8:00AM *Tamari lattices in types A, B, and D*.
(63) **Hugh R. Thomas**, Fields Institute (993-06-1446)

- 8:30AM *Free Triangle Orders, Comparability Invariants, and Graph Theoretic Questions*.
(64) **Barry A Balof***, Whitman College, and **Kenneth P. Bogart**, Dartmouth College (993-06-1028)
- 9:00AM *The Perkins semigroup has co-NP-complete term-equivalence problem*.
(65) **Steven W Seif**, University of Kentucky (993-06-1353)
- 9:30AM *Branch Products*.
(66) **David K Milovich**, Massachusetts Institute of Technology (993-06-1690)
- 10:00AM *Geometry of Data Tables*. Preliminary report.
▶ (67) **Tim B. Kaiser**, Darmstadt University of Technology, Germany, and **Stefan E. Schmidt***, Phoenix Mathematical Systems Modeling, Inc. (993-06-1350)
- 10:30AM *Finding Lattices in Responses to Public Opinion Surveys: Theory, Method, and Examples*. Preliminary report.
▶ (68) **James A Wiley**, San Francisco State University (993-06-1395)

AMS Special Session on Coding and Design-Theoretic Applications of Polynomials, I

8:00 AM – 10:40 AM

Organizers: **Donald D. Mills**, Southern Illinois University, Carbondale
Patrick S. Mitchell, Midwestern State University
Kent M. Neuerburg, Southeastern Louisiana University

- 8:00AM *Irreducible Polynomials Over $GF(2)$ Which Divide No Trinomials*.
▶ (69) **Solomon W. Golomb**, University of Southern California (993-12-1018)
- 9:00AM *The Covering Radius of BCH Codes — a Polynomial Method*. Preliminary report.
(70) **Ralf Franken*** and **Stephen D Cohen**, University of Glasgow, Scotland (993-12-133)
- 9:30AM *Value sets of polynomials and permutation polynomials over finite fields*.
(71) **Pinaki Das**, Penn State Altoona (993-11-575)
- 10:00AM *Mutual Irreducibility of Certain Polynomials over Finite Fields*.
(72) **Daniel Panario*** and **Michael Dewar**, Carleton University (993-12-1139)

AMS Special Session on Geometry and Combinatorics, I

8:00 AM – 10:50 AM

Organizers: **Michael J. Falk**, Northern Arizona University
Eva-Maria Feichtner, ETH Zurich
Dmitry N. Kozlov, Bern University

- 8:00AM *Lower bounds in enumerative real algebraic geometry from sign-imbalanced posets*. Preliminary report.
(73) **Frank Sottile***, University of Massachusetts/MSRI, and **Evgenia Soprunova**, University of Massachusetts (993-14-1402)
- 8:30AM *From nice ideals to nice initial complexes*. Preliminary report.
(74) **Aldo Conca**, University of Genoa, **Serkan Hosten***, San Francisco State University, and **Rekha R. Thomas**, University of Washington (993-13-1540)

- 9:00AM *The Combinatorics of Rigid Molecules: the Molecular Conjecture and Protein Rigidity.*
▶ (75) **Walter J. Whiteley**, York University (993-52-691)
- 9:30AM *Quotients of spheres by tori.*
(76) **Edward Swartz**, Cornell University (993-57-1229)
- 10:00AM *A Discrete Homotopy Theory for Graphs: New Results.* Preliminary report.
(77) **Shelly Smith**, Arizona State University (993-05-124)
- 10:30AM *Tropical Convexity.*
(78) **Mike Develin**, American Institute of Mathematics, and **Bernd Sturmfels***, University of California at Berkeley (993-05-261)

AMS Special Session on Nonlinear Partial Differential Equations and Conformal Geometry, I

8:00 AM – 10:50 AM

Organizers: **Jie Qing**, University of California Santa Cruz
Yu Yuan, University of Washington, Seattle

- 8:30AM *Combinatorial curvature flow methods and PDE.*
(79) Preliminary report.
David A Glickenstein, University of Arizona (993-51-1364)
- 9:00AM *Existence of Solutions of Dirichlet problems of the Prescribed Mean Curvature Equation on Unbounded Domains.*
(80) **Zhiren Jin**, Wichita State University (993-35-836)
- 9:30AM *The decomposition of Riemannian invariants that are conformally invariant under integration.*
(81) **Spyros Alexakis**, Princeton University (993-51-1070)
- 10:00AM *Bernstein type results for special Lagrangian equations.*
(82) **Yu Yuan**, University of Washington (993-58-1676)
- 10:30AM *Singularities in Conformal Geometry: from PDE to Topology.*
(83) **Maria del Mar Gonzalez**, Princeton University (993-53-1033)

AMS Session on Number Theory and General Algebra

8:00 AM – 10:55 AM

- 8:00AM *Sperner theory in a difference of Boolean lattices.*
▶ (84) **Mark J Logan**, University of Minnesota, Morris (993-06-805)
- 8:15AM Break
- 8:30AM *Unranked Posets Extending the Lattices of Partitions of n .* Preliminary report.
(85) **Michael E Detlefsen**, Slippery Rock University (993-06-1298)
- 8:45AM *Finitely Based Varieties of Directed Graph Algebras.*
(86) **Brian L Walter**, The Evergreen State College (993-08-1661)
- 9:00AM *Going Down Results for C_i Fields.* Preliminary report.
(87) **Anthony J Bevelacqua**, University of North Dakota, and **Mark J Motley***, Pikeville College (993-12-718)
- 9:15AM *Polynomial Sequences with Convergent Mahler Measure.* Preliminary report.
▶ (88) **Lenny Jones**, Shippensburg University (993-11-1170)
- 9:30AM *Identities Arising from Gauss Sums for Finite Classical Groups.*
(89) **Hi-joon Chae**, Hongik University, and **Dae San Kim***, Sogang University (993-11-703)

- 9:45AM *Monogenic Hopf Algebras in Low Ramification.*
(90) Preliminary report.
Alan Koch, Agnes Scott College (993-11-430)
- 10:00AM *On a certain cohomological invariant for quadratic fields.*
(91) **Seok-Min Lee**, Johns Hopkins University (993-11-1223)
- 10:15AM *Blowing-up to Calculate a Basis for the Ring of Integers in a Number Field.*
(92) **Sarah Hutcheson Jahn**, University of Illinois at Chicago (993-11-1334)
- 10:30AM *Inverting the Satake Isomorphism.* Preliminary report.
▶ (93) **Nathan C Ryan**, Dartmouth College (993-11-779)
- 10:45AM *Divisibility properties of class numbers of composite irreducibles in $\mathbb{F}_q[T]$.*
(94) **Joseph Palen***, **W. Andrew Prueett** and **Delilah Whittington**, Millsaps College (993-11-1569)

AMS Session on Ordinary and Partial Differential Equations

8:00 AM – 10:10 AM

- 8:00AM *On asymptotic representation of solutions of the fourth Painlevé equation.*
(95) **Youmin Lu**, Bloomsburg University, and **Zhoude Shao***, Millersville University (993-34-134)
- 8:15AM *Solutions to Polynomial System of Differential Equations.*
▶ (96) **David C. Carothers***, **G. Edgar Parker**, **James S. Sochacki**, **Debra A. Warne** and **Paul G. Warne**, James Madison University (993-34-913)
- 8:30AM *An Explicit A-Priori Error Bound for the Taylor Polynomial Approximation to the Solution of Ordinary Differential Equations.* Preliminary report.
▶ (97) **Dave C Carothers**, **G Edgar Parker**, **James S Sochacki**, **Debra A Warne** and **Paul G Warne***, James Madison University (993-34-677)
- 8:45AM *An Existence Theorem for Hamiltonian Systems Derived from Optimal Controls.*
▶ (98) **Lianwen Wang**, Central Missouri State University (993-34-637)
- 9:00AM *Hybrid Combat models.*
▶ (99) **Seenith Sivasundaram**, Embry-Riddle (993-34-912)
- 9:15AM *On the Solvability for Parabolic Equations in Anisotropic Spaces.* Preliminary report.
(100) **Martin Lopez Morales**, Monterrey Institute of Technology (993-35-880)
- 9:30AM Break.
- 9:45AM *Best approximation of a γ -monogenic function in certain Sobolev spaces.*
(101) **Dejenie A Lakew**, University of Arkansas at Pine Bluff (993-35-100)
- 10:00AM *Spectral properties of the polyharmonic operator with a limit-periodic potential in two dimensions.* Preliminary report.
(102) **Yulia Karpeshina** and **Young-Ran Lee***, University of Alabama at Birmingham (993-35-1578)

AMS Session on Real and Complex Analysis

8:00 AM – 10:40 AM

- 8:00AM *Functions having intermediate value property.*
▶ (103) Preliminary report.
K Muthuvel, UW-Oshkosh (993-26-1362)
- 8:15AM *Conditions Which Imply Continuity.*
(104) **Zbigniew Piotrowski**, Youngstown State University, and **Robert W Vallin***, Slippery Rock University (993-26-550)

- 8:30AM *Haar Functions and Sampling Expansions.*
(105) Preliminary report.
Nasser Dastrange, Buena Vista University
(993-26-954)
- 8:45AM *Opial type inequalities involving fractional
(106) derivatives of two functions and applications.*
Preliminary report.
George A Anastassiou, University of Memphis
(993-26-39)
- 9:00AM *A Dini Condition.* Preliminary report.
(107) **J Namazi**, Fairleigh Dickinson University
(993-28-74)
- 9:15AM *Applying Concentration Theory to Composition
(108) Operators.* Preliminary report.
Brian P Kelly, U. of Louisiana at Monroe
(993-30-95)
- 9:30AM *Some Generalizations involving the Polar Derivative
▶ (109) for an Inequality of Paul Turán.*
G. N. McTume*, Ferris State University, and **N. K. Govil**, Auburn University (993-30-623)
- 9:45AM *The best possible quadratic refinement of Sendov's
(110) conjecture.*
Michael J Miller, Le Moyne College (993-30-522)
- 10:00AM *An area and length condition that holds at almost
(111) every boundary point of a Jordan domain having a quasiconformal boundary.* Preliminary report.
John T Marafino, James Madison University
(993-30-536)
- 10:15AM *The generalized Noor integral operator and a class
(112) of analytic functions.*
Yi Ling* and **Fengshan Liu**, Delaware State University (993-30-640)
- 10:30AM *Constructions of Multiplicative Periodic Functions
▶ (113) on C^0 .* Preliminary report.
Ioana Mihaila, Cal Poly Pomona (993-30-1271)

AMS Session on Algebra, I

8:00 AM – 10:55 AM

- 8:00AM *The role of valuation theory in algebraic geometry:
(114) local uniformization theorems.*
Laura Ghezzi, University of Missouri-Columbia
(993-13-306)
- 8:15AM *GCD of Ideals and Modules.*
(115) **Majid M Ali**, Sultan Qaboos University, and **David J Smith***, University of Auckland (993-13-117)
- 8:30AM *Some computational work on bounding
(116) multiplicities.* Preliminary report.
Christopher A. Francisco, Cornell University
(993-13-671)
- 8:45AM *Finite representation type and direct-sum
(117) cancellation.*
Ryan Karr, Florida Atlantic University (993-13-723)
- 9:00AM *A new class of finite commutative rings.* Preliminary
(118) report.
Thomas Craven, University of Hawaii, and **Monika Vo***, Saint Leo University (993-13-773)
- 9:15AM Break.
- 9:30AM *Classification of Tor-algebras Associated with
▶ (119) Gorenstein Resolutions of Length Four.* Preliminary report.
Carrie E Finch*, **Sara Gabrielli**, **Andrew R. Kustin**, University of South Carolina, **Mary Ellen Kustin**, **Frank Sanacory**, **William H. Streyer**, **Adela Vraciu**, **Brooks Willet** and **Jim Work**, University of South Carolina (993-13-1159)

- 9:45AM *Reflection Groups and Semigroup Algebras in
(120) Multiplicative Invariant Theory.*
Mohammed S Tesemma, Temple University
(993-13-1189)
- 10:00AM *Some Commutativity Theorems for Subweakly
(121) Periodic Rings.*
Amber Rosin, Cal Poly Pomona (993-16-1504)
- 10:15AM *Presentations of monomial algebras and uniserial
(122) modules.*
Ahmad Mojiri, Wilfrid Laurier University
(993-16-1711)
- 10:30AM *Using orbits and Young Tableaux to compute type A
▶ (123) fusion rules.*
Omar D Saldarriaga, Binghamton University
(993-16-978)
- 10:45AM *On some non-noetherian algebras of finite
(124) Gelfand-Kirillov dimension.*
Melanie B Butler, Temple University (993-16-1045)

SIAM Minisymposium on Applications of Nonlinear Dynamical Systems

8:00 AM – 10:50 AM

- Organizer: **Eric J. Kostelich**, Arizona State University
- 8:00AM *Reconstruction of shared dynamics.*
(125) **Timothy Sauer**, George Mason University
(993-37-1496)
- 8:35AM *The dynamics of an interesting model from
(126) economics.*
Judy Kennedy, University of Delaware
(993-37-1495)
- 9:10AM *Degenerate KAM Theory via a Nash-Moser Implicit
(127) Function Theorem.*
John Vano, University of Wisconsin (993-37-1490)
- 9:45AM *Reliable Lyapunov Exponents from Embeddings.*
▶ (128) Preliminary report.
Eric J. Kostelich*, Arizona State University, and **James A Yorke**, University of Maryland (993-37-1488)
- 10:20AM *Inverse limits and an implicitly defined difference
(129) equation from economics.* Preliminary report.
Judy A Kennedy*, **David R Stockman**, University of Delaware, and **James A Yorke**, University of Maryland (993-37-613)

MAA Session on Teaching a History of Mathematics Course

8:00 AM – 10:55 AM

- Organizers: **Joel K. Haack**, University of Northern Iowa
Amy E. Shell-Gellasch, United States Military Academy
- 8:00AM *Writing Assignments for the History of
▶ (130) Mathematics.*
Alexander F Kleiner, Drake University
(993-A1-1014)
- 8:15AM *It's A Math Course After All.* Preliminary report.
▶ (131) **Robert G Stein**, California State U, San Bernardino
(993-A1-387)
- 8:30AM *A Problem Solving Approach to the History of
▶ (132) Mathematics.*
Art Gittleman, California State University
(993-A1-37)
- 8:45AM *Mathematics in a Global Context: A Liberal Arts
▶ (133) Course.* Preliminary report.
Ze'ev Barel, Hendrix College (993-A1-816)

- 9:00AM *Engaging Students in the Lives and Work of Famous Mathematicians*. Preliminary report.
▶ (134) **Cheri L Boyd**, Nazareth College (993-A1-1595)
- 9:20AM *History of Mathematics for Future Secondary School Teachers*.
▶ (135) **Barnabas B Hughes**, California State University, Northridge (993-A1-24)
- 9:40AM *Maximum History with Minimum Mathematics*.
▶ (136) **Patricia R. Allaire**, Queensborough Community College, City University o (993-A1-128)
- 10:00AM *History of mathematics through the evolving community of mathematicians*. Preliminary report.
▶ (137) **Thomas Drucker**, University of Wisconsin-Whitewater (993-A1-499)
- 10:15AM *History of Mathematics: Development of a Course for Secondary Teachers*.
▶ (138) **Elizabeth C. Rogers**, Piedmont College (993-A1-659)
- 10:30AM *A Seminar Approach to the History of Mathematics*.
▶ (139) **Herbert E. Kasube**, Bradley University (993-A1-850)
- 10:45AM *Getting to Know You*.
▶ (140) **Agnes M. Kalemari**, SUNY Farmingdale (993-A1-1677)

MAA Session on Teaching Operations Research in the Undergraduate Classroom

8:00 AM – 10:40 AM

Organizers: **Dipa Choudhury**, Loyola College
Steven M. Hetzler, Salisbury State University

- 8:00AM *First Couple of Weeks in an Operations Research Class*. Preliminary report.
▶ (141) **Dipa Choudhury**, Loyola College in Maryland (993-B1-680)
- 8:15AM *Objectives and evaluation in a Linear Programming course*. Preliminary report.
▶ (142) **Dale C Peterson**, US Air Force Academy (993-B1-1577)
- 8:30AM *Teaching Strategies in Operations Research in the undergraduate classroom*. Preliminary report.
▶ (143) **Prabha Petkar**, V.J.T.I., Mumbai (993-B1-1650)
- 8:45AM *FCA+PBL=behavior modification in learning operations research*.
(144) **Innokenti V. Semoushin**, Ulyanovsk State University (993-B1-941)
- 9:00AM *A Modeling Based Operations Research Service Course for Business Majors*.
(145) **Mark Parker**, Carroll College (993-B1-616)
- 9:15AM *Challenges and Suggestions for Teaching Operations Research in the Undergraduate Classroom*. Preliminary report.
▶ (146) **Ann E Moskol**, Rhode Island College (993-B1-541)
- 9:30AM *An Undergraduate Nonlinear Optimization Course*.
▶ (147) **William P Fox**, Francis Marion University (993-B1-448)
- 9:45AM *A New Way to Teach Queueing Without Equilibrium Assumption*. Preliminary report.
▶ (148) **Michael L. Green***, **Alan C. Krinik**, **Carrie A Mortensen** and **Jennifer M. Switkes**, California State Polytechnic University, Pomona (993-B1-402)
- 10:00AM *Using Legos to Teach Linear Programming*.
▶ (149) **Christopher J Lacke**, Rowan University (993-B1-391)
- 10:15AM *Student Projects in Operations Research*.
▶ (150) **Kay B. Somers**, Moravian College (993-B1-385)
- 10:30AM *Examples of Team Projects That Work*.
▶ (151) **Robert C. Williams**, Alfred University (993-B1-65)

MAA Session on Mathematical Experiences for Students Outside the Classroom, I

8:00 AM – 10:55 AM

Organizers: **Laura L. Kelleher**, Massachusetts Maritime Academy
Mary S. Hawkins, Prairie View A&M University

- 8:00AM *DSU Student Chapter of MAA Promotes Mathematics Awareness*.
▶ (152) **Daniel P Wisniewski**, DeSales University (993-D1-112)
- 8:20AM *Field trips in Our Nation's Capital*.
▶ (153) **Betty Mayfield**, Hood College (993-D1-433)
- 8:40AM *A First Timer's Experience with an Independent Study*. Preliminary report.
▶ (154) **Greg Cicconetti**, Muhlenberg College (993-D1-175)
- 9:00AM *Enticing, Engaging and Enlightening Examples of Mathematical Activities*.
▶ (155) **Thomas Q Sibley**, St. John's University (993-D1-170)
- 9:20AM *Obtaining Student Research Sponsors and Showcasing Student Research at the United States Military Academy*.
▶ (156) **Michael J. Johnson*** and **Edgar K. Rugenstein**, United States Military Academy (993-D1-183)
- 9:40AM *A Mentoring Program for Math, Engineering, and Computer Science Majors*. Preliminary report.
(157) **Holly S. Zullo**, Carroll College (993-D1-643)
- 10:00AM *Student-Centered Department Events*.
▶ (158) **Cheryl L Olsen**, Shippensburg University (993-D1-449)
- 10:20AM *A Competition for Future Mathematics Teachers*.
▶ (159) Preliminary report.
Vince Schielack, Texas A&M University (993-D1-513)
- 10:40AM *From Problem Solving Group to Summer Research: k-sets of Magic Squares*.
▶ (160) **Dave Feil*** and **Andrew Shulman**, Carroll College (993-D1-866)

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

8:00 AM – 10:55 AM

Organizer: **Sarah L. Mabrouk**, Framingham State College

- 8:00AM *A calculus course writing assignment based on Tolstoy's integration metaphor in War and Peace*.
▶ (161) **Stephen T Ahearn**, Macalester College (993-F1-1256)
- 8:15AM *Developing Fluency in Mathematics*. Preliminary report.
▶ (162) **Mary T Treanor**, Valparaiso University (993-F1-473)
- 8:30AM *Teaching a Liberal Arts Math Course Using a Communications-Centered Strategy*. Preliminary report.
▶ (163) **Anand Pardhanani*** and **Cameron Sawyer**, Southwestern University (993-F1-1308)
- 8:45AM *Deepening understanding of mathematics through communication of mathematics*. Preliminary report.
(164) **Bin Lu**, California State University at Sacramento (993-F1-967)
- 9:00AM *Discussion, Writing, and Problem Solving*.
(165) **David Fischman**, California State University, San Bernardino (993-F1-1559)

- 9:15AM (166) *"Writing to Convince: Uncovering Reasoning in the Mathematics Classroom"*. Preliminary report.
Tracie McLemore Salinas, University of Tennessee, Knoxville (993-F1-924)
- 9:30AM (167) *Seeing and Remembering Mathematical Connections: Growth of Mathematical Understanding*.
Mercedes A McGowen, William Rainey Harper College (993-F1-1645)
- 9:45AM (168) *Assessment of Student Understanding Through Written Reports and Oral Presentations in Upper Division Math Courses*.
Carl Lienert, Fort Lewis College, and **Stan Yoshinobu***, Cal State Dominguez Hills (993-F1-243)
- 10:00AM (169) *Piece-wise Projects*. Preliminary report.
Alex J Heidenberg*, **Elizabeth Schott** and **John Wasko**, United States Military Academy (993-F1-1307)
- 10:15AM (170) *Math Camp: A Language Immersion Class*. Preliminary report.
Meredith L. Greer, Bates College (993-F1-540)
- 10:30AM (171) *Developing Skills, Confidence and Community in Freshman Mathematics Majors*.
Jacqueline M. Dewar* and **Curtis D. Bennett**, Loyola Marymount University (993-F1-1020)
- 10:45AM (172) *Taking on a developed writing class in mathematics*. Preliminary report.
Curtis D. Bennett*, Loyola Marymount University, and **Jacqueline M. Dewar**, Loyola Marymount University (993-F1-1021)

MAA General Contributed Paper Session, I

8:00 AM – 10:55 AM

Organizers: **Laura J. Wallace**, California State University, San Bernardino
Jacqueline A. Jensen, Sam Houston State University
Gary W. Towsley, SUNY at Geneseo
Michael A. Jones, Montclair State University
Shawnee L. McMurrin, California State University at San Bernardino

- 8:00AM (173) *Topologies on the plane supporting continuous open projections*. Preliminary report.
Robert Kantrowitz*, Hamilton College, and **John A Lindberg, Jr.**, Syracuse University (993-Z1-386)
- 8:15AM (174) *Finding the minimum number k such that all the values of the function $F(n) = k * 2^n + 1$ are composite for any positive n* .
Anton S Akhpolau, Barry University, Miami, Florida (993-Z1-1084)
- 8:30AM (175) *Modeling Correlation Structure in Resource Selection Studies using Generalized Linear Mixed Models*.
Ashraf F. Elhoubi*, University of Wyoming Department of Statistics, and **Richard Anderson-Sprecher**, prof. University of Wyoming Dept. of Statistics (993-Z1-1622)
- 8:45AM (176) *Shift and Scale Invariant Estimators For Heavy Tail Index Alpha*. Preliminary report.
Kristen Lynn Bianchi* and **Mark M Meerschaert**, University of Nevada (993-Z1-928)
- 9:00AM Break.
- 9:15AM (177) *Escaping to Infinity: Iteration involving several polynomials*.
David A. Boyd, Washington State University (993-Z1-1387)

- 9:30AM (178) *Numbers Which Are Simultaneous Of The Type $x^3 + y^3$ and $a^2 + b^2$* .
Sanja D Zivanovic, Barry University (993-Z1-1060)
- 9:45AM (179) *Florence Nightingale's Use of Statistical Diagrams*. Preliminary report.
S. Kilic-Bahi, Colby-Sawyer College (993-Z1-1061)
- 10:00AM (180) *Sample Sizes That Are Almost Sufficient*. Preliminary report.
Richard L Stephens, University of Alaska Southeast (993-Z1-284)
- 10:15AM (181) *Coin Tossing, Confidence Intervals and Theology*.
C. Bryan Dawson, Union University (993-Z1-286)
- 10:30AM (182) *What will it take to convince you?* Preliminary report.
Mary M. Sullivan, Rhode Island College (993-Z1-464)
- 10:45AM (183) *Futurama πk - Mathematics in the Year 3000*. Preliminary report.
Tom Georgoulas, Austin, TX, **Sarah J Greenwald***, Appalachian State University, and **Marc Wichterich**, RWTH Aachen University, Germany (993-Z1-681)

AMS Special Session on Probability and Its Applications in Combinatorics and Algorithms, I

9:00 AM – 10:50 AM

Organizers: **Russell D. Lyons**, Indiana University
Yuval Peres, University of California Berkeley

- 9:00AM (184) *The Simplest Game in the World*. Preliminary report.
Yuliy Baryshnikov and **Peter Winkler***, Bell Labs (993-05-1337)
- 10:00AM (185) *Asymptotic Enumeration of Spanning Trees*.
Russell D Lyons, Indiana University (993-05-1185)
- 10:30AM (186) *Mixing time for the biased card shuffling and the asymmetric exclusion process*.
Noam Berger*, Caltech, **Elchanan Mossel**, U.C. Berkeley, **Christopher E. Hoffman**, University of Washington, and **Itai Benjamini**, The Weizmann Institute (993-60-1713)

MAA Minicourse #12: Part A

9:00 AM – 11:00 AM

Incorporating discrete mathematics in the preparation of K-12 mathematics teachers.

Organizer: **Lolina Alvarez**, New Mexico State University

MAA Minicourse #1: Part A

9:00 AM – 11:00 AM

Designing and evaluating assessments for introductory statistics.

Organizers: **Beth L. Chance**, California Polytech State University, San Luis Obispo
Robert C. Delmas, University of Minnesota
Allan J. Rossman, California Polytech State University, San Luis Obispo

MAA Minicourse #7: Part A

9:00 AM – 11:00 AM

Origami in undergraduate mathematics courses.
Organizer: **Thomas C. Hull**, Merrimack College

**MAA CUPM Subcommittee on Curriculum Renewal
Across the First Two Years Panel Discussion**

9:00 AM – 10:20 AM

Open discussion on beginning level courses.
 Organizer: **Donald B. Small**, U.S. Military Academy
 Moderator: **Jack Bookman**, Duke University
 Panelists: **Norma M. Agras**, Miami-Dade
 Community College
Bob Mayes, West Virginia University

**MAA Session on Courses Below Calculus: A New
Focus, I**

10:00 AM – 10:35 AM

Organizers: **Mary Robinson**, University of New
 Mexico, Valencia Campus
Florence S. Gordon, New York
 Institute of Technology
Arlene H. Kleinstein, SUNY at
 Farmingdale
Norma M. Agras, Miami Dade
 Community College
Laurette B. Foster, Prairie View A&M
 University
Linda Martin, Albuquerque T-VI

10:00AM *Innovations in College Algebra at Kent State: Part 1.*
 ► (187) Preliminary report.

Ed Dubinsky* and **Olaf Stackelberg**, Kent State
 University (993-E1-759)

10:20AM *Innovations in College Algebra at Kent State: Part 2.*
 ► (188) Preliminary report.

Beverly M. Reed* and **Mary Beth Rollick**, Kent
 State University (993-E1-763)

AMS Invited Address

10:05 AM – 10:55 AM

(189) *The status of the classification of the finite simple
 groups.*
Michael Aschbacher, California Institute of
 Technology (993-20-06)

AMS-MAA Invited Address

11:10 AM – NOON

(190) *Title to be announced.*
Stephen Wolfram, Wolfram Research, Inc.

Exhibits and Book Sales

NOON – 5:30 PM

Mathematical Art Exhibit

NOON – 5:30 PM

Organizers: **Robert Fathauer**, Tessellations
 Company, Phoenix, Arizona
Nat Friedman, ISAMA, University at
 Albany, NY
Reza Sarhangi, Bridges Conference,
 Towson University

AMS Colloquium Lectures: Lecture 1

1:00 PM – 2:00 PM

(191) *Conformal invariants and partial differential
 equations. Part I.*
Sun-Yang Alice Chang, Princeton University
 (993-53-08)

MAA Invited Address

2:15 PM – 3:05 PM

(192) *The on-line encyclopedia of integer sequences, or,
 confessions of a sequence addict.*
Neil J. A. Sloane, AT & T Shannon Labs (993-A0-12)

**AMS-MAA-MER Special Session on Mathematics and
Education Reform, II**

2:15 PM – 6:05 PM

Organizers: **William H. Barker**, Bowdoin College
Jerry L. Bona, University of Illinois at
 Chicago
Naomi Fisher, University of Illinois at
 Chicago
Kenneth C. Millett, University of
 California Santa Barbara
Bonnie Saunders, University of Illinois
 at Chicago

2:15PM *Progress Reports on Implementing the
 Recommendations in the MET Report—A Faculty
 View.*

Ginger Warfield, University of Washington, and
Dale R. Oliver*, Humboldt State University
 (993-97-932)

2:45PM *Preparing Mathematicians to Educate Teachers.*
 (194) **Bernard L. Madison**, University of Arkansas
 (993-97-614)

3:15PM *What mathematicians should know about teaching
 math for elementary teachers.*
 (195) **Sybilla Beckmann**, University of Georgia
 (993-97-581)

3:45PM *Elementary Mathematics for Teachers. A
 mathematician's course for prospective elementary
 teachers.*

Scott J. Baldridge*, Indiana University, and **Thomas
 H. Parker**, Michigan State University (993-97-876)

4:15PM *The Mathematical Education of Elementary School
 Teachers: A Mathematics - Mathematics Education
 Partnership at the University of Nebraska - Lincoln.*
 Preliminary report.

James Lewis* and **Ruth Heaton**, University of
 Nebraska - Lincoln (993-97-1050)

4:45PM *A capstone course for prospective high school math
 teachers.* Preliminary report.
 ► (198) **Richard O. Hill*** and **Sharon L. Senk**, Michigan
 State University (993-97-1321)

5:15PM *Fractals in the Classroom: Yale Teacher Workshops
 (and Course MA 190).*
Benoit B. Mandelbrot, Yale University (993-97-453)

5:45PM Question period and discussion.

**AMS-ASL Special Session on Infinite Combinatorics
and Inner Model Theory, II**

2:15 PM – 6:05 PM

Organizers: **Matthew D. Foreman**, University of
 California Irvine

- Martin Zeman**, University of California Irvine
- 2:15PM *Cofinalities and approachable ordinals below $\aleph_{\omega+1}$.* (200)
M. C. Stanley, San Jose State (993-03-1327)
- 3:15PM *Partitioning Metric Spaces and Bernstein Sets.* (201)
 Preliminary report.
William Weiss, University of Toronto (993-03-1715)
- 3:45PM *The Consistency Strength of Some Consequences of $SRP(\omega_2)$.* (202)
Stuart Zoble, Boise State University (993-03-1400)
- 4:15PM *On specialisations of the Jonsson property and sequences of mutually stationary sets.* (203)
Philip David Welch, University of Bristol (993-03-1250)
- 4:45PM *Set Mapping Reflection.* (204)
Justin Tatch Moore, Boise State University (993-03-1004)
- 5:15PM *Diamond principles on large cardinals.* Preliminary report. (205)
Mirna Dzamonja*, University of East Anglia, and **Joel David Hamkins**, CUNY (993-03-1235)
- 5:45PM *Diamond and antichains.* (206)
James Cummings and **Ernest Schimmerling***, Carnegie Mellon University (993-03-1074)

AMS Special Session on Celestial Mechanics, II

2:15 PM – 6:05 PM

Organizers: **Samuel R. Kaplan**, University of North Carolina at Asheville
Gareth E. Roberts, College of the Holy Cross

- 2:15PM *A variational construction of transit orbits for the three-body problem.* (207)
Richard B. Moeckel, University of Minnesota (993-70-1311)
- 3:15PM *Symbolic dynamics for the symmetric collinear 4-body problem.* (208)
Ernesto A. Lacomba* and **Mario Medina**, University Autonoma Metropolitana - Iztapalapa (993-70-997)
- 3:45PM *The Equation of Motion for a Gravitational Filament and the N-Body Problem.* (209)
Greg Buck, Saint Anselm College (993-70-1704)
- 4:15PM *Bifurcation of collinear relative equilibria for 3-body like molecules.* (210)
Cristina Stoica, University of Surrey, UK (993-70-1264)
- 4:45PM *Capture and exchange in the parabolic and hyperbolic restricted 3 body problem.* (211)
Joaquin Delgado*, UAM-Iztapalapa, and **Martha Alvarez**, UAM-Iztapalapa (993-34-1405)
- 5:15PM *Shepherding Moons - Estimates and Solutions.* (212)
Joyce Macabea, Boston University (993-70-1411)
- 5:45PM *Co-orbital limiting problems and ring systems.* Preliminary report. (213)
Glen R Hall, Boston University (993-70-1166)

AMS Special Session on Mathematics in Natural Resource Modeling, II

2:15 PM – 6:35 PM

Organizers: **Catherine A. Roberts**, College of the Holy Cross
Suzanne M. Lenhart, University of Tennessee

- 2:15PM *Natural resource modeling within the confines of legal and regulatory processes.* (214)
Charles R. Hadlock, Bentley College (993-92-810)

- 2:45PM *Open Access and Extinction of the Passenger Pigeon in North America.* (215)
Jon M. Conrad, Cornell University (993-34-518)
- 3:15PM *A Mathematical Theory of Ecological Traps.* (216)
Roland H Lamberson, Humboldt State University (993-92-644)
- 3:45PM *Diurnal Spatial Dynamics of Marine Birds and Mammals.* (217)
Shandelle M Henson* and **James L Hayward**, Andrews University (993-92-817)
- 4:15PM *The role of dispersal in the replacement of Golden-winged Warblers by Blue-winged Warblers.* (218)
Alexander E. Koonce, University of Redlands (993-92-983)
- 4:45PM *A structured population model for adult male snow crab, *Chionoecetes opilio*, in the southern Gulf of St. Lawrence.* Preliminary report. (219)
J Apaloo*, St. Francis Xavier University, **E Wade**, **T Surette** and **M Moriyasu**, Dept. of Fisheries and Oceans (993-92-646)
- 5:15PM *Periodic environments and periodic harvesting.* (220)
Fred Brauer, University of British Columbia, and **David A Sánchez***, Texas A & M University (993-92-171)
- 5:45PM *Optimal Discounting in Control Problems That Span Multiple Generations.* (221)
Frank Caliendo, Northern Arizona University, and **Kenneth S Lyon***, Utah State University (993-49-521)
- 6:15PM *Unified Neutral Theory of Biodiversity and Biogeography.* (222)
Karl Albert Beres, Ripon College (993-92-1689)

AMS Special Session on Probability and Its Applications in Combinatorics and Algorithms, II

2:15 PM – 5:55 PM

Organizers: **Russell D. Lyons**, Indiana University
Yuval Peres, University of California Berkeley

- 2:15PM *Monte Carlo tests of conformal invariance and SLE predictions for the two-dimensional self-avoiding walk.* (223)
Tom G Kennedy, University of Arizona (993-60-1172)
- 3:15PM *Level sets and flow lines of the Gaussian free field.* (224)
Scott Sheffield* and **Oded Schramm**, Microsoft Research (993-60-1662)
- 4:15PM *Asymptotics of random discrete interfaces.* (225)
Richard Kenyon, Université Paris-Sud (993-60-1542)
- 5:15PM *Random walk and random aggregation without randomness.* Preliminary report. (226)
Alexander E. Holroyd, University of British Columbia, **Lionel Levine**, U. C. Berkeley, and **James G. Propp***, U. Wisconsin - Madison (993-60-1071)

AMS Special Session on Discrete Dynamics and Difference Equations, II

2:15 PM – 6:05 PM

Organizers: **Saber N. Elaydi**, Trinity University
Jim M. Cushing, University of Arizona
Gerasimos Ladas, University of Rhode Island
James A. Yorke, University of Maryland, College Park

- 2:15PM *Multiple Attractors in a Discrete Model of Two Competing Species*. Preliminary report.
▶ (227) **Jeff Edmunds**, Mary Washington College (993-37-422)
- 2:45PM *On the Two-Parameter Absolute Difference Equation*. Preliminary report.
(228) **Candace M. Kent*** and **Hassan Sedaghat**, Virginia Commonwealth University (993-37-116)
- 3:15PM *On the asymptotic behavior of $x_{n+1} = a_n x_n / x_{n-1}$* . Preliminary report.
▶ (229) **Richard DeVault***, Northwestern State University of Louisiana, and **Raghib Abu-Saris**, University of Sharjah (993-39-200)
- 3:45PM *On the trichotomy character of $x_{n+1} = \frac{\alpha + \gamma x_{n-1}}{A + Bx_n + x_{n-2}}$* .
(230) **E Chatterjee**, **Edward A Grove***, **Y Kostrov** and **G Ladas**, University of Rhode Island (993-39-93)
- 4:15PM *On A System of Rational Difference Equations*.
(231) **C.A. Clark***, Univ. of Rhode Island/NUWC, and **M.R.S. Kulenovic**, Univ. of Rhode Island (993-39-67)
- 4:45PM *Global Character of Some Rational Equations with Period-two Coefficients*.
(232) **Carol B Overdeep***, Western Oregon University, **Carol H Gibbons**, Salve Regina University, **Mustafa R.S. Kulenovic** and **Gerasimos Ladas**, University of Rhode Island (993-39-61)
- 5:15PM *On the trichotomy character of $x_{n+1} = \frac{\gamma x_{n-1} + \delta x_{n-2}}{A + Bx_n + Dx_{n-2}}$* . Preliminary report.
▶ (233) **E. A. Grove**, **G. Ladas**, University of Rhode Island, and **M. Predescu***, Bentley College (993-39-72)
- 5:45PM *Open Problems and Conjectures*. Preliminary report.
▶ (234) **Gerasimos Ladas**, University of Rhode Island (993-39-331)

AMS Special Session on Time Scales and Applications, II

2:15 PM – 6:35 PM

- Organizers: **Martin J. Bohner**, University of Missouri at Rolla
Billur Kaymakcalan, Georgia Southern University
Allan C. Peterson, University of Nebraska
- 2:15PM *Some Oscillation Criteria for First Order Delay Dynamic Equations*. Preliminary report.
▶ (235) **Martin Bohner**, University of Missouri-Rolla (993-39-1099)
- 2:45PM *Nonlinear Three Point Boundary Value Problems on Time Scales*.
(236) **Ferhan Atici***, Western Kentucky University, and **Serap Topal**, Ege University (993-39-1130)
- 3:15PM *Nontrivial solutions to a nonlinear boundary value problem on a time scale*.
(237) **Johnny Henderson**, Baylor University (993-39-182)
- 3:45PM *Multipoint boundary value problems on time scales*.
(238) **Basant K Karna**, Baylor University (993-39-815)
- 4:15PM *Application of Dynamic Equations on Time Scales to Modelling the West-Nile Virus*. Preliminary report.
(239) **Jo Hoffacker**, University of Georgia (993-34-676)
- 4:45PM *Nonlinear Boundary Value Problems on Time Scales*.
(240) **Johnny L Henderson**, Baylor University, and **Christopher C Tisdell***, The University of New South Wales (993-39-1106)
- 5:15PM *Asymptotic behavior of perturbed dynamic equations on time scales revisited*. Preliminary report.
(241) **Sigrun Bodine***, University of Puget Sound, and **D.A. Lutz**, San Diego State University (993-39-1280)

- 5:45PM *Population Dynamics on a Time Scale*. Preliminary report.
(242) **Bonita A. Lawrence***, Marshall University, and **Billur Kaymakcalan**, Georgia Southern University (993-34-1388)
- 6:15PM *Some ideas about the implications of time scale usage in determining several concepts in cardiology*. Preliminary report.
▶ (243) **Billur Kaymakcalan**, Georgia Southern University (993-34-1617)

AMS Special Session on Theory and Applications of Orthogonal Polynomials, II

2:15 PM – 6:00 PM

- Organizers: **Mourad E. H. Ismail**, University of South Florida
Barry Simon, California Institute of Technology
- 2:15PM *Matrix valued orthogonal polynomials and differential equations*.
▶ (244) **F. Alberto Grunbaum**, UC Berkeley (993-33-1301)
- 3:15PM *Applications of a complete expansion for the partition function of random matrix theory*.
(245) **N Ercolani**, University of Arizona, and **Kenneth D. T-R McLaughlin***, University of North Carolina (993-60-1623)
- 4:15PM *Determinants With Orthogonal Polynomial Entries*.
(246) **Mourad E.H. Ismail**, University of Central Florida (993-33-1589)
- 5:15PM *Orthogonal and extremal polynomials on discrete sets*.
(247) **Steven Benjamin Damelin**, Georgia Southern University (993-33-173)

AMS Special Session on The Many Lives of Lattice Theory and the Theory of Ordered Sets, with Connections to Combinatorics, II

2:15 PM – 6:05 PM

- Organizers: **Jonathan D. Farley**, Massachusetts Institute of Technology
Stefan E. Schmidt, New Mexico State University
- 2:15PM *The Width of the Lattice of Antichains and Role-Based Access Control*. Preliminary report.
▶ (248) **J Crampton***, Information Security Group, Royal Holloway, University of London, **T I Fenner** and **G Loizou**, School of Computer Science and Information Systems, Birkbeck, University of London (993-06-1283)
- 2:45PM *Partial orders for physics and probability*.
(249) **Bob Coecke**, Oxford University (993-06-1322)
- 3:15PM *Injective Spaces*.
(250) **Dana S. Scott**, Carnegie Mellon University, Department of Computer Science (993-06-1640)
- 3:45PM *Topologie Über Alles, or, Applications and Open Problems for Comonoids*. Preliminary report.
▶ (251) **Vaughan R Pratt**, Stanford University (993-06-1673)
- 4:15PM *Lattices and random tilings*.
▶ (252) **James G. Propp**, University of Wisconsin - Madison (993-06-1220)
- 4:45PM *Order Theory in Reflexive Control*. Preliminary report.
▶ (253) **Xenia H. Kramer*** and **Stefan E. Schmidt**, Phoenix Mathematical Systems Modeling, Inc. (993-91-1203)

- 5:15PM *Linear Codes on Partially Ordered Sets*. Preliminary report. (254)
 ▶ **Marcus Greferath**, San Diego State University (993-94-1329)
- 5:45PM *Poset codes and their applications*. Preliminary report. (255)
Michael J. Adams, Truman State University (993-06-631)

- 4:45PM *The Markov Width of a Graph*. (267)
Mike Develin, American Institute of Mathematics, and **Seth Sullivant***, University of California, Berkeley (993-05-1276)
- 5:15PM *A Tutte polynomial for matrices*. (268)
Joseph P. S. Kung, University of North Texas (993-05-483)
- 5:45PM *The Kadison-Singer problem as a combinatorial question*. (269)
 ▶ **Nik Weaver**, Washington University (993-05-151)

AMS Special Session on Coding and Design-Theoretic Applications of Polynomials, II

2:15 PM – 6:00 PM

Organizers: **Donald D. Mills**, Southern Illinois University, Carbondale
Patrick S. Mitchell, Midwestern State University
Kent M. Neuerburg, Southeastern Louisiana University

- 2:15PM *Grobner bases and fibre structures*. (256)
 ▶ **Shuhong Gao**, Clemson University (993-13-653)
- 3:15PM *Generalized Gröbner Bases and Coding Theory*. (257)
Edward C Mosteig, Loyola Marymount University (993-13-361)
- 3:45PM *Order domains and generalized Goppa codes*. (258)
John B Little, College of the Holy Cross (993-94-52)
- 4:15PM *Minimal distance of an evaluation code on a zero-dimensional complete intersection*. Preliminary report. (259)
Leah H. Gold*, Texas A & M University, **John B. Little**, College of The Holy Cross, and **Hal Schenck**, Texas A & M University (993-14-252)
- 4:45PM *A minimum weight basis for the Reed-Muller code without computations*. Preliminary report. (260)
Horacio Tapia-Recillas* and **Jose Gutierrez**, UAM-I, Mexico (993-12-733)
- 5:15PM *Asymptotically optimal towers defined recursively by polynomials*. (261)
Wen-Ching Winnie Li, Penn State University (993-11-250)

AMS Special Session on Geometry and Combinatorics, II

2:15 PM – 6:05 PM

Organizers: **Michael J. Falk**, Northern Arizona University
Eva-Maria Feichtner, ETH Zurich
Dmitry N. Kozlov, Bern University

- 2:15PM *Symmetric and alternating groups as monodromy groups*. (262)
Robert Guralnick, University of Southern California, and **John Shareshian***, Washington University (993-05-1035)
- 2:45PM *Schubert polynomials and chains in the Bruhat order of the symmetric group*. (263)
Richard P. Stanley, M.I.T. (993-05-307)
- 3:15PM *Graph homomorphisms and chromatic number*. (264)
Eric Babson*, University of Washington, and **Dmitry N. Kozlov**, Royal Institute of Technology Stockholm (993-05-1694)
- 3:45PM *Some new methods in the theory of m -Quasi-Invariants of S_n* . (265)
A. M. Garcia* and **N. Wallach**, U C S D (993-05-720)
- 4:15PM *On face numbers of manifolds with symmetry*. (266)
Isabella Novik, University of Washington (993-05-724)

AMS Special Session on Nonlinear Partial Differential Equations and Conformal Geometry, II

2:15 PM – 5:35 PM

Organizers: **Jie Qing**, University of California Santa Cruz
Yu Yuan, University of Washington, Seattle

- 2:15PM *On some fully nonlinear elliptic equations in conformal geometry*. Preliminary report. (270)
Pengfei Guan*, McMaster University, and **Guofang Wang**, Max-Planck Institute (993-58-635)
- 2:45PM *On the Mass of Asymptotically Hyperbolic Manifolds*. Preliminary report. (271)
Lars Andersson, **Mingliang Cai*** and **Greg Galloway**, University of Miami (993-53-702)
- 3:15PM *The stability of Riemannian manifolds with a parallel spinor*. (272)
Xiaodong Wang, MIT (993-53-1215)
- 3:45PM *The Sobolev inequality for Paneitz operator on three manifolds*. (273)
Fengbo Hang* and **Paul Yang**, Princeton University (993-53-990)
- 4:15PM *An Analog to the Positive Mass Theorem on Spheres*. (274)
Jean Steiner, Courant Institute of Mathematical Sciences (993-58-751)
- 4:45PM *Timelike Surfaces of Constant Mean Curvature $|H| = 1$ in Anti-de Sitter (AdS) 3-Space and Integrable Systems*. Preliminary report. (275)
Sungwook Lee, University of Southern Mississippi (993-53-132)
- 5:15PM *Global Existence of Lorentz Wave Maps Between Manifolds With Symmetries*. Preliminary report. (276)
 ▶ **Tadg H Woods**, Gonzaga University (993-35-1198)

AMS Special Session on Nonstandard Methods, I

2:15 PM – 5:05 PM

- Organizers: **Matt Insall**, University of Missouri at Rolla
Peter A. Loeb, University of Illinois at Urbana-Champaign
David A. Ross, University of Hawaii
- 2:15PM *On continuous modifications of Skorokhod integral processes in abstract Wiener space*. (277)
Horst Osswald, Mathematisches Institut Universitaet Muenchen (993-60-152)
- 2:45PM *Non-Linear Theory of Generalized Functions in Non-Standard Setting*. (278)
Todor D. Todorov, California Polytechnic State University (993-46-429)
- 3:15PM *The Microscopic Behavior of Measurable Functions*. (279)
 ▶ **Peter A. Loeb**, University of Illinois, Champaign-Urbana (993-28-651)
- 3:45PM *Some hyperdiscrete analysis*. (280)
 ▶ **Chris Impens**, University of Ghent (Belgium) (993-26-833)

4:15PM *On infinitesimally optimal paths.* Preliminary report.
(281) **A G Kusraev**, Institute for Mathematics and Informatics, and **S S Kutateladze***, Sobolev Institute of Mathematics (993-49-972)

4:45PM *Exact law of large numbers and stationarity for dynamical systems with independent random mutations, matchings and type changing.*
(282) **Darrell Duffie**, Stanford University, and **Yeneng Sun***, National University of Singapore (993-60-1072)

MAA Minicourse #13: Part A

2:15 PM – 4:15 PM

The Fibonacci and Catalan numbers.

Organizer: **Ralph P. Grimaldi**, Rose-Hulman Institute of Technology

MAA Minicourse #2: Part A

2:15 PM – 4:15 PM

Hands-on discrete math with technology.

Organizers: **Douglas E. Ensley**, Shippensburg University
Kate McGiveny, Shippensburg University

MAA Minicourse #8: Part A

2:15 PM – 4:15 PM

Some mathematics of Leonhard Euler.

Organizers: **William W. Dunham**, Muhlenberg College
Edward C. Sandifer, Western Connecticut State University

AMS Session on Number Theory

2:15 PM – 6:10 PM

2:15PM *Elliptic curves and the abc conjecture.* Preliminary report.
(283) **Lily S. Khadjavi***, Loyola Marymount University, and **Victor Scharaschkin**, University of Queensland (993-11-1365)

2:30PM *Cohomological conditions for the abc conjecture.* Preliminary report.
(284) **Lily S. Khadjavi**, Loyola Marymount University, and **Victor Scharaschkin***, University of Queensland (993-11-1368)

2:45PM *Fourier Series and Hecke Operators on $GL(3, R)$.*
(285) **Umesh P. Nagarkatte**, Medgar Evers College, CUNY (993-11-748)

3:00PM *Moments of the Riemann zeta function and Eisenstein series.*
(286) **Jennifer E Beineke***, Western New England College, and **Daniel W Bump**, Stanford University (993-11-1240)

3:15PM *Differential equations of Eisenstein series on $\Gamma_0(2)$.*
(287) **Heekyoung Hahn**, University of Illinois at Urbana-Champaign (993-11-1295)

3:30PM *Certain powers of η : some formulas and related congruences.* Preliminary report.
(288) **Adrian D Stanger**, Brigham Young University (993-11-1573)

3:45PM *Automorphic forms on orthogonal groups.*
(289) **Eitan S Sayag**, Ohio State University (993-11-1427)

4:00PM *Bounds for the Number of Large Digits in the Positive Integers not Exceeding n .*
(290) **Curtis N Cooper**, Central Missouri State University (993-11-964)

4:15PM Break

4:30PM *Asymptotic subset-sum ranks of integer geometric series.* Preliminary report.
▶ (291) **David Petrie Moulton**, Center for Communications Research (993-11-1191)

4:45PM *Counting rational linear spaces on hypersurfaces.* Preliminary report.
(292) **Scott T. Parsell**, Penn State University (993-11-1611)

5:00PM *The best partition of the integers. (Almost.)*
▶ (293) **Sam Vandervelde**, University of Chicago (993-11-1343)

5:15PM *Multiplicative magic squares of order four.* Preliminary report.
▶ (294) **Carl A Libis**, University of Rhode Island (993-11-1412)

5:30PM *Almost all palindromes are composite.*
▶ (295) **Mayumi Sakata**, University of Missouri, Columbia (993-11-1566)

5:45PM *The chirality of Fibonacci triples.*
▶ (296) **Christopher S Simons*** and **Marcus Wright**, Rowan University (993-11-101)

6:00PM *Rational valued series of a rational function.*
▶ (297) **J Marshall Ash*** and **Stefan Catoiu**, DePaul University (993-11-1531)

AMS Session on Partial Differential Equations

2:15 PM – 5:55 PM

2:15PM *The Density of States in a Quasi-Gap.*
(298) **Jeffrey L Selden**, University of Arizona (993-35-1205)

2:30PM *Dimension of p -harmonic measure.* Preliminary report.
(299) **Björn Bennewitz**, University of Kentucky (993-35-1227)

2:40PM Break

3:00PM *On Prescribing the Curvature of Level Curves.* Preliminary report.
(300) **David L. Finn**, Rose-Hulman Institute of Technology (993-35-813)

3:15PM *Results on the Lagrangian averaged Navier-Stokes Equations.*
(301) **James P Peirce**, University of California, Davis (993-35-742)

3:30PM *Nonclassical symmetries of partial differential equations and compatibility.*
(302) **Daniel J. Arrigo***, University of Central Arkansas, and **Jon R. Beckham**, University of Delaware (993-35-921)

3:45PM *Positive Solutions for Large Elliptic Systems of Interacting Species Groups by Cone Index Methods.*
(303) **Anthony W Leung**, University of Cincinnati (993-35-996)

4:00PM Break

4:15PM *A Hierarchy of Nonlinear integrable PDEs and Its Exact Solution.*
(304) **Zhijun Qiao**, Los Alamos National Laboratory (993-35-1382)

4:30PM *Nonlinear degenerate parabolic equations with singular lower order term.*
(305)

Ismail Kombe*, University of Missouri, and **Jerome A Goldstein**, University of Memphis (993-35-1025)

- 4:45PM *An Equation For The Limit State Of A Superconductor With Pinning Sites.*
(306) **Patricia Bauman** and **Jianzhong Sun***, Purdue University (993-35-1182)
- 5:00PM *Vortices and current in the thin film Ginzburg-Landau model of superconductivity.*
(307) Preliminary report.
Patricia Bauman and **Dmitry Glotov***, Purdue University (993-35-1601)
- 5:15PM *The Phase Transition between Chiral Nematic and Smectic C* Liquid Crystals.*
(308) **Sookyung Joo*** and **Daniel Phillips**, Purdue University (993-35-1707)
- 5:30PM *Quenching of Solutions for a Degenerate Semilinear Parabolic Problem with Second Boundary Conditions.*
(309) **C. Y. Chan**, University of Louisiana at Lafayette, and **N. E. Dyakevich***, California State University at San Bernardino (993-35-1484)
- 5:45PM *Exponential Stability of a Connected System of Wave Equations in Bounded Regions.*
(310) **M Najafi**, Kent State University Ashtabula (993-93-1655)

AMS Session on Algebra, II

2:15 PM – 5:55 PM

- 2:15PM *The dimension of the Hilbert scheme of special threefolds.*
(311) **Gian Mario Besana***, DePaul University CTI, and **Maria Lucia Fania**, Universita degli Studi di L'Aquila (993-14-135)
- 2:30PM *Ample sequences and Frobenius amplitude.*
(312) Preliminary report.
Dennis S. Keeler, Miami University (993-14-582)
- 2:45PM *Cycle groups of curves over global fields of positive characteristic.* Preliminary report.
(313) **Reza Akhtar**, Miami University (993-14-1665)
- 3:00PM *An elementary note on asymptotic properties of Toeplitz and multilevel Toeplitz matrices.*
(314) **William F. Trench**, Trinity University (993-15-655)
- 3:15PM *The Spectral Radius of Submatrices of the Laplacian Matrix for a Tree.* Preliminary report.
▶ (315) **Jason J Moliterno**, Sacred Heart University (993-15-837)
- 3:30PM *Ranks of Strongly Regular Graphs.*
(316) **Charles R. Garner, Jr.**, Rand Afrikaan University, **George J. Davis***, **Gayla S. Domke**, Georgia State University, and **Elizabeth Jonck**, Rand Afrikaan University (993-15-821)
- 3:45PM *On GW Rootsysteams of Low Ranks.* Preliminary report.
(317) **Mohammad Q Hailat**, Jordan University of Science & Technology (993-17-517)
- 4:00PM Break
- 4:15PM *Computing a “nice basis” for the local symmetric space p.*
▶ (318) **Jennifer R Fowler***, Lamar University, and **Aloysius G Helminck**, North Carolina State University (993-17-670)
- 4:30PM *Dynamical Quantum Groups and Self-Duality.*
(319) **Bharath R Narayanan**, University of Arizona (993-17-865)
- 4:45PM *On certain vertex algebras and their modules associated with vertex algebroids (Preliminary report).* Preliminary report.
(320) **Haisheng Li**, Rutgers University, Camden, and **Gaywalee Yamskulna***, SUNY at Binghamton (993-17-867)

- 5:00PM *Representations of Generalized Heisenberg Algebras and of Quantum Weyl Algebras.*
(321) **M Chakrabarti**, DePaul University (993-17-1506)
- 5:15PM *Bimodules for Lie and anti-Lie triple systems.*
(322) **Nora C. Hopkins**, Indiana State University (993-17-1544)
- 5:30PM *The coquecigrue of a Leibniz algebra.*
(323) **Michael K Kinyon**, Indiana University South Bend (993-17-1686)
- 5:45PM *The Zero-Divisor Graph of a (not necessarily commutative) Semigroup.* Preliminary report.
▶ (324) **Neal O. Smith**, University of Tennessee, Knoxville (993-13-863)

AMS Session on Algebraic and General Topology

2:15 PM – 6:10 PM

- 2:15PM *On the immersion problem for 2^r -torsion lens spaces.*
(325) **Jesús González**, CINVESTAV-IPN, and **Thomas A Shimkus***, DeSales University (993-55-826)
- 2:30PM *The number of summands in v_1 -periodic homotopy groups of $SU(n)$.*
(326) **Katarzyna Potocka**, Lehigh University (993-55-898)
- 2:45PM *Parametrized Fixed Point Theory.*
(327) **Vesta Coufal**, University of Notre Dame (993-54-925)
- 3:00PM *Also on Systems of Interlocking Exact Sequences.*
(328) **C. Joanna Su**, Providence College (993-55-88)
- 3:15PM *On the degree 2 map for a sphere.*
(329) **Fred R. Cohen** and **Inga A Johnson***, University of Rochester (993-55-1583)
- 3:30PM *The Universal Vassiliev Invariant for the Lie Superalgebra $osp(1|2)$.* Preliminary report.
(330) **Hyunju Oh**, University of South Carolina, Salkehatchie (993-55-1318)
- 3:45PM *Collapsing a Simplex to a Non-collapsible Complex.* Preliminary report.
▶ (331) **Katherine Dutton Crowley***, **Abi Ebin**, **Paul Reyfman**, **John White**, **Mark Xue** and **Howie Kahn**, Columbia University (993-54-1668)
- 4:00PM *Characteristic twisting decomposition of knots in S^3 .*
(332) **Mohamed Ait Nouh**, Santa Barbara, California (993-54-1059)
- 4:15PM Break
- 4:30PM *Pauling-Pasteur-Mobius Theorem.* Preliminary report.
▶ (333) **Okan Gurel***, IBM, and **Demet Gurel**, Touro College (993-54-985)
- 4:45PM *Making group topologies with, and without, convergent sequences.*
(334) **W. W. Comfort***, Wesleyan University, **S. U. Raczkowski** and **F. J. Trigos-Arrieta**, California State University, Bakersfield (993-54-1597)
- 5:00PM *Some Non-homeomorphism Results for Bohr Topologies.*
(335) **Berit Nilsen Givens**, California State Polytechnic University, Pomona (993-54-1401)
- 5:15PM *The Compactification of a net and open-filter process and the stone-cech, wallman compactifications.*
(336) **Hueytzen J. Wu***, Texas A&M-Kingsville, and **Wan-Hong Wu**, UT-Health Sciences Center at San Antonio (993-54-25)

- 5:30PM (337) *Cut Points in Abcohesive, Aposyndetic, and Semi-Locally Connected Spaces.*
Shing S So*, Central Missouri State University, and **David A John**, Missouri Western State College (993-54-965)
- 5:45PM (338) *Topological Invariants of Translation Actions.*
Nicholas A. Koban, SUNY at Binghamton (993-54-991)
- 6:00PM (339) *Lindelof-type cardinal invariants in symmetrizable spaces.*
Sheldon W. Davis and **Dimitrina Ninova Stavrova***, Miami University (993-54-1065)

SIAM Minisymposium on Applied and Computational Mathematics: Research For and By Undergraduates

2:15 PM – 6:00 PM

- Organizers: **William L. Briggs**, University of Colorado at Denver
Terry L. Herdman, Virginia Polytechnic Institute and State University
- 2:15PM (340) *Student projects in biologically inspired electronic circuits.*
Frank Hoppensteadt, Arizona State University
- 2:45PM (341) *Projects for enhancing communication skills of the undergraduate.*
Don Miller, St. Mary's College
- 3:05PM (342) *An experience with early undergraduate research in modeling and computational mathematics.*
Kathleen Fowler, Clarkson University
- 3:35PM (343) *The high-order accuracy algebraic-Maclaurin-Pade numerical method with applications to singular differential equations from nonlinear mechanics.*
Debra Warne* and **Paul Warne***, James Madison University
- 4:05PM (344) *Undergraduate research in linear algebra.*
Gil Strang, MIT
- 4:35PM **Panel Discussion:** The Applied Master's Degree: An Employment-Focused Alternative to the Ph.D., moderated by Lee Seitelman and Ben Fusaro.

MAA Session on Mathematical Experiences for Students Outside the Classroom, II

2:15 PM – 3:30 PM

- Organizers: **Laura L. Kelleher**, Massachusetts Maritime Academy
Mary S. Hawkins, Prairie View A&M University
- 2:15PM (345) *A First Experience Advising Undergraduate Research.*
Lisa DeMeyer, Central Michigan University (993-D1-199)
- 2:35PM (346) *Student Construction Projects for Mathematics Awareness Week and Related Mathematics Problems.*
Aaron K Trautwein, Carthage College (993-D1-728)
- 2:55PM (347) *Summer Math Enrichment Camp Experience.*
Lynn C. McGrath*, **Jane Friedman** and **Perla Myers**, University of San Diego (993-D1-900)
- 3:15PM (348) *The South Alabama Math Circles.*
Vasiliy Prokhorov, the University of South Alabama, and **Natalya Prokhorova***, ASMS and the University of South Alabama (993-D1-905)

MAA Session on Courses Below Calculus: A New Focus, II

2:15 PM – 6:10 PM

- Organizers: **Mary Robinson**, University of New Mexico, Valencia Campus
Florence S. Gordon, New York Institute of Technology
Arlene H. Kleinstein, SUNY at Farmingdale
Norma M. Agras, Miami Dade Community College
Laurette B. Foster, Prairie View A&M University
Linda Martin, Albuquerque T-VI
- 2:15PM (349) *College Algebra and Brief Calculus - A Problem-Solving and Technology-Based Approach for Associate of Arts Students.*
Robert L. Kimball, Wake Technical Community College (993-E1-666)
- 2:35PM (350) *A Small Department's Approach to Rethinking Introductory Courses.* Preliminary report.
George W. Moss, University of Virginia's College at Wise (993-E1-465)
- 2:55PM (351) *Diary of a New "College Algebra" Program.*
Carl Lienert* and **Carol Smith**, Fort Lewis College (993-E1-296)
- 3:15PM (352) *Using Modeling and Real Data Applications in a "College Algebra in Context" Course.*
Ronald J. Harshbarger*, U. S. Carolina Beaufort, and **Lisa S. Yocco**, Georgia Southern Univ. (993-E1-618)
- 3:35PM (353) *The Ideas of Algebra.* Preliminary report.
William G McCallum, University of Arizona (993-E1-945)
- 3:55PM (354) *A New Vision for Mathematics for Management Students.* Preliminary report.
Kris H Green* and **Allen Emerson**, St. John Fisher College (993-E1-700)
- 4:15PM (355) *Building a House: A Quadratic Model.*
Scott R. Herriott, Maharishi University of Management (993-E1-710)
- 4:35PM (356) *Interactive Instruction Utilizing Computer Generated Materials.* Preliminary report.
Wayne Mackey* and **William A Feldman**, University of Arkansas (993-E1-874)
- 4:55PM (357) *A New Approach to Teaching Comparison and Proportional Reasoning.*
Arlene Kleinstein, Farmingdale State University of New York (993-E1-749)
- 5:15PM (358) *Intermediate Algebra with Function as an Underlying Theme.*
Edward D Laughbaum, The Ohio State University (993-E1-738)
- 5:35PM (359) *A Different Type of Freshmen Level Mathematics Curriculum Without all the Algebra.*
Erick Brian Hofacker, University of Wisconsin River Falls (993-E1-853)
- 5:55PM (360) *Understanding and Using Algebra: a concrete, applications-rich, modeling-based "Applied Algebra" alternative to intermediate algebra.* Preliminary report.
Suzanne I. Doree, Augsburg College, Minneapolis, MN (993-E1-510)

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

2:15 PM – 6:10 PM

Organizer: **Sarah L. Mabrouk**, Framingham State College

- 2:15PM *Writing a Fractal Story.*
▶ (361) **Virginia R Jones**, Central CT State Univ. (993-F1-939)
- 2:30PM *To Play or Not to Play? A writing project that enhances students' learning of the basic concepts of counting.*
▶ (362) **Deborah Lurie**, Saint Joseph's University (993-F1-238)
- 2:45PM *A Probability Class Report. Preliminary report.*
▶ (363) **Jose Almer T. Sanqui**, Appalachian State University (993-F1-958)
- 3:00PM *Papers and Peer Review in Advanced Statistics.*
(364) **Kelly S Cline**, Carroll College (993-F1-927)
- 3:15PM *Using Group Presentations in Lower Division Math Courses to Illustrate Real Life Uses of Mathematics. Preliminary report.*
▶ (365) **Edwin Prine Herman**, University of Wisconsin, Stevens Point (993-F1-940)
- 3:30PM *Reading, Writing and Assessing in a Problem Solving Course for K-8 Pre-service Teachers.*
▶ (366) **Maria G. Fung***, Western Oregon University, and **Leon Roland**, Western Oregon University (993-F1-382)
- 3:45PM *Kramerica Industries: How to Turn a Rectangle Into a Circle.*
▶ (367) **John C Tynan**, Marietta College (993-F1-914)
- 4:00PM *Using Student-Selected Projects in Second Semester Calculus. Preliminary report.*
(368) **Christopher D Goff**, University of the Pacific (993-F1-438)
- 4:15PM *Short Writing Assignments for Gaining Understanding in Differential Equations. Preliminary report.*
(369) **Michael A Brilleslyper**, U. S. Air Force Academy (993-F1-177)
- 4:30PM *The Mathematics Term Paper Survival Guide (Instructor's Edition).*
▶ (370) **Janet C Woodland**, University of Arkansas (993-F1-466)
- 4:45PM *Algebra Out Loud: Students Read and Write to Learn and Communicate Mathematics.*
▶ (371) **Pat A. Mower**, Washburn University (993-F1-606)
- 5:00PM *Online Small Group Discussions in Geometry.*
▶ (372) **Matthew J Haines**, Augsburg College (993-F1-512)
- 5:15PM *Papers on Abstract Algebra. Preliminary report.*
▶ (373) **Heakyung Lee**, Winthrop University (993-F1-333)
- 5:30PM *Is Aunt Frieda FUNCTIONally Literate?*
▶ (374) **Janet M McShane**, Northern Arizona University (993-F1-1161)
- 5:45PM *Writing Proofs: How do we teach students what is second nature to us? Preliminary report.*
▶ (375) **James Sandefur**, Georgetown University (993-F1-938)
- 6:00PM *Using Guided Learning and E-Learning Tools to Get Students to Discuss and Write About Mathematics.*
▶ (376) **Sarah L. Mabrouk**, Framingham State College (993-F1-1489)

MAA Session on The Effective Use of Computer Algebra Systems in the Teaching of Mathematics, I

2:15 PM – 5:40 PM

Organizers: **L. Carl Leinbach**, Gettysburg College
Edward A. Connors, University of Massachusetts

- 2:15PM *Differential Equations and Friction—Where's the Rub?*
▶ (377) **Richard J Marchand**, Slippery Rock University (993-G1-394)
- 2:30PM *CAS, Visualization Software or Both?*
▶ (378) **Jean Marie McDill***, California Polytechnic State University, and **Agnes Rash**, St. Joseph's University (993-G1-395)
- 2:45PM *A Comprehensive Mathematics Curriculum with Mathematica.*
▶ (379) **Joanne Mason**, The Harker School (993-G1-1047)
- 3:00PM *A Comprehensive Use of CAS In the Mathematics Major.*
▶ (380) **Mark Parker**, Carroll College (993-G1-1055)
- 3:15PM *Presentation of An Issue - Teaching Mathematics with CAS: A RIPA Song. Preliminary report.*
▶ (381) **Raymond Rozen**, RMIT University (993-G1-1048)
- 3:30PM *Using PC and TI-92 in teaching Binomial and Normal Distribution in the final Grades of Austrian Grammar Schools.*
(382) **Otto Wurnig**, University of Graz (993-G1-1049)
- 3:45PM *Introducing Students to Mathematica within a Context.*
▶ (383) **Tom Linton** and **Mark A Mills***, Central College (993-G1-210)
- 4:00PM *Visualizing Eigenvectors with Computer Algebra Software Maple: A Linear Algebra Classroom Capsule.*
▶ (384) **Suda Kunyosying**, Shepherd College (993-G1-292)
- 4:15PM Break
- 4:30PM *Internet-Based Instruction of Applied Calculus Course.*
▶ (385) **Bakhodirzhon M. Siddikov**, Ferris State University (993-G1-31)
- 4:45PM *An Electronic Calculus Book in Maple.*
(386) **Mylan Redfern*** and **David Betounes***, University of Southern Mississippi (993-G1-1052)
- 5:00PM *Seeing the Flow and Watching the Wave. Preliminary report.*
▶ (387) **Elton Graves**, Rose-Hulman Institute of Technology (993-G1-482)
- 5:15PM *Using Maple Labs to Flavor an Introduction to Higher Mathematics.*
▶ (388) **Paul E. Becker**, Penn State - Erie (993-G1-1053)
- 5:30PM *Mathematica: A Tale of Two Versions.*
▶ (389) **Danny W. Turner*** and **Thomas W. Polaski**, Winthrop University (993-G1-335)

MAA General Contributed Paper Session, II

2:15 PM – 6:10 PM

Organizers: **Laura J. Wallace**, California State University, San Bernardino
Jacqueline A. Jensen, Sam Houston State University
Gary W. Towsley, SUNY at Geneseo
Michael A. Jones, Montclair State University
Shawnee L. McMurran, California State University at San Bernardino

- 2:15PM *The Missing Chapter in Elementary Statistics Textbooks: A Prescription for Transition into Statistical Inference.* Preliminary report.
 ▶ (390) **Gerald Y Agbegha**, Johnson C. Smith University (993-Z1-313)
- 2:30PM *A Geometry Course for High School Mathematics Teachers.* Preliminary report.
 ▶ (391) **Brenda C. Strassfeld**, New York University/University of Plymouth (993-Z1-187)
- 2:45PM *Don't Just Stand There - Do Something (In Your Stats Class)!* Preliminary report.
 ▶ (392) **Kelly Molkenthin Fuller**, Nazareth College (993-Z1-704)
- 3:00PM *Teaching a Summer Elementary Statistics Course Online.*
 ▶ (393) **Hasan N Hamdan**, James Madison University (993-Z1-1565)
- 3:15PM *Alef Efes- Students Of Education Create and Publish a Mathematical Quarterly and an Interactive Site.*
 (394) **Ziva Z Deutsch*** and **Akiva Kadari**, Jerusalem College (993-Z1-1232)
- 3:30PM Break.
- 3:45PM *The Vanishing Remainders Paradoxes And Other Overlooked Paradoxes of Infinity.*
 ▶ (395) **Michael Hugh Knowles**, Belo Horizonte, MG, Brazil (993-Z1-441)
- 4:00PM *A Question of Limits.*
 ▶ (396) **Paul H Schuette**, Meredith College (993-Z1-443)
- 4:15PM *Haven't I Heard That Before?* Preliminary report.
 ▶ (397) **Joanne V Peeples**, El Paso Community College (993-Z1-1009)
- 4:30PM *Reflections on a small-group discovery method experience: the Real Analysis class.*
 ▶ (398) **Constantin Dorin Dumitraşcu**, Dartmouth College (993-Z1-343)
- 4:45PM *Teaching a multilevel History of Mathematics course.*
 ▶ (399) **Joel K. Haack**, University of Northern Iowa (993-Z1-355)
- 4:55PM Break.
- 5:15PM *Discussing and Writing About Mathematics: Highlights and Pitfalls.*
 ▶ (400) **Michael L. Berry**, West Virginia Wesleyan College (993-Z1-35)
- 5:30PM *Investigating the "Unknown" to Motivate Mathematics Discussion.*
 ▶ (401) **Eileen Fernandez**, Montclair State University (993-Z1-1374)
- 5:45PM *Creative Reading and Writing in a Proofs Course.* Preliminary report.
 ▶ (402) **Heather A. Lewis**, Nazareth College (993-Z1-1287)
- 6:00PM *There's no Writing in Math Class?*
 ▶ (403) **Karen D Ivy**, Montclair State University (993-Z2-1292)

Lida McDowell, University of Southern Mississippi

MAA CUPM Subcommittee on Quantitative Literacy Requirements Panel Discussion

2:15 PM – 3:35 PM

Quantitative literacy across the curriculum.

Organizers: **Rick Gillman**, Valparaiso University

Kim Rheinlander, Dartmouth University

Emily Decker Larder, Evergreen State University

Gillie Malnarich, Evergreen State University

MAA CUPM Subcommittee on Curriculum Renewal Across the First Two Years Panel Discussion

2:15 PM – 3:35 PM

The impact of laptop computers on classroom instruction.

Organizer: **Donald B. Small**, U.S. Military Academy

Moderator: **Joseph D. Myers**, U.S. Military Academy

Panelists: **Panama Geer**, Bryn Mawr College

Michael Huber, U.S. Military Academy

Jim Rolfe, U.S. Air Force Academy

Math on the Web

2:15 PM – 5:00 PM

Go to the Math on the Web Pavilion for the complete schedule of presentations.

MAA Project NExT Panel Discussion

2:30 PM – 4:00 PM

Writing textbooks in mathematics.

Organizer: **Revathi Narasimhan**, Kean University

Panelists: **Lynn Cox**, Houghton-Mifflin

J. Douglas Faires, Youngstown State University

William Hoffman, Addison-Wesley

Dan Kalman, American University

MAA Section Officers

2:30 PM – 5:00 PM

MAA Invited Address

3:20 PM – 4:10 PM

- (404) *Selections from the calculus museum.*
William W. Dunham, Muhlenberg College (993-A0-16)

AWM Panel Discussion

3:20 PM – 4:35 PM

Supporting the diverse personal lives of mathematicians.

Organizers: **Carolyn S. Gordon**, Dartmouth College

Marianne Kortzen, Kansas State University

MAA Panel Discussion

2:15 PM – 3:35 PM

Service learning in mathematics: They wrote the book.

Organizer: **Jerry F. Dwyer**, Texas Tech University

Panelists: **Josh Sabloff**, Haverford College

Richard A. Zang, University of New Hampshire at Manchester

Perla L. Myers, University of San Diego

Dana S. Craig, University of Central Oklahoma

Panelists: **Helen Moore**, American Institute of Mathematics
Christina Sormani, Lehman College, CUNY
Beth Bradley, University of Louisville
Robert L. Bryant, Duke University
Jerome Dancis, University of Maryland
Dawn A. Lott, New Jersey Institute of Technology
Cleopatria Martinez, Phoenix College
Elizabeth Stanhope, Willamette University

Florence S. Gordon, New York Institute of Technology

MAA Special Presentation

3:45 PM – 5:30 PM

CINEMATH: Mathematics on the silver screen.
Organizer: **Charlie L. Smith**, Park University

MAA Committee on the Mathematics Education of Teachers-NCTM Panel Discussion

3:45 PM – 5:15 PM

National Council for Accreditation of Teacher Education (NCATE) and the mathematics community
Organizers: **Judith L. Covington**, Louisiana State University-Shreveport
Marilyn L. Hala, NCTM

MAA Minicourse #14: Part A

4:30 PM – 6:30 PM

Introduction to mathematical card tricks.
Organizers: **Colm K. Mulcahy**, Spelman College
Jeffrey A. Ehme, Spelman College

MAA Minicourse #3: Part A

4:30 PM – 6:30 PM

Computation and discovery in the number theory classroom.
Organizer: **Clifford A. Reiter**, Lafayette College

MAA Minicourse #9: Part A

4:30 PM – 6:30 PM

PMET: Preparing mathematicians to educate teachers, grades 7–12.
Organizers: **Holly Hirst**, Appalachian State University
Jack Y. Narayan, SUNY College at Oswego

MAA Panel Discussion

4:30 PM – 6:00 PM

A fresh start for collegiate mathematics.
Organizers: **Nancy Baxter Hastings**, Dickinson College
Sheldon P. Gordon, Farmingdale State University of New York
Moderator: **Jack Y. Narayan**, SUNY at Oswego
Panelists: **Nancy Baxter Hastings**
Sheldon P. Gordon

AWM Business Meeting

4:35 PM – 5:00 PM

Graduate Student Reception

5:00 PM – 6:00 PM

Special Presentation

5:00 PM – 7:00 PM

A tutorial on computer experiments based on A New Kind of Science.
Presenter: **Stephen Wolfram**, Wolfram Research, Inc.

Mathematical Institutes Open House

5:30 PM – 8:00 PM

First Timers Reception

6:00 PM – 7:00 PM

Young Mathematicians Network Town Meeting

7:15 PM – 8:15 PM

AMS Josiah Willard Gibbs Lecture

8:30 PM – 9:30 PM

(405) *Biology as information.*
Eric Lander, Whitehead Institute for Biomedical Research (993-92-33)

AWM Reception

9:30 PM – 11:00 PM

Thursday, January 8

Elsevier Science 5K Fun Run/Walk and Breakfast

7:00 AM – 8:00 AM

Employment Center

7:00 AM – 7:00 PM

Joint Meetings Registration

7:30 AM – 4:00 PM

AMS Session on Applications of Mathematics

7:45 AM – 11:55 AM

7:45AM *Taylor Series Solution of Lane-Emden Type Equations.*
(406) **Asai Asaithambi**, Saint Louis University (993-65-129)
8:00AM *Spectral Analysis of Low-Dispersion Interpolation Schemes.* Preliminary report.
▶ (407) **Jim Ferry**, University of Illinois, Urbana-Champaign (993-65-1015)

- 8:15AM (408) *Computing Dominant Eigenvalues of the Linearized Navier-Stokes Equations.* Preliminary report.
Beau B Grande, Colorado State University (993-65-1576)
- 8:30AM (409) *A Numerical Method for Solving a Dual-Phase-Lagging Heat Transport Equation in a Three Dimensional Micro Sphere.*
Lixin Shen*, **Weizhong Dai**, Louisiana Tech University, and **Teng Zhu**, Grambling State University (993-65-1340)
- 8:45AM (410) *Comparing Algorithmic Approaches to List the Minimal Hitting Sets of a Hypergraph.* Preliminary report.
Ken Takata, University of Illinois at Chicago (993-68-1471)
- 9:00AM (411) *Pattern Formation in a CICR Reaction.* Preliminary report.
Maya Mincheva, Wilfrid Laurier University (993-35-1393)
- 9:15AM (412) *A Mathematical Model for Thermohydrodynamic(THD) Analysis of Titled Pad Slider Bearing with Heat Conduction to the Pad and Slider.*
Prawal Sinha, Indian Institute of Technology Kanpur (993-76-86)
- 9:30AM (413) *Approximate solutions to the porous medium equation.* Preliminary report.
Aleksey S Telyakovskiy, University of Nevada, Reno (993-76-818)
- 9:45AM (414) *On Amplitude-Frequency Dependences for Standing Waves in Fluids of Various Configurations.*
Inna Konstantinovna Shingareva* and **Carlos Lizárraga Celaya**, University of Sonora, Mexico (993-76-819)
- 10:00AM Break
- 10:15AM (415) *Economics of Optimal Water Allocation on Agriculture in the Lower Chattahoochee River Basin.* Preliminary report.
Krishna P Paudel*, Louisiana State University, **Jim Cruise**, Ashutosh Limaye, University of Alabama Huntsville, and **Upton Hatch**, Auburn University (993-90-1262)
- 10:30AM (416) *Decomposition and Dynamic Cut Generation in Integer Programming.* Preliminary report.
Matthew V Galati* and **Ted K Ralphs**, Lehigh University (993-90-1303)
- 10:45AM (417) *The gravitational field of a rotating dust cylinder.*
M D Iftime, UMass (993-83-716)
- 11:00AM (418) *Progress and Challenges in Modeling Plant Competition For Light.* Preliminary report.
Andrew L Nevai* and **Richard R Vance**, University of California, Los Angeles (993-92-1683)
- 11:15AM (419) *Mathematical Modeling of Isothermal Frontal Polymerization.*
Divya E Devadoss* and **Vladimir A Volpert**, Northwestern University (993-92-767)
- 11:30AM (420) *Population Persistence and Extinction in a Discrete-Time, Stage-Structured Epidemic Model.* Preliminary report.
Keith E Emmert* and **Linda J.S. Allen**, Texas Tech University (993-92-982)
- 11:45AM (421) *Computing the probability of cycles in a random election.* Preliminary report.
Bruce W. Atkinson, Samford University (993-91-1418)

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

8:00 AM – 11:50 AM

Organizers: **Tamara A. Burton**, Rochester Institute of Technology
Michael J. Fisher, California State University, Fresno
Carl V. Lutzer, Rochester Institute of Technology
Darren A. Narayan, Rochester Institute of Technology

- 8:00AM (422) *Solving the Dirichlet problem with rational data.*
Tim Ferguson, University of Richmond (993-30-59)
- 8:30AM (423) *Polynomial factorization.*
Radoslaw Lucjan Stefanski, University of Richmond (993-30-60)
- 9:00AM (424) *Minimum Rank of Positive Semi-Definite Matrices with a Prescribed Graph.*
Wendy Wang*, Duke University, and **Kelly Steinmetz**, Truman State University (993-05-118)
- 9:30AM (425) *Minimum Rank of Positive Semi-Definite Matrices with a Prescribed Graph.* Preliminary report.
Kelly J. Steinmetz*, Truman State University, and **Wendy Wang**, Duke University (993-15-123)
- 10:00AM (426) *Subgraph Summability Number of a Graph.* Preliminary report.
Josh R Whitney, Arizona State University (993-00-131)
- 10:30AM (427) *Randomly Decomposable Graphs in $K_m P_e$.* Preliminary report.
Erin Rita Miltzer, Central Michigan University (993-00-145)
- 11:00AM (428) *Classifying semigroups where $\Gamma(S)$ is the refinement of a star graph.* Preliminary report.
Amanda J. Geiser, Susquehanna University (993-00-157)
- 11:30AM (429) *Completely solving equations by iteration.* Preliminary report.
John Matthew Mahoney, California State University, Long Beach (993-37-1710)

AMS-MAA-MER Special Session on Mathematics and Education Reform, III

8:00 AM – 11:50 AM

Organizers: **William H. Barker**, Bowdoin College
Jerry L. Bona, University of Illinois at Chicago
Naomi Fisher, University of Illinois at Chicago
Kenneth C. Millett, University of California Santa Barbara
Bonnie Saunders, University of Illinois at Chicago

- 8:00AM (430) *Confronting Diverse Student Interests: Departmental Efforts in Reforming Undergraduate Mathematics.* Preliminary report.
Naomi Fisher*, University of Illinois at Chicago, **Jerry Bona**, University of Illinois at Chicago, **Kenneth Millett**, University of California Santa Barbara, **Samuel Rankin**, American Mathematical Society, and **Bonnie Saunders**, University of Illinois at Chicago (993-97-934)
- 8:30AM (431) *The Computational Mathematical Sciences Program at Arizona State University.*
Eric J. Kostelich, Arizona State University (993-97-1373)

- 9:00AM *More effective mathematical education for teachers*. Preliminary report.
▶ (432) **Amy Cohen**, Rutgers University (993-97-1005)
- 9:30AM *Evolution of the Undergraduate Curriculum at the University of South Carolina*.
(433) **Douglas B Meade**, University of South Carolina (993-97-1424)
- 10:00AM *Reforming the mathematics core for engineers and everyone else*.
▶ (434) **Jeffrey K Lawson**, Trinity University (993-97-645)
- 10:30AM *Making Mathematics Relevant: College Algebra Reform at Trinity College*. Preliminary report.
(435) **Laurie Johnson**, Trinity College (993-97-987)
- 11:00AM *Implementing Mathematics Reform in College Developmental Mathematics*. Preliminary report.
▶ (436) **Andy Carter*** and **Steve Cohen**, Roosevelt University (993-97-1024)
- 11:30AM Question period and discussion.

AMS-SIAM Special Session on Mathematical Modeling in Neuroscience, Biomedicine, Genetics, and Epidemiology, I

8:00 AM – 11:50 AM

Organizers: **Steven M. Baer**, Arizona State University
Ivo D. Dinov, University of California Los Angeles
Frank C. Hoppensteadt, Arizona State University
Hal L. Smith, Arizona State University

- 8:00AM *How Far is One Kinetic Time Activity Curve from Another: Measure the physiological Similarity between Voxels over Brain PET Data*. Preliminary report.
▶ (437) **Hongbin Guo***, **Rosemary A Renaut**, Arizona State University, and **Kewei Chen**, Good Samaritan Regional Medical Center (993-92-1699)
- 8:30AM *FFTs for the Life Sciences*. Preliminary report.
(438) **Peter Kostelec*** and **Daniel N Rockmore**, Dartmouth College (993-42-1571)
- 9:00AM *Image segmentation models using curve evolution and functional minimization, with applications to medical imaging*. Preliminary report.
(439) **Jason T. Chung** and **Luminita A. Vese***, UCLA (993-35-1502)
- 9:30AM *Towards Mathematical Modeling of Local Information Processing in Vertebrate Brain*. Preliminary report.
(440) **Amir H Assadi***, **Miroslav Backonja**, **P. Charles Garell**, University of Wisconsin-Madison, and **Nik Kasabov**, Auckland University of Technology (993-92-1034)
- 10:00AM *Diffusion Tensor Imaging*.
(441) **S M Pizer**, Univ of North Carolina (993-92-890)
- 10:30AM *Membrane protein structure from NMR orientational constraints*. Preliminary report.
▶ (442) **J R Quine***, **S Achuthan** and **P Srinivasan**, Florida State University (993-92-889)
- 11:00AM *Mathematical and Computational Challenges in Brain Mapping*.
▶ (443) **Paul M. Thompson*** and **Arthur W. Toga**, UCLA School of Medicine (993-92-886)
- 11:30AM *Modelling Spreading Cortical Depression in the Brain-Cell Microenvironment*. Preliminary report.
▶ (444) **Robert M. Miura**, New Jersey Institute of Technology (993-92-1641)

AMS-ASL Special Session on Infinite Combinatorics and Inner Model Theory, III

8:00 AM – 11:50 AM

Organizers: **Matthew D. Foreman**, University of California Irvine
Martin Zeman, University of California Irvine

- 8:00AM *The determinacy of real games*.
(445) **W. Hugh Woodin**, University of California, Berkeley (993-03-1367)
- 9:00AM *Club guessing sequences and filters*.
(446) **Tetsuya Ishiu**, University of Kansas (993-03-952)
- 9:30AM *More Coloring Theorems*.
(447) **E. Todd Eisworth**, University of Northern Iowa (993-03-1115)
- 10:00AM *Additivity of measure and maximal functions*.
(448) **Juris Steprans**, York University (993-03-1104)
- 10:30AM *On the existence of Hausdorff ultrafilters*. Preliminary report.
(449) **Tomek Bartoszynski***, Boise State University, and **Saharon Shelah**, Hebrew University and Rutgers University (993-03-1392)
- 11:00AM *Club guessing applied to universality problems*. Preliminary report.
▶ (450) **Katherine A Thompson**, Carnegie Mellon University (993-03-1354)
- 11:30AM *Mutual stationarity, fine structure and pcf*. Preliminary report.
(451) **James Cummings**, Carnegie Mellon University (993-03-1010)

AMS Special Session on Discrete Dynamics and Difference Equations, III

8:00 AM – 11:50 AM

Organizers: **Saber N. Elaydi**, Trinity University
Jim M. Cushing, University of Arizona
Gerasimos Ladas, University of Rhode Island
James A. Yorke, University of Maryland, College Park

- 8:00AM *Chaos in the solar system*. Preliminary report.
▶ (452) **Mario Umberto Martelli**, Claremont McKenna College (993-37-268)
- 8:30AM *Convergence, Periodicity and Bifurcations in a 2-parameter, Second-order Absolute Difference Equation*.
(453) **H Sedaghat**, Virginia Commonwealth University (993-39-577)
- 9:00AM *Shooting Methods For Numerical Solution Of Stochastic Boundary-Value Problems*.
(454) **Armando Arciniega***, St. Mary's University, and **Edward J Allen**, Texas Tech University (993-65-44)
- 9:30AM *On Fraenkel's N-Heap Wythoff's Conjecture*.
▶ (455) **Xinyu Sun***, Temple University, and **Doron Zeilberger**, Rutgers University (993-39-130)
- 10:00AM *Noise Sensitivity for Natural Measures of Chaotic Attractors*.
(456) **Timothy D. Sauer**, George Mason University (993-37-571)
- 10:30AM *Shadowing in Higher Dimensional Discrete Dynamical Systems*. Preliminary report.
(457) **Judy A Kennedy***, University of Delaware, **James A. Yorke**, University of Maryland, **Carmen Young**, Fields Institute, and **Wayne B. Hayes**, University of Maryland (993-37-663)

- 11:00AM *The Same Transmission Dynamics Drive the Fast Gay and the Slow African HIV Epidemics.*
▶ (458) **James A Yorke**, University of Maryland, **Frederick Suppe**, Texas Tech University, and **Brandy L Rapatski***, University of Maryland (993-00-549)
- 11:30AM *A New Class of Maps in the Plane: the Movie.*
▶ (459) **James A Yorke*** and **James T Halbert**, University of Maryland (993-37-471)

AMS Special Session on Partial Differential Equations and Applications, I

8:00 AM – 11:50 AM

Organizers: **Xin Lu**, University of North Carolina at Wilmington
Yan-Wei Qi, University of California Santa Barbara
Weiqing Xie, California State Polytech University
Hong-Ming Yin, Washington State University

- 8:00AM *Optimal Control of Obstacles in Variational Inequalities.*
(460) **Suzanne Lenhart**, University of Tennessee (993-35-740)
- 8:30AM *Existence and nonexistence of Positive Radial Solutions for quasilinear elliptic Systems.*
(461) **Haiyan Wang**, Arizona State University West (993-35-621)
- 9:00AM *Existence of Solutions for a Nonlinear System.*
(462) Preliminary report.
Ping Wang*, Penn State University, and **Chaochun Qu**, Yunnan University (993-35-287)
- 9:30AM *Local Regularity Theorems for the Stationary Thermistor Problem.*
(463) **Xiangsheng Xu**, Mississippi State University (993-35-919)
- 10:00AM *Stability, Periodicity, and Numerical Solutions in Reaction-diffusion Systems with time delays.*
(464) **Wei Feng***, University of North Carolina at Wilmington, and **Xin Lu**, University Of North Carolina at Wilmington (993-35-1336)
- 10:30AM *A Weighted Strichartz Inequality on the Einstein Universe For the Global Existence of Solutions to Nonlinear Wave Equations.*
(465) **Nimet Alpay**, Michigan State University (993-35-107)
- 11:00AM *Higher-order Cahn-Hilliard models for faceting of a growing crystal surface.*
▶ (466) **Tatiana Savin***, **A.A. Golovin**, **S.H. Davis**, Northwestern University, **A.A. Nepomnyashchy**, Technion-IIT, and **P.W. Voorhees**, Northwestern University (993-35-1006)
- 11:30AM *On A Phase-Change Problem Arising from Inductive Heating.* Preliminary report.
(467) **Hong-Ming Yin**, Washington State University (993-35-665)

AMS Special Session on Theory and Applications of Orthogonal Polynomials, III

8:00 AM – 11:40 AM

Organizers: **Mourad E. H. Ismail**, University of South Florida
Barry Simon, California Institute of Technology

- 8:00AM *Some recurrence formulas for Two variable orthogonal polynomials on the Unit circle.*
(468) Preliminary report.
Jeffrey S Geronimo, Georgia Institute of Technology (993-41-1716)
- 9:00AM *Orthogonal Polynomials on the Unit Circle.*
(469) **Barry Simon**, Caltech (993-33-1712)
- 10:00AM *The Christoffel-Uvarov formula and averages of random characteristic polynomials.*
(470) **E Strahov**, Caltech (993-60-1141)
- 11:00AM *Generalised Chebyshev Polynomials under Polynomial Mappings.*
(471) **Y Chen**, **J C Griffin***, Imperial College, and **M Ismail**, University of South Florida (993-33-1520)

AMS Special Session on Topological Dynamics and Ergodic Theory, II

8:00 AM – 11:50 AM

Organizers: **Alica Miller**, University of Illinois at Urbana-Champaign
Joseph Rosenblatt, University of Illinois at Urbana-Champaign

- 8:00AM *Generalized polynomials: from Weyl equidistribution theorem to translations on nilmanifolds.*
(472) **Vitaly Bergelson**, Ohio State University (993-37-1216)
- 9:00AM *Syndetically Hypercyclic Operators.*
(473) **Luis E. Saldivia***, Educational Testing Service, and **Alfredo Peris**, Universitat Politècnica de València (993-37-526)
- 9:30AM *Optimal weights for moving averages in L_p spaces, $1 \leq p \leq \infty$.* Preliminary report.
(474) **Parthena Avramidou**, Ohio State University (993-37-1553)
- 10:00AM *Critical rates in nonconventional ergodic averaging.*
(475) **Anthony Quas*** and **Máté Wierdl**, University of Memphis (993-37-1420)
- 10:30AM *Orbit-equivalence of compact minimal \mathbb{R} -flows.*
(476) Preliminary report.
Alica Miller* and **Joseph Rosenblatt**, University of Illinois at Urbana-Champaign (993-37-1548)
- 11:00AM *Ergodicity of Weyl cocycles.*
(477) **Mahesh G Nerurkar**, Rutgers University (993-28-1527)
- 11:30AM *On almost automorphic lattice dynamics.*
(478) **Yingfei Yi**, Georgia Institute of Technology (993-37-904)

AMS Special Session on The Many Lives of Lattice Theory and the Theory of Ordered Sets, with Connections to Combinatorics, III

8:00 AM – 11:50 AM

Organizers: **Jonathan D. Farley**, Massachusetts Institute of Technology
Stefan E. Schmidt, New Mexico State University

- 8:00AM *Determining Properties of a Multipartite Tournament from its Lattice of Convex Subsets.*
(479) **Atif Abueida**, **Wiebke S Diestelkamp**, **Stephanie P Edwards** and **Darren B Parker***, University of Dayton (993-05-38)

- 8:30AM (480) *Visualizations of weighted lattices for Formal Concept Analysis.* Preliminary report.
Alex Pogel, Physical Science Laboratory, **Tim Hannan**, New Mexico State University, and **Lance Miller***, University of Connecticut (993-06-1290)
- 9:00AM (481) *Enumeration of Totally Positive Grassmann Cells.*
Lauren Kiyomi Williams, MIT, Berkeley (993-06-479)
- 9:30AM (482) *Differential Posets and Down-Up Algebras.*
Tom Roby, California State University, Hayward (993-06-1695)
- 10:00AM (483) *A discrete homotopy theory for order complexes of lattices.* Preliminary report.
Helene Barcelo, Arizona State University (993-05-1404)
- 10:30AM (484) *Linear Extensions of Ranked Posets, Enumerated by Descents: A Problem of Richard P. Stanley from the 1981 Banff Conference on Ordered Sets.*
Jonathan David Farley, Massachusetts Institute of Technology (993-06-1651)
- 11:00AM (485) *Lattice Theory and Enumeration.*
Joseph E. Bonin*, The George Washington University, **Anna de Mier**, University of Oxford, and **Marc Noy**, Universitat Politecnica de Catalunya (993-06-1190)
- 11:30AM (486) *A Glimpse of Dowling Lattices.*
Thomas A. Dowling, Ohio State University (993-06-1706)

David M. Strong, Pepperdine University

AMS Session on Dynamical Systems and Difference Equations

8:00 AM – 11:40 AM

- 8:00AM (493) *Linear Transformations on Polynomial Models of Time Series.*
Aihua Li, Loyola University, and **Chuang Peng***, Morehouse College (993-37-1561)
- 8:15AM (494) *$m \times n$ Proper Arrays: Geometric Construction and the Associated Linear Cellular Automata.*
Jocelyn A Quaintance, SUNY Fredonia (993-37-42)
- 8:30AM (495) *Lipschitz Flow-box Theorem.*
Craig J. Calcaterra* and **Axel Boldt**, Metropolitan State University (993-37-232)
- 8:45AM (496) *Solitons and Random Cauchy Matrices.* Preliminary report.
Kevin Hughes and **Hieu D Nguyen***, Rowan University (993-37-989)
- 9:00AM (497) *Recurrent Points in Fuzzy Dynamical Systems of the First Type.* Preliminary report.
Mark Burgin, UCLA (993-37-1670)
- 9:15AM (498) *Band Structure in Bose-Einstein Condensates in Periodic Lattices.*
Mason Alexander Porter* and **Predrag Cvitanovic**, Georgia Institute of Technology (993-37-1038)
- 9:30AM (499) *Nonlinear analysis of a coupled mechanism for enhancing amplification in auditory hair cells.*
K A Montgomery*, **M Silber** and **S A Solla**, Northwestern University (993-37-1403)
- 9:45AM (500) *Toward Establishing a Connection between the Poincare Functional Equation and Linear Embedding.*
Tara Marie Michels, East Tennessee State University (993-37-1140)
- 9:55AM Break
- 10:30AM (501) *Global Stability of Difference Equations.* Preliminary report.
Zhivko S. Athanassov, Institute of Mathematics, Bulgarian Academy of Sci (993-39-103)
- 10:45AM (502) *On the Behavior of Solutions of $x_{n+1} = p + \frac{x_{n-1}}{x_n}$.*
Jeffrey J Feuer, Coastal Carolina University (993-39-215)
- 11:00AM (503) *Dynamic Consistency and Discrete Models for the Harmonic Oscillator.* Preliminary report.
Sandra A Rucker* and **Ronald E Mickens**, Clark Atlanta University (993-39-213)
- 11:15AM (504) *Dynamics of the Discrete Model of West-Nile like Epidemics.*
V. L. Kocic* and **T. Darensburg**, Xavier University of Louisiana (993-39-1129)
- 11:30AM (505) *On a Max Type Recurrence Relation with Periodic Coefficients.*
W T Patula, Southern Illinois University, and **H D Voulou***, University of Missouri - Kansas City (993-39-1627)

AMS Special Session on Coding and Design-Theoretic Applications of Polynomials, III

8:00 AM – 11:50 AM

Organizers: **Donald D. Mills**, Southern Illinois University, Carbondale
Patrick S. Mitchell, Midwestern State University
Kent M. Neuerburg, Southeastern Louisiana University

- 8:00AM (487) *Regularity in Codes and Designs.*
A. R. Calderbank, Princeton University (993-05-165)
- 9:00AM (488) *Polynomial arithmetic behind the IEEE 802.12 standard for 100Mbit/s data transmission.* Preliminary report.
James A. Davis*, University of Richmond, **Simon Crouch**, Bristol, UK, and **Jonathan Jedwab**, Simon Fraser University (993-05-71)
- 9:30AM (489) *A reduction of polynomial factorization over \mathbb{F}_p to factoring polynomials which split.*
Greg Stein, Claremont McKenna College (993-11-1102)
- 10:00AM (490) *Piecewise Quadratic Bent Functions.*
Joseph L Yucas, Southern Illinois University (993-12-686)
- 10:30AM (491) *Highly degenerate quadratic forms over finite fields of characteristic 2.*
Robert W. Fitzgerald, Southern Illinois University (993-11-163)
- 11:00AM (492) *Weight Enumerators and Self-Dual Codes.*
Judy L Walker, University of Nebraska (993-94-1608)

MAA Minicourse #4: Part A

8:00 AM – 10:00 AM

Java applets in teaching mathematics.
Organizers: **Joe Yanik**, Emporia State University

MAA Session on Courses Below Calculus: A New Focus, III

8:00 AM – 12:05 PM

Organizers: **Mary Robinson**, University of New Mexico, Valencia Campus
Florence S. Gordon, New York Institute of Technology

- Arlene H. Kleinstejn**, SUNY at Farmingdale
Norma M. Agras, Miami Dade Community College
Laurette B. Foster, Prairie View A&M University
Linda Martin, Albuquerque T-VI
- 8:00AM *Modeling and Data Analysis as the Core of Precalculus.* (506)
Daniel J Teague, NC School of Science and Mathematics (993-E1-746)
- 8:25AM *A focus on mathematical modeling in courses below calculus: What are the implications for prerequisite courses?* (507)
Mercedes A McGowen, William Rainey Harper College (993-E1-804)
- 8:50AM *What Does Conceptual Understanding Mean?* Preliminary report. (508)
Florence S. Gordon, New York Institute of Technology (993-E1-722)
- 9:15AM *Lab Projects in Courses Below Calculus.* Preliminary report. (509)
Elias H Toubassi*, University of Arizona, and **Jerry Morris**, Sonoma State University (993-E1-768)
- 9:40AM *Some Political and Practical Issues on Implementing Reform.* (510)
Robert E. Megginson, Mathematical Sciences Research Institute (993-E1-747)
- 10:05AM *MAA/AMATYC Guidelines: Implementation Strategies.* (511)
Norma M Agras, Miami-Dade College (993-E1-894)
- 10:30AM *College Algebra Alternatives: One Size Doesn't Fit All (and how it works).* (512)
Bonnie Gold, Monmouth University (993-E1-699)
- 10:55AM *Elementary Math Modeling: A Dynamic Approach.* (513)
James T Sandefur, Georgetown University (993-E1-300)
- 11:20AM *Modeling before calculus.* (514)
Benny D Evans, Oklahoma State University (993-E1-843)
- 11:45AM *Mathematical Modeling and Problem Solving.* (515)
Richard D West* and **William P Fox**, Francis Marion University (993-E1-470)
- 9:00AM *The Effective Use of Computer Algebra Systems in Teaching An Introductory Course in Mathematical Modeling using MAPLE.* (520)
William P Fox, Francis Marion University (993-G1-1056)
- 9:15AM *Using a CAS to Investigate List Scheduling in a First-Year Mathematics Course.* (521)
Bruce Torrence, Randolph Macon College (993-G1-1057)
- 9:30AM *Use of a CAS in a Discrete Mathematics Course.* (522)
Ed Conjura, The College of New Jersey (993-G1-1054)
- 9:45AM *Using Inherent Errors of CAS to Teach Mathematical Concepts.* Preliminary report. (523)
Michael J. Bosse*, Morgan State University, and **N. R. Nandakumar**, Delaware State University (993-G1-322)
- 10:00AM *A Comparative Study in College Algebra using a CAS.* (524)
Eric Hofacker, University of Wisconsin - River Falls (993-G1-1051)
- 10:15AM *Using the TI-89 in Math Education— Does it Improve the Students' Performance?* (525)
Karsten Schmidt*, University of Applied Sciences Schmalkalden, and **Wolfgang Moldenhauer**, ThILLM (993-G1-55)
- 10:30AM *Using the Automated CAS Process of Simplification to Teach an Often Seemingly Mysterious Mathematical Concept.* Preliminary report. (526)
Michael J. Bosse*, Morgan State University, and **N. R. Nandakumar**, Delaware State University (993-G1-321)
- 10:45AM *Using Discovery and The Computer Algebra System to Help Promote Student Understanding.* (527)
Thomas Fox, University of Houston Clear Lake (993-G1-591)
- 11:00AM *How Does a Computer Algebra System Integrate?* Preliminary report. (528)
Kevin E. Charlwood, Washburn University (993-G1-439)
- 11:15AM *Visualizing Linear Combination and Span.* (529)
John F. Putz, Alma College (993-G1-320)

MAA Session on The Effective Use of Computer Algebra Systems in the Teaching of Mathematics, II

8:00 AM – 11:25 AM

- Organizers: **L. Carl Leinbach**, Gettysburg College
Edward A. Connors, University of Massachusetts
- 8:00AM *Effective Use of Derive in Modeling with Difference Equations and Matrices.* (516)
Mazen Shahin, Delaware State University (993-G1-494)
- 8:15AM *Using a Computer Algebra System to Explore Geometry and Matrix Groups in a Linear Algebra Course.* (517)
Timothy D Comar, Benedictine University (993-G1-417)
- 8:30AM *Stopping Vibrations with a Hammer Strike.* (518)
Leonard J Lipkin, University of North Florida (993-G1-240)
- 8:45AM *Visualization of 2D to 3D Transformations - Exploration Thru Technology.* (519)
Mark Gorak*, **B Gabriel Costa** and **Barbara S Melendez**, United States Military Academy (993-G1-1058)
- Organizers: **Janet P. Ray**, Seattle Central Community College
Susan L. Forman, Bronx Community College (CUNY)
Patricia R. Wilkinson, Borough of Manhattan Community College (CUNY)
- 8:00AM *The Development and Implementation of a Mathematics Placement Program.* (530)
James P. Marshall, Illinois College (993-H1-674)
- 8:20AM *Placement Strategies at Western New England College: An Approach that Emphasizes Individual Attention.* Preliminary report. (531)
Josephine Sears Rodriguez, Western New England College (993-H1-424)
- 8:35AM *The Placement Nightmare Continues.* Preliminary report. (532)
William P Fox, Francis Marion University (993-H1-1132)
- 8:50AM *Getting started right for engineering at UMR.* Preliminary report. (533)
Mary Ellen Kirgan, University of Missouri-Rolla (993-H1-809)

MAA Session on Placement Strategies

8:00 AM – 11:55 AM

- 9:05AM *Accuplacer at Bloomsburg University*. Preliminary report. (534) ▶
Lisa A Lister* and **James Pomfret**, Bloomsburg University (993-H1-454)
- 9:20AM *Central College Mathematics Placement*. Preliminary report. (535)
Mark A Mills, Central College (993-H1-739)
- 9:35AM *The Process of Math Placement: Evaluation, Assessment, and Change*. (536) ▶
Frances B. Lichtman, Alma College (993-H1-1041)
- 9:50AM *A Dynamic Multi-criteria Multi-Stage Approach to Placement*. Preliminary report. (537) ▶
Evelyn C. Bailey* and **Fang Chen**, Oxford College of Emory University (993-H1-57)
- 10:05AM *Placement, Prerequisites, and Student Success*. (538) ▶
Barbara A. Jur, Macomb Community College (993-H1-278)
- 10:20AM *Rethinking Placement in Undergraduate Mathematics*. (539) ▶
Sheldon P. Gordon, Farmingdale State University of New York (993-H1-721)
- 10:40AM *Case Study: Developing College Mathematics Placement Tests*. Preliminary report. (540)
Gloria S Dion, ETS (993-H1-708)
- 10:55AM *Web-based Calculus Placement*. Preliminary report. (541) ▶
Leah Wrenn Berman, Ursinus College (993-H1-743)
- 11:15AM *First Year Advising at Illinois Wesleyan University*. (542)
Melvyn Jeter* and **Paul Kapitza***, Illinois Wesleyan University (993-H1-752)
- 11:30AM *An Online Placement Testing System*. Preliminary report. (543)
David J Dwyer and **Mark E Gruenwald***, University of Evansville (993-H1-452)
- 11:45AM *An Online Mathematics Readiness Testing Program*. Preliminary report. (544) ▶
Jerry Johnson*, **Inmaculada Aban** and **Jeff Mortensen**, University of Nevada (993-H1-660)
- 9:30AM *When Lines Go Bad: Understanding the Hausdorff Metric*. (551) ▶
Steven Schlicker, Grand Valley State University (993-11-973)
- 9:45AM *On the dynamics of a generalized $3x + 1$ function*. (552) ▶
Jeffrey P Dumont, NH, and **Clifford A Reiter***, Lafayette College (993-11-263)
- 10:00AM *Julia Sets that are Full of Holes*. (553) ▶
Kimberly A. Roth, Wheeling Jesuit University (993-11-420)
- 10:15AM *Using Picard's Method to Analyze Chaotic Systems*. (554) ▶
James S Sochacki, James Madison University (993-11-553)
- 10:30AM *Manufacturing Systems, Invariant Measures, and Undergraduates*. (555) ▶
James Andrew Walsh, Oberlin College (993-11-58)
- 10:45AM *Describing Points in some simple Fractals*. (556) ▶
Sandra Fillebrown* and **Vincent Russo**, Saint Joseph's University (993-11-214)
- 11:00AM *The Evolution of Interesting Limit Sets*. Preliminary report. (557) ▶
Anne M. Burns, Long Island University (993-11-206)
- 11:15AM *Multifractal Cartoons of the Variation of Financial Prices*. (558) ▶
Benoit B Mandelbrot, Yale University (993-11-1238)
- 11:30AM *Fractals in the Financial Markets*. (559) ▶
Marilyn B. Durkin, Bentley College (993-11-285)
- 11:45AM *Chaotic Dynamics in a Capstone Seminar Course*. (560) ▶
Douglas E. Norton, Villanova University (993-11-1023)
- NOON *Polygons and Chaos*. (561) ▶
Jay M. Kappraff*, New Jersey Institute of Technology, and **Gary W. Adamson**, San Diego, CA (993-11-962)

MAA Session on Truth in Using the History of Mathematics in Teaching Mathematics

MAA Session on Chaotic Dynamics and Fractal Geometry

8:00 AM – 12:10 PM

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

- 8:00AM *Numerics and Chaotic Dynamics: Can you trust your computer?* (545) ▶
H. Kocak*, **B. Coomes** and **B. Rosenberg**, University of Miami (993-11-1221)
- 8:15AM *Iterated Function Systems in the Classroom*. Preliminary report. (546) ▶
Charles Waiveris, Central Connecticut State University (993-11-389)
- 8:30AM *Java Programs for Box Fractals*. (547) ▶
Shawn E Roering, St. Cloud State University, MN (993-11-693)
- 8:45AM *Fractal Dimension and Iterated Automorphism Systems*. Preliminary report. (548) ▶
Michael J Bardzell, Salisbury University (993-11-416)
- 9:00AM *The Convergence of Difference Boxes*. (549) ▶
Antonio Behn, Universidad de Chile, **Christopher Kribs-Zaleta**, University of Texas at Arlington, and **Vadim Ponomarenko***, Trinity University (993-11-114)
- 9:15AM *Undergrads CAN Do Research in Dynamical Systems!* (550) ▶
Jody Sorensen, Grand Valley State University (993-11-143)

8:00 AM – 11:55 AM

Organizers: **Victor J. Katz**, University of the District of Columbia

Eisso J. Atzema, University of Maine

- 8:00AM *The Role of "History": Student Motivation in the Mathematics Classroom*. (562) ▶
Jeffery T. McLean, University of St. Thomas (993-J1-923)
- 8:20AM *The truth hurts: Using ancient astronomical models in the mathematics classroom*. (563) ▶
Matthew M Pascal, American University (993-J1-981)
- 8:40AM *Benjamin Banneker's Life and Mathematics: Web of Truth?* Preliminary report. (564) ▶
Florence D Fasanelli, American Association for the Advancement of Science (993-J1-1116)
- 9:00AM *Tell the Truth, Tell Nothing But the Truth, But Whatever You Do, Don't Tell the Whole Truth*. Preliminary report. (565) ▶
V. Frederick Rickey, West Point (993-J1-1012)
- 9:20AM *Accounting for the Phenomena: Newton's Laws Come of Age*. Preliminary report. (566) ▶
Robert E. Bradley, Adelphi University (993-J1-1567)
- 9:40AM *Who really created the "Pascal's" Triangle?* Preliminary report. (567) ▶
Mohammad Moazzam, Salisbury University (993-J1-562)
- 10:00AM *Dispelling Myths while Promoting Math*. (568) ▶
Judith V Grabiner, Pitzer College (993-J1-1036)

- 10:20AM *Who discovered Green's Theorem?* Preliminary report. (569)
▶ **Stacy G. Langton**, University of San Diego (993-J1-594)
- 10:40AM *The Flatland myth.* Preliminary report. (570)
▶ **W. F. Lindgren***, Slippery Rock University, and **T. F. Banchoff**, Brown University (993-J1-255)
- 11:00AM *Truth and Justification in the Use of History of Mathematics in the Mathematics Classroom.* Preliminary report. (571)
▶ **Thomas Drucker**, University of Wisconsin-Whitewater (993-J1-1348)
- 11:20AM *The Effects of the NonEuclidean Revolution on the Notion of Truth in the Sciences and Culture.* Preliminary report. (572)
▶ **Michael J. Bosse**, Morgan State University (993-J1-293)
- 11:40AM *In Search of the Real Juan Diez Freyle.* Preliminary report. (573)
▶ **Bruce S. Burdick**, Roger Williams University (993-J1-1111)

MAA Session on Technology in Mathematics Teacher Preparation Courses, I

8:00 AM – 11:55 AM

Organizers: **Mary Ann Connors**, Westfield State College

Christine Browning, Michigan University, Kalamazoo

- 8:00AM *Using Graphing Calculator Technology to Facilitate Geometric Insights in Teaching Problem Solving Skills to Pre-service Teachers.* (574)
▶ **Reginald Luke**, Middlesex County College (993-X1-271)
- 8:20AM *The Impact of Technology on a Patterns and Functions Course for Prospective Elementary Teachers.* Preliminary report. (575)
▶ **David E. Boliver**, Univ. of Central Oklahoma (993-X1-612)
- 8:40AM *What do Preservice Mathematics Teachers Need to Know About Computer Algebra Systems?* Preliminary report. (576)
▶ **Thomas Fox**, University of Houston-Clear Lake (993-X1-593)
- 9:00AM *Technology Integration in Mathematics for Prospective Elementary Teachers.* (577)
▶ **Barbara Boschmans**, Plymouth State University (993-X1-603)
- 9:20AM *Math Tools, New Help for Teacher Educators and Teachers.* Preliminary report. (578)
▶ **Gene Klotz**, Math Forum/Swarthmore College (993-X1-602)
- 9:40AM *An overview of three, 1-hour courses designed to prepare secondary mathematics teachers to use technology in the classroom.* Preliminary report. (579)
▶ **Timothy W Flood*** and **Elwyn H Davis**, Pittsburg State University (993-X1-600)
- 10:00AM *Technology Throughout the Secondary Mathematics Teacher Preparation Curriculum.* (580)
▶ **Teresa D. Magnus***, **A. Darien Lauten** and **William Bonnice**, Rivier College (993-X1-442)
- 10:20AM *The Impact of Students' Conceptualizations of Mathematics on a Computers in Teaching and Learning Matheamtics Course.* (581)
▶ **Jason Silverman**, Vanderbilt University (993-X1-604)

- 10:40AM *A Technology Enriched Secondary Teacher Preparation Program.* (582)
▶ **Virginia M Horak**, The University of Arizona (993-X1-400)
- 11:00AM *Using Technology to Enhance Elementary Pre-Service Students' Mathematical Understanding.* Preliminary report. (583)
▶ **Erica L Johnson**, St. John Fisher College (993-X1-586)
- 11:20AM *Using Technology to Enhance Depth and Complexity in Mathematics Instruction for Preservice Teachers.* (584)
▶ **Jane F. Schielack**, Texas A&M University (993-X1-508)
- 11:40AM *Technology's Role in Preparing Second-Career Individuals for Teaching Middle Grades Mathematics.* (585)
▶ **Judy S O'Neal**, North GA College & State University (993-X1-64)

MAA General Contributed Paper Session, III

8:00 AM – 11:55 AM

Organizers: **Laura J. Wallace**, California State University, San Bernardino

Jacqueline A. Jensen, Sam Houston State University

Gary W. Towsley, SUNY at Geneseo

Michael A. Jones, Montclair State University

Shawnee L. McMurrin, California State University at San Bernardino

- 8:00AM *Building Academic Bridges Between Senior High School Students and Universities.* (586)
▶ **Faiz B Al-Rubae**, University of North Florida (993-Z1-447)
- 8:15AM *Solving problems in elementary mathematics using concepts from Mechanics.* (587)
▶ **Mysore S Jagadish**, Barry University (993-Z1-463)
- 8:30AM *Mathematics for Biology Students.* Preliminary report. (588)
▶ **Patti Frazer Lock**, St. Lawrence University (993-Z1-501)
- 8:45AM *No lectures, no tests, no tears!* (589)
▶ **Jennifer R Galovich**, College of St. Benedict/St. John's University (993-Z1-457)
- 9:00AM *Using the Irrationality of Pi to Introduce the Mathematics Major.* (590)
▶ **John R. Stoughton**, Hope College (993-Z1-685)
- 9:30AM *The Deadly Calculations of Dr. Malevolence.* (591)
▶ **Stephen M Walk**, St. Cloud State University (993-Z1-224)
- 9:45AM *What Does it Take to Increase the Diversity of Ph.D. Mathematicians?* (592)
▶ **Abbe H Herzig**, University at Albany, State University of New York (993-Z1-412)
- 10:00AM *Integrating writing and technology into mathematical learning-a study of its effect on high school students' understanding of mathematics and their attitude toward mathematics.* Preliminary report. (593)
▶ **Yuan Yuan**, National Hualien Teachers College in Taiwan (993-Z1-260)
- 10:15AM *Changing Students' Attitudes Towards Mathematics Through Direct Experience.* (594)
▶ **David B. Streid*** and **M. Anne Dow**, Maharishi University of Management (993-Z1-1692)

- 10:30AM *Students' Perceptions and Attitudes about Mathematics: A Look at Lyndon State College First-Year Students.* Preliminary report.
 ▶ (595) **Julie M Theoret**, Lyndon State College (993-Z1-1062)
- 10:45AM *MERLOT as a forum to disseminate high-quality public domain or low cost learning materials.* Preliminary report.
 ▶ (596) **Bernd S. W. Schroeder**, Louisiana Tech University (993-Z1-70)
- 11:00AM *How to Turn Math Duds into Math Studs.*
 ▶ (597) **Linda Braddy***, **Mickle Duggan**, **Anne Fine**, **Elizabeth Keiffer** and **Rebecca Lyle**, East Central University (993-Z1-689)
- 11:15AM *The Keystone Project: Teaching Study Skills in a Mathematics Classroom.*
 ▶ (598) **Vali Siadat***, Richard J. Daley College, and **Paul M Musial**, Chicago State University (993-Z1-1389)
- 11:30AM *A Successful Program to Prepare Graduate Students to Teach Undergraduate Mathematics.*
 (599) **Phoebe B. Rouse**, Louisiana State University (993-Z1-714)
- 11:45AM *High School Excel at the University of Portland-Building Partnerships with Local Schools by Using University Students in High School and Middle School Math Classrooms.* Preliminary report.
 ▶ (600) **Carmen J Schabel**, University of Portland (993-Z1-305)

AMS Special Session on Nonlinear Partial Differential Equations and Conformal Geometry, III

8:30 AM – 11:20 AM

Organizers: **Jie Qing**, University of California Santa Cruz
Yu Yuan, University of Washington, Seattle

- 8:30AM *On the Conformal Paneitz Equation on Compact, Riemannian Manifolds without Boundary.*
 (601) **David Timothy Raske**, UCSC (993-35-1414)
- 9:00AM *Analytic torsion and generalized Hodge metrics on Calabi-Yau moduli.*
 (602) **Hao Fang**, New York University (993-53-827)
- 9:30AM *On asymptotic rank of the Weil-Petersson metric on Teichmüller space.* Preliminary report.
 (603) **Zheng Huang**, University of Oklahoma (993-53-662)
- 10:00AM *A Fully Nonlinear Version of the Yamabe Problem.*
 (604) **Aobing Li**, Rutgers, The State University of New Jersey (993-35-963)
- 10:30AM *The geometry of nonlinear elliptic and hyperbolic equations.* Preliminary report.
 (605) **Magdalena D Toda**, Texas Tech University (993-54-156)
- 11:00AM *Real-analytic hypersurfaces with stability groups determined by high-order jets.* Preliminary report.
 (606) **R. Travis Kowalski**, Colorado College (993-32-1214)

SIAM Minisymposium on the Dynamics and Stability of Coherent Structures

8:30 AM – 10:55 AM

Organizer: **Joceline C. Lega**, University of Arizona

8:30AM *Inverse scattering and the linear stability of solitons.* Preliminary report.
 (607) **Todd Kapitula**, University of New Mexico (993-35-1351)

- 9:00AM *Stability of solitary waves on lattices at low energy.*
 (608) **Gero Friesecke**, University of Warwick, and **Robert L Pego***, University of Maryland College Park (993-70-1269)
- 9:30AM *Bifurcations of travelling breathers in the discrete NLS equations.* Preliminary report.
 ▶ (609) **Dmitry Pelinovsky**, McMaster University (993-39-1302)
- 10:00AM *Localized Waves in Elastic Rods: Existence and Stability.*
 (610) **Stephane Lafortune*** and **Joceline Lega**, University of Arizona (993-35-1320)
- 10:30AM *Dynamics of coherent structures in oscillatory media.*
 (611) **Bjorn Sandstede***, Ohio State University, and **Arnd Scheel**, University of Minnesota (993-35-1137)

AWM Emmy Noether Lecture

9:00 AM – 9:50 AM

- (612) *Symbolic dynamics for geodesic flows.*
Svetlana R. Katok, The Pennsylvania State University (993-37-07)

AMS Special Session on Probability and Its Applications in Combinatorics and Algorithms, III

9:00 AM – 11:50 AM

Organizers: **Russell D. Lyons**, Indiana University
Yuval Peres, University of California Berkeley

- 9:00AM *A Tractable Stochastic Model of Complex Networks.*
 (613) **David J Aldous**, U.C. Berkeley (993-60-1136)
- 10:00AM *A Stable Marriage of Poisson and Lebesgue.*
 (614) **Chris Hoffman**, University of Washington, **Alexander Holroyd**, University of British Columbia, and **Yuval Peres***, University of California, Berkeley (993-60-1609)
- 10:30AM *How independent are the branches of a search tree?* Preliminary report.
 ▶ (615) **Cristopher Moore**, University of New Mexico (993-60-1491)
- 11:00AM *The mixing time for simple exclusion.*
 (616) **Ben J Morris**, Indiana University (993-60-1691)
- 11:30AM *Combinatorial evaluations of the Tutte polynomial and T-tetromino tilings.*
 ▶ (617) **Michael Korn** and **Igor Pak***, MIT (993-05-1413)

AMS Special Session on Nonstandard Methods, II

9:00 AM – 11:20 AM

Organizers: **Matt Insall**, University of Missouri at Rolla
Peter A. Loeb, University of Illinois at Urbana-Champaign
David A. Ross, University of Hawaii

- 9:00AM *Theorems Proved Using Nonstandard Methods Can Lead to New Standard Concepts.*
 (618) **Matt Insall**, University of Missouri - Rolla (993-03-1213)
- 9:30AM *Topological and nonstandard extensions.*
 (619) **Mauro M Di Nasso*** and **Marco Forti**, University of Pisa (993-03-1260)
- 10:00AM *Quantum brownian motion as the standard part of an infinitesimal quantum random walk.*
 (620) **Manfred P.H. Wolff**, Universitaet Tuebingen (993-03-1278)

- 10:30AM (621) *Nonstandard vector-vector integrals*. Preliminary report.
G. Beate Zimmer, Texas A&M University - Corpus Christi (993-46-1079)
- 11:00AM (622) *Applications of S-measurability*. Preliminary report.
David A. Ross, University of Hawaii (993-28-1209)

John Bradley, NSF Division of Elementary, Secondary, and Informal Education
James H. Lightbourne, NSF Division of Graduate Education
Lloyd E. Douglas, NSF Division of Mathematical Sciences

MAA Minicourse #10: Part A

9:00 AM – 11:00 AM

Teaching linear algebra with applications.

Organizer: **Gilbert Strang**, Massachusetts Institute of Technology

MAA Minicourse #15: Part A

9:00 AM – 11:00 AM

Fair enough? Mathematics of equity.

Organizers: **John C. Maceli**, Ithaca College
Stanley E. Seltzer, Ithaca College

MAA Project NExT Panel Discussion

9:00 AM – 10:30 AM

Mentoring new faculty.

Organizers: **T. Christine Stevens**, St. Louis University

Joseph A. Gallian, University of Minnesota Duluth

Aparna W. Higgins, University of Dayton

Panelists: **Emily Ann Hynds**, Samford University
Jim Lewis, University of Nebraska, Lincoln
Catherine M. Murphy, Purdue University Calumet
Thomas Q. Sibley, Saint John's University

MAA CUPM Subcommittee on Curriculum Renewal Across the First Two Years Panel Discussion

9:00 AM – 10:20 AM

The impact of technology in calculus courses on long-term student performance and employment.

Organizers: **Susan L. Ganter**, Clemson University
Jack Bookman, Duke University

Panelists: **Betsy Darken**, University of Tennessee at Chattanooga
Elton Graves, Rose-Hulman Institute of Technology
Glen Ledder, University of Nebraska
Howard L. Penn, U.S. Naval Academy

MAA Special Presentation

9:00 AM – 10:20 AM

National Science Foundation programs supporting learning and teaching in the mathematical sciences.

Organizers: **Elizabeth J. Teles**, NSF Division of Undergraduate Education
Calvin L. Williams, NSF Division of Undergraduate Education
Lee L. Zia, NSF Division of Undergraduate Education

MAA Committee on Minority Participation Panel Discussion

9:00 AM – 10:20 AM

Strengthening Underrepresented Minority Mathematics Participation (SUMMA).

Organizer: **William A. Hawkins, Jr.**, MAA and the University of the District of Columbia

Moderator: **William A. Hawkins, Jr.**, MAA and the University of the District of Columbia

Panelists: **Jong Pil Lee**, SUNY College at Old Westbury
Thomas Martin, California State University at Chico

Exhibits and Book Sales

10:00 AM – 6:00 PM

Mathematical Art Exhibit

10:00 AM – 6:00 PM

Organizers: **Robert Fathauer**, Tessellations Company, Phoenix, Arizona
Nat Friedman, ISAMA, SUNY at Albany
Reza Sarhangi, Bridges Conference, Towson University

Math on the Web

10:00 AM – 3:30 PM

Go to the Math on the Web Pavilion for the complete schedule of presentations.

MAA Invited Address

10:05 AM – 10:55 AM

(623) *The representations of integers by quadratic forms.*
Manjul Bhargava, Harvard University (993-A0-14)

MAA Minicourse #5: Part A

10:15 AM – 12:15 PM

Visual linear algebra.

Organizers: **Eugene A. Herman**, Grinnell College
Michael D. Pepe, Seattle Central Community College
Eric P. Schulz, Walla Walla Community College

AMS Session on Analysis, I

10:15 AM – 11:55 AM

10:15AM (624) *Extensions of a Result of Erdős about the Arc Length of a Trigonometric Polynomial.*

Mohammed A. Qazi*, Tuskegee University, and **Q. I. Rahman**, Université de Montreal (993-41-369)

10:30AM (625) *Comparing the Uniform Norms of Exponential Polynomials on $\mathbb{T} \times \mathbb{T}$ with Measurable Subsets of $\mathbb{T} \times \mathbb{T}$.* Preliminary report.
Natacha Camara Fontes, Kent State University (993-41-729)

10:45AM (626) *Some Convergence Properties of Szegő Polynomials with respect to Weakly Convergent Densities.*
Michael J Arciero, United States Military Academy (993-41-1598)

11:00AM (627) *Radial parts of invariant differential operators on Grassmannians.*
Olga S. Kurgalina, Tufts University (993-43-648)

11:15AM (628) *The Radon Transform on Z_n^k .*
Michelle R. DeDeo*, Univ. of North Florida, and **Elionor Velasquez**, San Francisco State U. (993-44-393)

11:30AM (629) *The Numerical Solution of the Exterior Dirichlet Problem for the Radiocivity Equation.* Preliminary report.
Yajni M Warnapala-Yehiya, Roger Williams University (993-45-121)

11:45AM (630) *A study of the Lippmann-Schwinger Equation and Spectra for Some Unbounded Quantum Potentials.*
Christopher J Winfield, Western Kentucky University (993-45-1555)

Bruce C. Crauder, Oklahoma State University

SIAM Invited Address

11:10 AM – NOON

(631) *Coupled cell systems: A potpourri of theory and examples.*
Martin Golubitsky, University of Houston

AMS Colloquium Lectures: Lecture II

1:00 PM – 2:00 PM

(632) *Conformal invariants and partial differential equations. Part II.*
Sun-Yang Alice Chang, Princeton University (993-53-09)

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

1:00 PM – 3:50 PM

Organizers: **Tamara A. Burton**, Rochester Institute of Technology
Michael J. Fisher, California State University, Fresno
Carl V. Lutzer, Rochester Institute of Technology
Darren A. Narayan, Rochester Institute of Technology

- 1:00PM (633) *Embeddings of Six Stick Loops.*
Tom Bachmann*, **Freddie Hayes**, **Ben Hummon** and **Heather Johnston**, Vassar College (993-57-1643)
- 1:30PM (634) *On Formal Fibers of Integral Domains.* Preliminary report.
A Dundon, Pomona College, **D Jensen***, **S. Loepp**, Williams College, **John Robert Provine**, Harvard University, and **J Rodu**, Williams College (993-13-181)
- 2:00PM (635) *Double Bubbles in Other Universes.*
Neil R Hoffman*, Williams Colllege, **J. Corneli**, University of Texas - Austin, **G. Lee**, Harvard, **N. Leger**, University of Texas - Austin, **S. Moseley, P Holt** and **E Scheonfeld**, Williams College (993-51-309)
- 2:30PM (636) *Properties of Eccentric Sequences.* Preliminary report.
Laurel Evans*, Swarthmore College, and **Eden Hochbaum**, Brown University (993-05-374)
- 3:00PM (637) *Random Kneser Pairs.* Preliminary report.
Alexa Mater*, Reed College, and **Deanna Turk**, University of Northern Colorado (993-05-375)
- 3:30PM (638) *The number of ascending patterns in random permutations.* Preliminary report.
Carol Henley*, Trevecca Nazarene University, **Daphne Williams**, Clark Atlanta University, and **Laurel Evans**, Swarthmore College (993-05-785)

MAA Project NExT-Young Mathematicians' Network Panel Discussion

10:45 AM – 12:05 PM

Finding your next job.

Organizers: **Chawne M. Kimber**, Lafayette College
David T. Kung, St. Mary's College of Maryland

MAA Committee on the Undergraduate Program in Mathematics Panel Discussion

10:45 AM – 12:05 PM

Undergraduate programs and courses in the mathematical sciences: A CUPM Curriculum Guide.

Organizers: **Harriet S. Pollatsek**, Mount Holyoke College

Panelists: **Susan L. Ganter**, Clemson University
William H. Barker, Bowdoin College
David M. Bressoud, Macalester College
Susanna Epp, DePaul University
Susan L. Ganter, Virginia Commonwealth University
Bill Haver, Virginia Commonwealth University

MAA CUPM Subcommittee on Curriculum Renewal Across the First Two Years Panel Discussion

10:45 AM – 12:05 PM

Assessment in a refocused college algebra program.

Organizer: **Donald B. Small**, U.S. Military Academy
Moderator: **Norma Agrass**, Miami-Dade Community College

Panelists: **Paul Dirks**, Miami-Dade Community College
Laurette B. Foster, Prairie View A & M University

AMS-MAA-MER Special Session on Mathematics and Education Reform, IV

1:00 PM – 3:20 PM

Organizers: **William H. Barker**, Bowdoin College
Jerry L. Bona, University of Illinois at Chicago
Naomi Fisher, University of Illinois at Chicago

Kenneth C. Millett, University of California Santa Barbara

Bonnie Saunders, University of Illinois at Chicago

- 1:00PM *Joaquin Bustoz and the SUMS program at Arizona State University.*
▶ (639) **Andrew Bremner**, Arizona State University (993-01-999)
- 1:30PM *Dr. Bustoz and the SUMS Institute at Arizona State University.*
(640) **Katherine Sisulak**, SUMS/ASU (993-97-1148)
- 2:00PM *The Far-Reaching Impact of Professor Joaquin Bustoz and the Math-Science Honors Program: A Personal Testimony and Tribute.*
▶ (641) **Trachette L Jackson**, University of Michigan (993-97-1128)
- 2:30PM *Personal Account and Impact of Educational Programs Initiated by Dr. Joaquin Bustoz.*
(642) **Brian Alvarado**, SUMS Institute/ASU (993-97-1142)
- 3:00PM *Perspectives on the career of Joaquin Bustoz and the SUMS program.*
▶ (643) **John N Mc Donald**, Arizona State University (993-97-1076)

AMS-SIAM Special Session on Mathematical Modeling in Neuroscience, Biomedicine, Genetics, and Epidemiology, II

1:00 PM – 3:50 PM

Organizers: **Steven M. Baer**, Arizona State University
Ivo D. Dinov, University of California Los Angeles
Frank C. Hoppensteadt, Arizona State University
Hal L. Smith, Arizona State University

- 1:00PM *Dynamics of a Neuronal Network with Inhibitory and Electrical Coupling.*
(644) **David H. Terman**, Ohio State University (993-92-1296)
- 1:30PM *Analysis of Pulse Sequences in solid-state Nuclear Magnetic Resonance.* Preliminary report.
(645) **Parthasarathy Srinivasan***, Florida State University, **Zhehong Gan**, National High Magnetic Field Laboratory, and **J. R. Quine**, Florida State University (993-92-1263)
- 2:00PM *Modeling and noise-sensitivity.*
(646) **Rachel Kuske***, University of British Columbia, **Steve Baer**, Arizona State University, and **Malgorzata Klosek**, NIH (993-60-1000)
- 2:30PM Discussion.
- 3:00PM *Short-term synaptic depression promotes phase maintenance in rhythmic neuronal networks.*
(647) **Victoria Booth**, New Jersey Institute of Technology (993-92-847)
- 3:30PM *Modeling Activity-Dependent Synapse Restructuring.*
(648) **Diana W. Verzi**, San Diego State University-Imperial Valley Campus (993-92-490)

AMS-AWM Special Session on Coding, Geometry, and Hyperbolic Dynamics, I

1:00 PM – 3:50 PM

Organizers: **Svetlana R. Katok**, The Pennsylvania State University
Boris Hasselblatt, Tufts University

- 1:00PM *Measure rigidity for higher rank hyperbolic actions.*
(649) **Manfred L Einsiedler***, University of Washington, **Anatole Katok**, Penn State University, and **Elon Lindenstrauss**, Clay Mathematics Institute (993-37-358)
- 1:30PM *Dynamics on homogeneous spaces and badly approximable vectors on fractals.*
(650) **Dmitry Y Kleinbock***, Brandeis University, and **Barak Weiss**, Ben Gurion University (993-37-533)
- 2:00PM *Distribution results for lattices in $SL(2, \mathbb{Q}_p)$.*
(651) **François Ledrappier***, University of Notre Dame, and **Mark Pollicott**, Manchester University (993-37-672)
- 3:00PM *Invariant Radon measures for horocycle flows on Abelian covers.*
(652) **Omri Sarig**, Penn State University (993-37-654)
- 3:30PM *Immersed Non-Flat Strip on a Surface with No Conjugate Points.* Preliminary report.
(653) **Marlies Gerber**, Indiana University (993-53-478)

AMS Special Session on Probability and Its Applications in Combinatorics and Algorithms, IV

1:00 PM – 3:40 PM

Organizers: **Russell D. Lyons**, Indiana University
Yuval Peres, University of California Berkeley

- 1:00PM Discussion.
- 1:30PM *Non-monotonic outcomes in elections.*
▶ (654) **Anthony Quas**, University of Memphis (993-60-1417)
- 2:00PM *On Random Points in the Unit Disk.* Preliminary report.
▶ (655) **Catherine H Yan***, Texas A&M University, **Xingde Jia**, Southwest Texas State University, and **Robert Ellis**, Texas A&M University (993-05-137)
- 2:30PM *Nonuniqueness of Gibbs Measures for transition functions.*
(656) **Christopher Hoffman**, University of Washington (993-60-1328)
- 3:00PM *Zeros of i.i.d. Gaussian power series.*
(657) **Balint Virag**, University of Toronto (993-60-1618)

AMS Special Session on Discrete Dynamics and Difference Equations, IV

1:00 PM – 3:50 PM

Organizers: **Saber N. Elaydi**, Trinity University
Jim M. Cushing, University of Arizona
Gerasimos Ladas, University of Rhode Island
James A. Yorke, University of Maryland, College Park

- 1:00PM *Towards a theory of periodic difference equations.*
▶ (658) **Saber N Elaydi***, Trinity University, and **Robert J Sacker**, University of Southern California (993-39-248)
- 1:30PM *Periodic Difference Equations, Population Biology and the Cushing-Henson Conjectures.*
(659) **Saber Elaydi**, Trinity University, and **Robert J Sacker***, University of Southern California (993-37-469)
- 2:00PM *Discrete Dynamical Systems Arising from Clustering and Associative Memory.*
(660) **Jianhong Wu**, York University (993-39-1272)

- 2:30PM *Dynamic Consistency: A Fundamental Principle for Constructing Discrete Models of Continuous Systems.*
(661) **Ronald E. Mickens**, Clark Atlanta University (993-39-174)
- 3:00PM *Mandelbrot Sets for Matrix Rings: Tales of Binary and Ternary Number Systems.* Preliminary report.
▶ (662) **Paul E Fishback***, Grand Valley State University, and **Matthew D Horton**, UC-San Diego (993-37-139)
- 3:30PM *Sierpinski Curve Julia Sets.*
(663) **Robert L. Devaney**, Boston University (993-37-244)

AMS Special Session on Time Scales and Applications, III

1:00 PM – 3:50 PM

Organizers: **Martin J. Bohner**, University of Missouri at Rolla
Billur Kaymakcalan, Georgia Southern University
Allan C. Peterson, University of Nebraska

- 1:00PM *Comparison and Oscillation Results for Linear Dynamic Equations.* Preliminary report.
(664) **Lynn H Erbe**, University of Nebraska (993-39-1186)
- 1:30PM *Some Dynamic Inequalities.* Preliminary report.
▶ (665) **Elvan Akin-Bohner**, University of Missouri-Rolla (993-39-1098)
- 2:00PM *Askey-Wilson Divided Operators and Basic Exponential Functions.*
(666) **Andreas L. Ruffing**, Munich University of Technology (993-39-1032)
- 2:30PM *Hybrid Fuzzy Systems on Time Scale.*
(667) **M Sambandham**, Morehouse College (993-39-1167)
- 3:00PM *When are the Δ and ∇ derivatives adjoints of one another?* Preliminary report.
(668) **Kirsten R Messer***, Washington, DC, and **David R Pitts**, University of Nebraska, Lincoln (993-39-1415)
- 3:30PM *Uniqueness Implies Existence for Three-Point Boundary Value Problems for Second Order Dynamic Equations.*
(669) **Johnny Henderson**, Baylor University, **Christopher C. Tisdell**, The University of New South Wales, and **William K.C. Yin***, LaGrange College (993-39-1145)

AMS Special Session on Partial Differential Equations and Applications, II

1:00 PM – 3:50 PM

Organizers: **Xin Lu**, University of North Carolina at Wilmington
Yan-Wei Qi, University of California Santa Barbara
Weiqing Xie, California State Polytech University
Hong-Ming Yin, Washington State University

- 1:00PM *Nonlinear evolution of an unstable fluid interface.*
▶ (670) **S. I. Abarzhi**, Center for Turbulence Research, Stanford University (993-76-115)
- 1:30PM *Elliptic boundary problems on curvilinear polygons.*
(671) **Irina Mitrea**, Cornell University (993-45-1097)
- 2:00PM *Focusing Solutions of Porous Medium Equations with Reaction.* Preliminary report.
(672) **Yuanwei Qi**, University of Central Florida (993-35-993)

- 2:30PM *The Inverse Scattering Problem for the Wave Equation in an Anisotropic Time-Independent Medium in 2-D at Fixed Energy.*
(673) **Borislava Gutarts**, UCLA (993-35-162)
- 3:00PM *\mathcal{H}^s Solutions for Nonlinear Schrödinger Equations with Potentials Superquadratic at Infinity.*
(674) **Guoping Zhang*** and **Fengshan Liu**, Delaware State University (993-35-189)
- 3:30PM *Mathematical analysis for a problem from stress driven diffusion.* Preliminary report.
(675) **W. Xie**, California State Polytechnic University (993-35-1624)

AMS Special Session on Theory and Applications of Orthogonal Polynomials, IV

1:00 PM – 3:40 PM

Organizers: **Mourad E. H. Ismail**, University of South Florida
Barry Simon, California Institute of Technology

- 1:00PM *The Ten Martini Problem.*
(676) **Joaquim Puig**, Universitat de Barcelona (993-37-1105)
- 2:00PM *Jacobi matrices with unbounded coefficients at critical coupling.* Preliminary report.
(677) **David Damanik***, California Institute of Technology, and **Serguei Naboko**, St. Petersburg University (993-47-1087)
- 3:00PM *Zero Distribution of Orthogonal Polynomials over Regions and Curves.* Preliminary report.
(678) **Edward B. Saff*** and **Erwin Mina**, Vanderbilt University (993-41-1717)

AMS Special Session on The Many Lives of Lattice Theory and the Theory of Ordered Sets, with Connections to Combinatorics, IV

1:00 PM – 3:50 PM

Organizers: **Jonathan D. Farley**, Massachusetts Institute of Technology
Stefan E. Schmidt, New Mexico State University

- 1:00PM *Sequential Classification on Partially Ordered Sets.*
(679) **Curtis Tatsuoka***, George Washington University, and **Thomas Ferguson**, UCLA (993-06-1408)
- 1:30PM *B.F. Skinner's Box: Lattice Theory and the Psychology of Animals.*
(680) **Vladimir Lefebvre**, School of Social Sciences, University of California at Irvine (993-06-1647)
- 2:00PM *A Combinatorial Model of Ethnic Identity Change.* Preliminary report.
(681) **Kanchan Chandra*** and **Cilanne Boulet**, M.I.T. (993-05-1637)
- 2:30PM *A Minimax Procedure for Negotiating Multilateral Treaties.*
▶ (682) **Steven J. Brams**, New York University, **D. Marc Kilgour***, Wilfrid Laurier University, and **M. Remzi Sanver**, Istanbul Bilgi University (993-06-1217)
- 3:00PM *Forming Stable Coalitions from Preferences over Coalition Partners.*
▶ (683) **Steven J Brams**, New York University, **Michael A Jones***, Montclair State University, and **D. Marc Kilgour**, Wilfrid Laurier University (993-06-1092)
- 3:30PM *Separable Discrete Preferences.*
(684) **Jonathan K. Hodge***, Grand Valley State University, **W. James Bradley**, Calvin College, and **D. Marc Kilgour**, Wilfrid Laurier University (993-06-753)

AMS Special Session on Geometry and Combinatorics, III

1:00 PM – 3:50 PM

Organizers: **Michael J. Falk**, Northern Arizona University
Eva-Maria Feichtner, ETH Zurich
Dmitry N. Kozlov, Bern University

- 1:00PM (685) *On the Edelman-Reiner conjecture.*
Hiroaki Terao, Tokyo Metropolitan University (993-32-906)
- 1:30PM (686) *The Coxeter Complex for Shephard Groups.* Preliminary report.
Anne V Shepler, University of North Texas (993-05-1163)
- 2:00PM (687) *Salveti complexes as homotopy colimits.* Preliminary report.
Emanuele Delucchi, ETH Zürich (993-52-1522)
- 2:30PM (688) *Resonance in positive characteristic and characteristic varieties of arrangements.*
Michael J Falk, Northern Arizona University (993-13-1275)
- 3:00PM (689) *The fundamental group and cohomology ring of the boundary of a line arrangement.*
Daniel C. Cohen*, Louisiana State University, and **Alexander I. Suci**, Northeastern University (993-57-1305)
- 3:30PM (690) *On the decomposability of the holonomy Lie algebra of an arrangement.*
Stefan Papadima, Institute of Mathematics of the Romanian Academy, and **Alexander I. Suci***, Northeastern University (993-52-1642)

AMS Special Session on Fixed Points: Theory and Application, I

1:00 PM – 3:50 PM

Organizers: **Robert F. Brown**, University of California Los Angeles
Mark S. Burgin, University of California Los Angeles

- 1:00PM (691) *Bifurcation without compactness and applications.* Preliminary report.
Mario Umberto Martelli, Claremont McKenna College (993-37-176)
- 1:30PM (692) *Metric Fixed Point Theory in Geodesic Spaces.*
W. A. Kirk, University of Iowa (993-51-207)
- 2:00PM (693) *Fuzzy Fixed Points in Banach Spaces.* Preliminary report.
Mark Burgin, UCLA (993-46-216)
- 2:30PM (694) *Extremal approximately convex functions and fixed points.*
Stephen J Dilworth*, **Ralph Howard** and **James W Roberts**, University of South Carolina (993-26-235)
- 3:00PM (695) *A Mann iteration sequence for approximating fixed points of continuous operators that are solutions of Variational Inequalities.* Preliminary report.
Jinlu Li, Shawnee State University (993-47-484)
- 3:30PM (696) *Minimal Numerical Radius Extensions of Operators.*
Asuman G Aksoy*, Claremont McKenna College, and **Bruce Chalmers**, University of California-Riverside (993-42-754)

AMS Special Session on Nonstandard Methods, III

1:00 PM – 3:20 PM

Organizers: **Matt Insall**, University of Missouri at Rolla
Peter A. Loeb, University of Illinois at Urbana-Champaign
David A. Ross, University of Hawaii

- 1:30PM (697) *Why were infinitesimals removed from the calculus curriculum?* Preliminary report.
Mark McKinzie, Monroe Community College, SUNY (993-01-1581)
- 2:00PM (698) *On representation of dynamical systems on Lebesgue spaces by hyperfinite dynamical systems.*
Yevgeniy I Gordon*, Eastern Illinois University, **C Ward Henson** and **Peter A Loeb**, University of Illinois at Urbana-Champaign (993-28-1063)
- 2:30PM (699) *Skolem and Gödel: Missed Connections.*
Martin D Davis, Visitor, University of California, Berkeley (993-03-1017)
- 3:00PM (700) *Fully Relativized Internal Set Theory.*
Karel Hrbacek, City College of CUNY (993-03-998)

MAA Minicourse #10: Part B

1:00 PM – 3:00 PM

Teaching linear algebra with applications.
Organizer: **Gilbert Strang**, Massachusetts Institute of Technology

MAA Minicourse #11: Part A

1:00 PM – 3:00 PM

Developing your department's assessment plan.
Organizers: **William G. Marion**, Valparaiso University
Bonnie Gold, Monmouth University

MAA Minicourse #16: Part A

1:00 PM – 3:00 PM

Getting students involved in undergraduate research.
Organizers: **Aparna W. Higgins**, University of Dayton
Joseph A. Gallian, University of Minnesota, Duluth

AMS Session on Group Theory

1:00 PM – 4:10 PM

- 1:00PM (701) *On Commutators in p -groups.*
Luise-Charlotte Kappe*, SUNY at Binghamton, and **Robert F Morse**, University of Evansville (993-20-862)
- 1:15PM (702) *Capability of some nilpotent products of cyclic p -groups.* Preliminary report.
Arturo Magidin, University of Montana (993-20-69)
- 1:30PM (703) *Irreducible symplectic and orthogonal modules with finitely many orbits on totally isotropic subspaces.*
W. Ethan Duckworth, Rutgers University (993-20-1089)
- 1:45PM (704) *Almost Disjoint Central Sets.* Preliminary report.
Timothy J. Carlson, Ohio State University, **Neil Hindman***, Howard University, and **Dona Strauss**, University of Hull (993-20-735)

- 2:00PM *Aspects of computation with matrix groups.*
 ▶ (705) Preliminary report.
Peter A Brooksbank, The Ohio State University
 (993-20-980)
- 2:15PM *A Characterization of Permutable Subgroups of Direct Products.*
 (706) **Joseph Evan**, King's College (993-20-1153)
- 2:30PM *Lie groups which cannot act like non-elementary convergence groups, A preliminary report.*
 (707) Preliminary report.
Blake J Boursaw, University of Minnesota
 (993-22-1638)
- 2:45PM *Centralizers in Graph Products of Groups.*
 (708) **Donald A. Barkauskas**, Pacific University
 (993-20-1206)
- 3:00PM *Constructing Minimal Length Representatives for Certain Elements in Thompson's Group.* Preliminary report.
 ▶ (709) **Micah Israel Miller**, Bowdoin College
 (993-20-1426)
- 3:15PM *Constructing Basic Algebras.* Preliminary report.
 (710) **Thomas Rune Hoffman**, University of Arizona
 (993-20-1505)
- 3:30PM *Topologically pure projectives.* Preliminary report.
 (711) **Peter Loth**, Sacred Heart University (993-22-253)
- 3:45PM *Weakened Lie groups in which the arc component of the identity is dense.* Preliminary report.
 (712) **Jon W. Short**, Sam Houston State University
 (993-22-1579)
- 4:00PM *Pro-x Groups.*
 (713) **Julie C Jones**, Sam Houston State University
 (993-22-1591)

AMS Session on Functional Analysis

1:00 PM – 3:25 PM

- 1:00PM *Banach-Stone theorems for Banach bundles.*
 (714) **Terje Hoim**, Florida Atlantic University, and **D A Robbins***, Trinity College (993-46-276)
- 1:15PM *Monotonically complemented subspaces of $C[a, b]$.*
 (715) **M. P. Prophet*** and **D. Mupasiri**, University of Northern Iowa (993-46-1300)
- 1:30PM *Shift Operator on Space of Continuous Functions on Compact Extremely Disconnected Spaces.*
 (716) Preliminary report.
Minakshisundaram Rajagopalan, Tennessee State University (993-46-1563)
- 1:45PM *Tensor Products and Dunford-Pettis Sets.*
 (717) **Ioana Ghenciu*** and **Paul W Lewis**, University of North Texas (993-46-1409)
- 2:00PM *The uncomplemented spaces $W(X, Y)$ and $K(X, Y)$.*
 (718) **Paul Lewis**, University of North Texas
 (993-46-1154)
- 2:15PM *Strong Additivity in the Strong Operator Topology and in Banach Lattices.*
 (719) **Kimberly O. Muller*** and **Paul W. Lewis**, University of North Texas (993-46-1546)
- 2:30PM *Determining Subspaces for Bounded Linear Operators.* Preliminary report.
 (720) **Elizabeth M Bator*** and **Rhonda Huettenmueller**, University of North Texas (993-46-1556)
- 2:45PM *Independence of Translates of a Multivariable Refinable Function.*
 (721) **Denise A Jacobs**, United States Military Academy
 (993-46-1568)
- 3:00PM *On the cohomology of operator algebras.*
 (722) **Ali-Amir Husain**, Texas A&M University
 (993-46-1410)

- 3:15PM *Baer Ordered Jordan Algebras.* Preliminary report.
 (723) **Alexander A Katz**, St. John's University, NY
 (993-46-1406)

AMS Session on Analysis, II

1:00 PM – 3:10 PM

- 1:00PM *The question of equivalence for generalized Hausdorff matrices.*
 (724) **B. E. Rhoades**, Indiana University (993-40-196)
- 1:15PM *Generalizations of Lambert's series.*
 (725) **Thomas J. Osler**, Rowan University (993-40-878)
- 1:30PM *Infinite Series for Logarithms using Cyclotomic Polynomials and Generalized Gaussian-Mersenne Primes.* Preliminary report.
 ▶ (726) **Marc Chamberland**, Grinnell College
 (993-40-1267)
- 1:45PM *A Multivariate Analogue of Hardy's Inequality for Hausdorff Means.* Preliminary report.
 ▶ (727) **Constantine Georgakis**, DePaul University
 (993-40-1605)
- 2:00PM *The Cesàro submethod as an ℓ - ℓ summability matrix.* Preliminary report.
 (728) **Jeffrey A. Osikiewicz**, Kent State University, Tuscarawas Campus (993-40-1667)
- 2:15PM *On Estimates of Some Determinants and Rational Approximation.*
 (729) **Vasiliy Prokhorov**, University of South Alabama
 (993-41-1225)
- 2:30PM *A class of non-negative sums of exponential and trigonometric functions.* Preliminary report.
 ▶ (730) **Valerio De Angelis**, Xavier University of Louisiana
 (993-41-1379)
- 2:45PM *Burmann-Series Distributions and Approximation Operators.*
 (731) **Jerry P. King**, Lehigh University (993-41-304)
- 3:00PM *Asymptotic analysis of the Krawtchouk polynomials by the WKB method.*
 ▶ (732) **Diego Dominici**, SUNY New Paltz (993-41-563)

AMS Session on Calculus of Variations

1:00 PM – 2:10 PM

- 1:00PM *Generalized variational principle of Herglotz for several independent variables. First Noether-type theorem.*
 (733) **Bogdana A. Georgieva***, Pacific University, **Ronald B Guenther**, Oregon State University, and **Theodore G. Bodurov**, Eugene, Oregon (993-49-1165)
- 1:15PM *General convergence analysis for two-step projection methods and applications to variational problems.*
 (734) **Ram U. Verma**, Toledo, OH (993-49-1521)
- 1:30PM *Nonlinear Pseudocoercive Variational Problems and Projection Methods.* Preliminary report.
 (735) **Ram N Mohapatra***, University of Central Florida, and **Ram U. Verma**, International Publications
 (993-49-1696)
- 1:45PM *Tangent Cones of Epigraphs, Hypographs, and Graphs.*
 (736) **Doug E. Ward**, Miami University (993-49-1202)
- 2:00PM *Pattern search methods for linearly constrained minimization in the presence of degeneracy.*
 ▶ (737) **Olga A. Brezhneva***, IMA, University of Minnesota, and **J. E. Dennis Jr.**, Rice University (993-49-1702)

SIAM Minisymposium on Nonlinear Elasticity: Theory and Applications

1:00 PM – 3:50 PM

Organizers: **Alain Goriely**, University of Arizona
Michael Tabor, University of Arizona

- 1:00PM (738) *Global continuation and bifurcation in nonlinear elasticity.*
Timothy J. Healey, Department of Theoretical Applied Mechanics, Cornell University
- 1:45PM (739) *Theory of polymorphism in bacterial flagella.*
Thomas R. Powers, Department of Engineering, Brown University
- 2:30PM (740) *Sequence-dependent elastic models of DNA.*
Oscar Gonzalez, University of Texas
- 3:15PM (741) *Growth-induced instability in exact elasticity.*
Alain Goriely, University of Arizona

MAA Session on Innovations in Teaching Discrete Mathematics

1:00 PM – 3:55 PM

Organizers: **William E. Fenton**, Bellarmine University
Nancy L. Hagelgans, Ursinus College

- 1:00PM (742) *Discrete Dynamical Systems.*
▶ **James Andrew Walsh**, Oberlin College (993-K1-56)
- 1:15PM (743) *Mathematical Modeling with Discrete Dynamical Systems.*
▶ **Richard D West*** and **William P Fox**, Francis Marion University (993-K1-459)
- 1:30PM (744) *Teaching Discrete Mathematics via Primary Historical Sources.*
▶ **Jerry M Lodder**, New Mexico State University (993-K1-875)
- 1:45PM (745) *Student Engagement in Discrete Mathematics.*
▶ Preliminary report.
Karolyne E. Fogel, California Lutheran University (993-K1-468)
- 2:00PM (746) *Going Beyond the Basics: Creating and Inspiring Problem Solvers.* Preliminary report.
▶ **Alex J Heidenberg*** and **John Wasko**, United States Military Academy (993-K1-1274)
- 2:15PM (747) *Community-Based Projects in a Discrete Mathematics Course.* Preliminary report.
▶ **Linda McGuire**, Muhlenberg College (993-K1-251)
- 2:30PM (748) *Linking Discrete Mathematics with Computer & Information Technology.*
▶ **Morteza Shafii-Mousavi***, Indiana University South Bend, and **Paul Kochanowski**, Indiana University South Bend (993-K1-203)
- 2:45PM Discussion
- 3:00PM (749) *Discrete Mathematics TI-89 Calculator Projects.*
Jean M Horn*, Northern Virginia Community College - Woodbridge, **Paul K Horn**, University of Wisconsin - Madison, and **Toni T Robertson**, Woodbridge, Virginia (993-K1-218)
- 3:15PM (750) *Maple Activities for the Discrete Math Course.*
▶ **Kate G. McGivney**, Shippensburg University (993-K1-456)
- 3:30PM (751) *Incorporating technology in the teaching of Discrete Mathematics.* Preliminary report.
▶ **Richard M. Grassl**, University of Northern Colorado (993-K1-760)

- 3:45PM (752) *Induction proofs with Flash.* Preliminary report.
▶ **J. Winston Crawley***, Shippensburg University, and **Douglas E. Ensley**, Shippensburg University (993-K1-432)

MAA Session on Initiating and Sustaining Undergraduate Research Projects and Programs

1:00 PM – 3:50 PM

Organizers: **James A. Davis**, University of Richmond
Joel S. Foisy, State University of New York

- 1:00PM (753) *Undergraduate Research at Mount Holyoke College.*
▶ **Harriet Pollatsek*** and **Margaret M. Robinson**, Mount Holyoke College (993-L1-1344)
- 1:30PM (754) *Starting an Undergraduate Research Program.*
Julie C Jones* and **Jacqueline A Jensen**, Sam Houston State University (993-L1-340)
- 2:00PM (755) *Undergraduate Research Courses at Ithaca College.*
▶ Preliminary report.
David A Brown* and **Osman Yurekli**, Ithaca College (993-L1-314)
- 2:30PM (756) *The Towson University Applied Mathematics Laboratory.*
▶ **Mike O'Leary**, Towson University (993-L1-312)
- 3:00PM (757) *Fostering Student Research in Mathematical Biology.*
Thomas Q Sibley, St. John's University (993-L1-172)
- 3:30PM (758) *Deepening Understanding Mathematics Through Project-based Study.* Preliminary report.
Bin Lu, California State University (993-L1-1629)

MAA Session on Mathlets for Teaching and Learning Mathematics

1:00 PM – 4:15 PM

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

- 1:00PM (759) *Group Explorer - Visualization Software in the Abstract Algebra Classroom.*
▶ **Nathan C. Carter***, Indiana University, and **Brad A. Emmons**, Utica College (993-M1-538)
- 1:20PM (760) *A Greater Tantalizer.*
▶ **Andrew J Simoson**, King College (993-M1-43)
- 1:40PM (761) *Building Bridges and Digging Ditches.* Preliminary report.
▶ **Thomas W Mattman**, Cal. State Univ., Chico, and **Neil Portnoy***, SUNY, Stony Brook (993-M1-68)
- 2:00PM (762) *Using Term Rewriting Systems in Algebra.*
▶ **Jeffrey W Clark**, Elon University (993-M1-211)
- 2:20PM (763) *zMap: Exploring Complex Functions.*
▶ **Bert Wachsmuth*** and **Robert Moore**, Seton Hall University (993-M1-440)
- 2:40PM (764) *Java applets for the chaos game.*
▶ **Robert L. Devaney**, Boston University (993-M1-233)
- 3:00PM (765) *Some Observations on Internationalizing Mathlets.*
Thomas E Leathrum, Jacksonville State Univ. (993-M1-608)
- 3:20PM (766) *A Modular Approach to Writing ASP/JavaScript Mathlets.* Preliminary report.
▶ **Mark E Gruenwald**, University of Evansville (993-M1-435)

- 3:40PM *Calculus Applets with Online Exercises.*
 ▶ (767) **Charles E Oelsner**, Manlius Pebble Hill School (993-M1-212)
- 4:00PM *Teaching 3-Dimensional High School Geometry With Animation.*
 ▶ (768) **Kevin C Dietzler*** and **Stephen Cooper**, Saint Joseph's University (993-M1-149)

MAA Session on Math and the Arts, I

1:00 PM – 3:55 PM

Organizers: **Ann Robertson**, Connecticut College
John M. Sullivan, University of Illinois, Urbana
Reza Sarhangi, Towson University
Nathaniel A. Friedman, State University of New York, Albany

- 1:00PM *Sculptural Variations of an Annular Region.*
 ▶ (769) Preliminary report.
Nathaniel A. Friedman, Univ. at Albany (993-O1-870)
- 1:20PM *Computer Sculpture Without Computers: Artificial Life Algorithms In Creating Modular Form.*
 ▶ (770) **Stephen J Luecking**, DePaul University (993-O1-357)
- 1:40PM *The Topology of Celtic Knot Designs.* Preliminary report.
 ▶ (771) **Gwen Fisher**, California Polytechnic University, San Luis Obispo, and **Blake Mellor***, Loyola Marymount University (993-O1-344)
- 2:00PM *Pattern and Symmetry in the Basketry of Botswana.*
 ▶ (772) **Douglas E. Norton**, Villanova University (993-O1-1019)
- 2:20PM *The Geometrical Structure of Portal and Window Grilles of La Mezquita.*
 ▶ (773) **B. L. Bodner**, Monmouth University (993-O1-197)
- 2:35PM Break
- 3:00PM *Polynomiography: Visualization of Polynomials.*
 ▶ (774) **Bahman Kalantari**, Rutgers University (993-O1-1118)
- 3:20PM *Counting of the Art of James Mai.* Preliminary report.
 ▶ (775) **Daylene Zielinski**, Bellarmine University (993-O1-367)
- 3:40PM *Mathematical Paintings: Clark Richert.* Preliminary report.
 ▶ (776) **Carla E Farsi**, University of Colorado (993-O1-780)

MAA Session on Strategies that Work to Positively Change Student Attitudes Toward Mathematics, I

1:00 PM – 2:40 PM

Organizers: **Caren L. Diefenderfer**, Hollins University
Janet L. Anderson, Hope College
Elizabeth G. Yanik, Emporia State University

- 1:00PM *College Algebra Done Discretely.*
 ▶ (777) **Warren P. Koepf**, Univ. of Texas-Permian Basin (993-Y1-534)
- 1:15PM *Assignments that count: a short project strategy to encourage mathematical discussion and thought.* Preliminary report.
 ▶ (778) **R. Travis Kowalski**, Colorado College (993-Y1-403)
- 1:30PM *Keeping the Doors Open: Service Learning in Linear Algebra.*
 ▶ (779) **John B. Fink**, Kalamazoo College (993-Y1-273)

- 1:45PM *Improving Student Attitudes, Achievement, and Retention in First-Year Calculus.*
 ▶ (780) **Joy Moore**, University of Cincinnati (993-Y1-326)
- 2:00PM *A Seminar for Starting Math Majors on the Right Foot.* Preliminary report.
 ▶ (781) **Gail P Greene** and **Melvin G Royer***, Indiana Wesleyan University (993-Y1-572)
- 2:15PM *Achieving a Department Climate that Attracts Majors.* Preliminary report.
 ▶ (782) **Teri J Murphy**, University of Oklahoma (993-Y1-409)
- 2:30PM *Are we Losing the Best and Keeping the Rest? A Discussion of Advanced Undergraduates' Mathematical Abilities, Attitudes, and Understanding of Research Mathematics.*
 ▶ (783) **Timothy P Fukawa-Connelly**, University of Maryland, College Park (993-Y1-1285)

MAA General Contributed Paper Session, IV

1:00 PM – 3:40 PM

Organizers: **Laura J. Wallace**, California State University, San Bernardino
Jacqueline A. Jensen, Sam Houston State University
Gary W. Towsley, SUNY at Geneseo
Michael A. Jones, Montclair State University
Shawnee L. McMurran, California State University at San Bernardino

- 1:00PM *Using Web-Based Activities in a Quantitative Literacy Course.*
 ▶ (784) **Cathleen Zucco-Teveloff**, Trinity College (993-Z1-20)
- 1:15PM *It's a Web of Design...It's WebAssign.*
 ▶ (785) **Mary Joyce Plott*** and **Karen O'Hara**, High Point University (993-Z1-1604)
- 1:30PM *Interactive Modules for Precalculus and College Algebra.*
 ▶ (786) **Paul A Sundheim**, University of Wisconsin (993-Z1-1602)
- 1:45PM *Interdisciplinary Labs in College Precalculus.*
 ▶ (787) **Sofia Agrest*** and **Debby Jeter**, College of Charleston (993-Z1-1599)
- 2:00PM *Enhancing Student Learning through Online Surveys of Pre-Reading.*
 ▶ (788) **Cynthia J. Wyels**, California Lutheran University (993-Z1-1358)
- 2:15PM *Incorporating On-line Testing and Tutorials in the Calculus Curriculum: Helping Students Become More Self Directed Learners.* Preliminary report.
 ▶ (789) **Nathan Smith***, **Lesa Beverly**, University of Texas at Tyler, and **Cameron Sawyer**, Southwestern University (993-Z1-1312)
- 2:30PM *Dispelling the Myth that Mathematics is Easier Online.* Preliminary report.
 ▶ (790) **Denise J LeGrand**, UALR (993-Z1-629)
- 2:45PM *Interactive Course Syllabi.*
 ▶ (791) **Ronald W DeGray**, Saint Joseph College (993-Z1-539)
- 3:00PM *Supplementing a Mathematics Course with an Online Homework System.* Preliminary report.
 ▶ (792) **Michael B Scott**, Kansas State University (993-Z1-477)
- 3:15PM *An Innovative Computational Science Curriculum.*
 ▶ (793) **Ignatios E Vakalis**, Capital University (993-Z1-346)

3:30PM *Persistent Patterns and Decay of Variance in Fluid Mixing.*
(794)
Weijiu Liu* and George Haller, MIT (993-Z1-47)

Robert J. Lopez, Rose-Hulman Institute of Technology and Waterloo Maple
Olympia E. Nicodemi, State University of New York, Geneseo
Kathleen G. Snook, Consortium for Mathematics and its Applications

MAA Invited Paper Session on WeBWork, a Web-Based Homework System, I

1:00 PM – 3:50 PM

Organizers: **Michael E. Gage**, University of Rochester
Arnold K. Pizer, University of Rochester
Vicki Roth, University of Rochester
Jeffrey J. Holt, University of Virginia
John W. Jones, Arizona State University

1:00PM *WeBWorkK2: Playing nicely with others.*
(795) **Michael E Gage*** and **Sam Hathaway**, University of Rochester (993-Z2-920)

1:30PM *Adaptation of WeBWork to College Algebra at Radford University.*
(796) **Coreen L Mett*** and **Neil Sigmon**, Radford University (993-Z2-864)

2:00PM *AiM, a CAS based homework system.* Preliminary report.
(797) **Michael Fraboni**, Moravian College (993-Z2-858)

2:30PM *Successes and failures in setting up webwork courses.* Preliminary report.
▶ (798) **Richard E. Bayne**, Howard University (993-Z2-1151)

3:00PM *Statistical Assessment of WeBWork for College Algebra Classes.*
▶ (799) **Angelo Segalla*** and **Alan Safer**, California State University, Long Beach (993-Z2-1587)

3:30PM *Assessing Student Responses to WeBWork: The Connection between Answer Patterns and Course Performance.* Preliminary report.
(800) **Vicki J. Roth**, University of Rochester (993-Z2-783)

MAA Panel Discussion

1:00 PM – 2:20 PM

Mathematics education in a research intensive department: What makes it work?

Organizers: **David A. Gay**, University of Arizona
Deborah Hughes Hallett, University of Arizona

William G. McCallum, University of Arizona

Fred Stevenson, University of Arizona

Panelists: **Marilyn P. Carlson**, Arizona State University

Jim Lewis, University of Nebraska-Lincoln

Joan R. Litzel, MSEB

William G. McCallum, University of Arizona

Fred Stevenson, University of Arizona

MAA Project NExT Panel Discussion

1:00 PM – 2:30 PM

Technology and the mathematics major.

Organizer: **Ioana Mihaila**, California State Polytechnic University at Pomona

Panelists: **Bernard W. Banks**, California State Polytechnic University at Pomona

MAA Panel Discussion

1:00 PM – 2:20 PM

Successful activities for a Math Club.

Organizers: **Jennifer M. McNulty**, University of Montana

Janet C. Woodland, University of Arkansas

Panelists: **Jean Bee Chan**, Sonoma State University

J. Douglas Faires, Youngstown State University

Donna L. Flint, South Dakota State University

Philip K. Hotchkiss, Westfield State College

Timothy R. Ray, Southeast Missouri State University

Robert S. Smith, Miami University

MAA Minicourse #6: Part A

1:30 PM – 3:30 PM

Using interactive labs to explore abstract algebra topics.

Organizers: **Allen C. Hibbard**, Central College
Kenneth M. Levasseur, University of Massachusetts at Lowell

MAA Project NExT-Young Mathematicians Network Poster Session

2:00 PM – 4:00 PM

Organizers: **Kevin E. Charlwood**, Washburn University

Kenneth A. Ross, University of Oregon

Summer Program for Women in Mathematics (SPWM)

2:00 PM – 4:00 PM

Organizer: **Murli Gupta**, George Washington University

AMS Invited Address

2:15 PM – 3:05 PM

(801) *Network games and approximation algorithms.*
Eva Tardos, Cornell University (993-05-18)

MAA SIGMAA on Statistics Education Panel Discussion

2:40 PM – 4:00 PM

The undergraduate mathematical statistics sequence.

Organizer: **Carolyn K. Cuff**, Westminster College

Moderator: **Allan J. Rossman**, California Polytechnic State University at San Luis Obispo

Panelists: **Matthew J. Hassett**, ASA, AdvancePCS
Elliot A. Tanis, Hope College
Douglas A. Wolfe, The Ohio State University
Deborah Nolan, University of California Berkeley

MAA SIGMAA on the History of Mathematics Panel Discussion

2:40 PM – 4:00 PM

The history of applications in teaching undergraduate mathematics: 1950–2000.

Organizers: **Joseph Malkevitch**, York College, CUNY

Walter Meyer, Adelphi University
Jack Winn, SUNY at Farmingdale

Panelists: **Peter D. Lax**, Courant Institute
Donald W. Bushaw, University of Washington at Pullman
Chandler Davis, University of Toronto
Andrew M. Gleason, Harvard University
Daniel P. Maki, Indiana University

AMS Retiring Presidential Address

3:20 PM – 4:10 PM

(802) *Mathematics, mathematicians, and mathematics education.*

Hyman Bass, University of Michigan (993-97-17)

Joint Prize Session and Reception

4:25 PM – 6:30 PM

SIGMAA on Environmental Mathematics Business Meeting and Invited Address

5:45 PM – 6:45 PM

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

SIGMAA on Statistics Education

5:45 PM – 6:45 PM

2004 business meeting and swap session.

Organizer: **Carolyn K. Cuff**, Westminster College

MAA Video Presentations

5:45 PM – 7:00 PM

“Only Four Colors” and “An Introduction to Topology”.

Organizer: **Robin Wilson**, The Open University

Web SIGMAA Panel Discussion and Inaugural Business Meeting.

5:45 PM – 7:45 PM

Organizers: **Kirby A. Baker**, UCLA
Marcelle Bessman, Jacksonville University

Lehigh University Reception for Friends and Graduates

5:45 PM – 7:00 PM

MAA Two-Year College Reception

5:45 PM – 7:00 PM

Alumni Reception for the University of Chicago’s Mathematics Department

6:00 PM – 7:00 PM

Association of Gay, Lesbian, Bisexual, and Transgendered Mathematicians Reception

6:00 PM – 8:00 PM

MER Banquet

6:30 PM – 9:30 PM

Knitting Circle

8:15 PM – 9:45 PM

Friday, January 9

Joint PME and MAA Student Chapter Advisors’ Breakfast

7:00 AM – 8:00 AM

Employment Center

7:00 AM – 7:30 PM

Joint Meetings Registration

7:30 AM – 4:00 PM

AMS Session on Combinatorics, I

7:30 AM – 10:55 AM

- 7:30AM Extension of multi-restricted numbers. Preliminary report.
▶ (803) **Ji Young Choi***, Shippensburg University of Pennsylvania, and **Jonathan D. H. Smith**, Iowa State University (993-05-1635)
- 7:45AM A Transform Approach to Constacyclic and
▶ (804) *Quasi-twisted Codes*. Preliminary report.
Tom Blackford, Western Illinois University (993-05-1304)
- 8:00AM The m -quasiinvariants of S_n . Preliminary report.
(805) **Jason Bandlow** and **Gregg Musiker***, University of California, San Diego (993-05-1386)
- 8:15AM *Rook Theory and Cycle-Counting Permutation*
(806) *Statistics*.
Frederick Michael Butler, University of Pennsylvania (993-05-824)
- 8:30AM *Morphism Families for δ -Matchings*.
▶ (807) **Anna Maltseva**, University of Michigan (993-05-1697)
- 8:45AM *Packing densities of patterns*.
▶ (808) **Reid W Barton**, MIT (993-05-1613)

- 9:00AM *Wilf classes of pairs of permutations of length four.*
 ▶ (809) Preliminary report.
Ian T Le, Harvard College (993-05-1545)
- 9:15AM *Improved bounds on the minimum length of maximal abelian square-free words.*
 ▶ (810) **Evan M Bullock**, Rice University (993-05-1347)
- 9:30AM Break
- 9:45AM *Maximal covering groups and perfect cwatsets.*
 ▶ (811) Preliminary report.
Thomas M Langley* and **Brian Barker**,
 Rose-Hulman Institute of Technology (993-05-1218)
- 10:00AM *A Technique for Creating Non-Simplicial Polytopes.*
 ▶ (812) Preliminary report.
Matthew M Menzel, The University of Kentucky
 (993-05-636)
- 10:15AM *Rook Numbers and the Normal Ordering Problem.*
 ▶ (813) **Anna Varvak**, Brandeis University (993-05-1196)
- 10:30AM *Forming Configurations from Nondegenerate Quadratic Forms over Finite Fields.*
 ▶ (814) **Sharon L. Sullivan**, Catawba College (993-05-971)
- 10:45AM *Characterizations of t -Split Interval Orders.*
 (815) Preliminary report.
Trisha Moller, Lehigh University (993-05-690)

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

8:00 AM – 10:50 AM

Organizers: **Tamara A. Burton**, Rochester Institute of Technology
Michael J. Fisher, California State University, Fresno
Carl V. Lutzer, Rochester Institute of Technology
Darren A. Narayan, Rochester Institute of Technology

- 8:00AM *A New Axiomatic Geometry: Cylindrical (or Periodic) Geometry.*
 ▶ (816) **Elizabeth Ehret*** and **Mike Westmoreland**,
 Denison University (993-51-554)
- 8:30AM *k -Alternating Knots.* Preliminary report.
 ▶ (817) **Philip Hackney***, Central Michigan University,
Nathan Walters, Drake University, and **Leonard Van Wyk**,
 James Madison University (993-57-462)
- 9:00AM *Pade' approximates for torsion of a compressible nonlinearly elastic cylinder: modeling, computation, and visualization.* Preliminary report.
 ▶ (818) **Danielle K Miller***, James Madison University,
Jennifer K Salyer, East Tennessee State University,
Debra A Warne and **Paul G. Warne**, James Madison University
 (993-34-569)
- 9:30AM *Integer Construction by Induction.*
 ▶ (819) **Anthony Fressola*** and **Joan Krone**, Denison University
 (993-03-607)
- 10:00AM *Pretzel Knots and Colorability.* Preliminary report.
 ▶ (820) **Kathryn Brownell***, Lenoir-Rhyne College, **Kaitlyn O'Neil**,
 Merrimack College, and **Laura A. Taalman**, James Madison University
 (993-00-831)
- 10:30AM *An Illumination of the Aristarchus of Samos' treatise On the Sizes and Distances of the Sun and the Moon.*
 ▶ (821) **Katherine E Northrup**, Ursinus College
 (993-85-1279)

AMS-MAA Special Session on Mathematical Techniques in Musical Analysis, I

8:00 AM – 9:50 AM

Organizers: **Judith L. Baxter**, University of Illinois at Chicago
Robert W. Peck, Louisiana State University

- 8:00AM *Polya's Enumeration Theorem in Music Theory (Or, Why Are There 29 Tetrachords?).* Preliminary report.
 ▶ (822) **Julian L Hook**, Indiana University (993-05-551)
- 8:30AM *A Non-Acoustical Application of the Discrete Fourier Transform to Music Theory.* Preliminary report.
 ▶ (823) **Ian Quinn**, University of Oregon (993-42-1486)
- 9:00AM *On Some Musically Interesting Properties of Multi-aggregate Compound Interval Cycles.*
 (824) **E Gollin**, Williams College (993-20-1338)
- 9:30AM *Counting Potential Intervals in Infinite (and Smaller) Spaces.*
 ▶ (825) **Michael H. Buchler**, Florida State University
 (993-05-574)

AMS-SIAM Special Session on Classical and Nonlinear Special Functions, I

8:00 AM – 10:50 AM

Organizers: **Peter A. Clarkson**, University of Kent
Francisco Marcellan, Universidad Carlos III
Peter A. McCoy, U. S. Naval Academy

- 8:00AM *Deconvolution and Sampling on Non-Commensurate Lattices via Complex Interpolation.*
 (826) **Stephen D. Casey**, American University
 (993-33-1306)
- 8:30AM *A Note on the Equivalence of Kramer's and Shannon's Sampling Theorems.* Preliminary report.
 (827) **Ahmed I Zayed***, DePaul University, and **Amin Boumenir**,
 University of West Georgia (993-41-1003)
- 9:00AM *Lamé polynomials, the Hermite-Krichever Ansatz, and hyperelliptic reduction.*
 (828) **Robert S. Maier**, University of Arizona
 (993-33-1693)
- 9:30AM *Differential Equations for Dyson Processes.*
 (829) **Craig A Tracy***, UC Davis, and **Harold Widom**, UC
 Santa Cruz (993-60-1131)
- 10:00AM *First Integrals of a Generalized Darboux-Halphen System.*
 (830) **R G Halburd**, Loughborough University
 (993-34-1517)
- 10:30AM *Chazy and Darboux-Halphen Systems.*
 (831) **M J Ablowitz**, University of Colorado, Boulder
 (993-34-948)

AMS-AWM Special Session on Coding, Geometry, and Hyperbolic Dynamics, II

8:00 AM – 10:50 AM

Organizers: **Svetlana R. Katok**, The Pennsylvania State University
Boris Hasselblatt, Tufts University

- 8:00AM *Gauss Maps for Quadratic Imaginary Fields.*
 (832) Preliminary report.
David Fried, Boston University (993-37-782)

- 8:30AM *Geometric coding on the modular surface and countable Markov chains.*
(833) **Ilie Ugarcovici*** and **Svetlana Katok**, The Pennsylvania State University (993-37-1081)
- 9:00AM *What is the arithmetic code for $SL(n, \mathbb{Z})$, $n \geq 3$?*
(834) Preliminary report.
Anatole Katok, The Pennsylvania State University (993-37-585)
- 10:00AM *Substitution tiling spaces, interval exchange transformations and pseudo-Anosov flows.*
(835) **Marcy Barge**, Montana State University - Bozeman, **Charles Holton** and **Brian F Martensen***, The University of Texas at Austin (993-37-414)
- 10:30AM *Convex dynamics and applications.*
▶ (836) **Roy L Adler**, IBM, Emeritus (993-37-169)

AMS Special Session on Competitive and Adaptive Dynamics in Ecology, I

8:00 AM – 10:50 AM

Organizers: **Carlos Castillo-Chavez**, Los Alamos National Laboratory
Yang Kuang, Arizona State University
Bai-Lian Li, University of California Riverside
Horst R. Thieme, Arizona State University

- 8:00AM *Competitive coexistence in patchy environments: the interplay between spatial heterogeneity and density-dependent dispersal.*
▶ (837) **Priyanga Amarasekare**, University of Chicago (993-00-1265)
- 8:30AM *Perfect aggregation and integrability in ecological dynamical systems.* Preliminary report.
▶ (838) **Alain Franc***, INRA, Paris, France, and **Vadim Kuznetsov**, University of Leeds (993-92-598)
- 9:00AM *Competition and Coexistence of Strains: The Impact of Vaccination.* Preliminary report.
(839) **Maia Martcheva***, University of Florida, **Mimmo Iannelli**, University of Trento, Italy, and **Xue-Zhi Li**, Xinyang Teachers College (993-92-351)
- 9:30AM *Mathematical models of HIV; How robust are they and what are the limitations of their conclusions.*
▶ (840) **Patrick W Nelson***, **Stanca Ciupe**, University of Michigan, and **Benjamin Lovegren de Bivort**, Harvard University (993-92-931)
- 10:00AM *Effects of Non-random Mixing and of Stochasticity on Optimal Disease Intervention.*
▶ (841) **James Koopman** and **Carl P Simon***, The University of Michigan (993-92-1628)
- 10:30AM *The adaptive dynamics of resource use.*
▶ (842) **Sebastian J. Schreiber***, College of William and Mary, and **Glory Tobiason**, Western Washington University (993-92-1371)

AMS Special Session on Multiscale and Oscillatory Phenomena: Modeling, Numerical Techniques, and Applications, I

8:00 AM – 10:50 AM

Organizers: **Richard Tsai**, Princeton University
Luminita A. Vese, University of California Los Angeles

8:00AM *Computational Multiscale Methods.*
▶ (843) **Bjorn Engquist**, Princeton University (993-65-1352)

9:00AM *Numerical microlocal analysis of harmonic wavefields.*
(844) **Olof Runborg**, NADA, KTH (993-65-543)

- 9:30AM *Analysis of numerical techniques for multiscale stochastic dynamical systems.*
(845) **Weinan E**, Princeton University, **Di Liu*** and **Eric Vanden-Eijnden**, Courant Institute (993-65-1536)
- 10:00AM *Multiscale Modeling of Fluids.* Preliminary report.
(846) **Weinan E** and **Weiqing Ren***, Princeton University (993-76-778)
- 10:30AM *Heterogeneous Multiscale Methods for Stiff ODEs.*
(847) **Richard Tsai*** and **Bjorn Engquist**, Princeton University (993-65-1114)

AMS Special Session on Partial Differential Equations and Applications, III

8:00 AM – 10:50 AM

Organizers: **Xin Lu**, University of North Carolina at Wilmington
Yan-Wei Qi, University of California Santa Barbara
Weiqing Xie, California State Polytech University
Hong-Ming Yin, Washington State University

- 8:00AM *On a class of nonlinear nonclassical parabolic equations.*
(848) **John R. Cannon** and **Mohamed Salman***, University of Central Florida (993-35-565)
- 8:30AM *Maximal nonnegative constraint-preserving boundary conditions for the linearized Einstein equations.*
(849) **Nicolae Tarfulea**, University of Minnesota (993-83-669)
- 9:00AM *The weak asymptotics method. Interaction of shocks in gases.*
(850) **Ruben F. Espinoza**, **Martin G. Garcia** and **Georgii A. Omel'yanov***, Universidad de Sonora, Mexico (993-35-879)
- 9:30AM *$L_2(S^n)$ error estimates for Galerkin method for elliptic PDEs on spheres.* Preliminary report.
(851) **Quoc Le Gia**, Texas A&M University (993-35-1138)
- 10:00AM *Uniform regularity estimate for the linear elasticity system in convex polygonal domains.*
(852) **Bacuta Constantin***, Penn State University, and **James H. Bramble**, Texas A&M University, Cornell University (993-65-1394)
- 10:30AM *Understanding the transition between quasi-static and fully dynamic interfaces through Renormalization.*
(853) **Huseyin Merdan*** and **Gunduz Caginalp**, University of Pittsburgh (993-82-1580)

AMS Special Session on Continued Fractions, I

8:00 AM – 10:50 AM

- Organizers: **James G. McLaughlin**, Trinity College
Nancy J. Wyshinski, Trinity College
- 8:00AM *A Survey on q -Continued Fractions in Ramanujan's Lost Notebook.*
(854) **Bruce C. Berndt**, University of Illinois at Urbana-Champaign (993-11-1119)
- 9:00AM *A Moment Problem and a Family of Integral Evaluations.*
(855) **Mourad E.H. Ismail**, University of Central Florida (993-33-1575)
- 9:30AM *Simultaneous diophantine approximation in the vector space $\mathbb{Q} + \mathbb{Q}\alpha$.*
▶ (856) **Edward B Burger**, Williams College (993-11-755)

- 10:00AM *Systems of orthogonal polynomials arising from the modular j -function.* (857)
Stephanie Basha, Santa Clara University, **Jayce Robert Getz***, Harvard, **Harris Nover**, California Institute of Technology, and **Emma Smith**, Massachusetts Institute of Technology (993-11-777)
- 10:30AM *A Two-Dimensional Minkowski Question Mark Function.* (858)
Olga R. Beaver and **Thomas Garrity***, Williams (993-11-1075)

AMS Special Session on Topological Dynamics and Ergodic Theory, III

8:00 AM – 10:50 AM

Organizers: **Alica Miller**, University of Illinois at Urbana-Champaign
Joseph Rosenblatt, University of Illinois at Urbana-Champaign

- 8:00AM *Generic behavior in positive entropy.* (859)
Daniel J Rudolph, University of Maryland (993-37-1200)
- 9:00AM *Absolutely rhythmic and IP recurrent sequences.* Preliminary report. (860)
Randall G McCutcheon, University of Memphis (993-37-1659)
- 9:30AM *Simple spectrum, finite rank, and rotations in \mathbb{Z}^d .* Preliminary report. (861)
E. Arthur Robinson, Jr., George Washington University, and **Ayse A. Sahin***, DePaul University (993-37-1570)
- 10:00AM *Variation inequalities and convergence of non-standard ergodic averages.* Preliminary report. (862)
Roger L Jones, DePaul University (993-37-854)
- 10:30AM *Collapsed indecomposable continua in area preserving two dimensional dynamical systems.* Preliminary report. (863)
Judy A Kennedy, University of Delaware (993-37-1251)

AMS Special Session on Fixed Points: Theory and Application, II

8:00 AM – 10:50 AM

Organizers: **Robert F. Brown**, University of California Los Angeles
Mark S. Burgin, University of California Los Angeles

- 8:00AM *Axiomatizing the regular words.* Preliminary report. (864)
Stephen L Bloom*, Stevens Institute of Technology, and **Zoltán Ésik**, University of Szeged (993-68-337)
- 8:30AM *Equational properties of fixed points.* (865)
Zoltan Esik, Dept. of Computer Science, University of Szeged (993-68-692)
- 9:00AM *Fixed-Point Theory in the Semantics of Logic Programming.* (866)
Anthony K. Seda, University College Cork (993-54-732)
- 9:30AM *Computational Complexity and Optimal Algorithms for Fixed Points.* (867)
Christopher Sikorski, School of Computing, University of Utah (993-68-701)
- 10:00AM *Fixed Points in Fuzzy Dynamical Systems.* (868)
Mark Burgin*, UCLA, and **Juan Nieto**, Universidad de Santiago de Compostela (993-37-570)

- 10:30AM *Ruin Probabilities and Stationary Distributions.* Preliminary report. (869)
Alan Krinik, California State Polytechnic, University (993-60-558)

AMS Special Session on Nonlinear Partial Differential Equations and Variational Problems, I

8:00 AM – 10:50 AM

Organizers: **David A. Hartenstine**, University of Utah
Ahmed Mohammed, Ball State University
John M. Neuberger, Northern Arizona State University
John W. Neuberger, University of North Texas

- 8:00AM *On a Class of Resonant Schrodinger Equations.* (870)
David G Costa, University of Nevada Las Vegas (993-35-881)
- 8:30AM *Fully Nonlinear Equations with Time-measurable Coefficients.* (871)
Jay J Kovats, Florida Institute of Technology (993-35-861)
- 9:00AM *Symmetry and related problems for elliptic and parabolic pde.* Preliminary report. (872)
John L Lewis, University of Kentucky (993-35-712)
- 9:30AM *Remarks On Sobolev Gradients.* (873)
Nicholas D Alikakos, University of North Texas (993-35-1574)
- 10:00AM *Nonlinear Elliptic Difference Equations on Graphs.* Preliminary report. (874)
John M. Neuberger, Northern Arizona University (993-35-1648)
- 10:30AM *Surfaces of Continua for Quasilinear Elliptic Equations.* Preliminary report. (875)
Jon Jacobsen, Harvey Mudd College (993-35-1361)

AMS Special Session on Low-Dimensional Topology, I

8:00 AM – 10:50 AM

Organizer: **Tim D. Cochran**, Rice University

8:00AM *Deformation of homotopy into isotopy in oriented 3-manifolds.* Preliminary report. (876)
Uwe Kaiser, Boise State University (993-57-1179)

8:30AM *Non-universality of topological symmetry groups.* Preliminary report. (877)
Erica L Flapan*, Pomona College, **Ramin Naimi**, Occidental College, **James Pommersheim**, Pomona College, and **Harry Tamvakis**, Brandeis University (993-57-956)

9:00AM *Mahler measure of Alexander polynomials and Lehmer's question.* Preliminary report. (878)
Daniel S Silver* and **Susan G Williams**, University of South Alabama (993-57-1284)

9:30AM *Uniform 1-Cochains and Genuine Laminations.* (879)
Baris Coskunuzer, Princeton University (993-57-299)

10:00AM *Knot complements covered by great circle link complements.* (880)
Genevieve Walsh, University of Texas at Austin (993-57-1204)

10:30AM *Essential surfaces in 3-manifolds which fiber over the circle.* (881)
Liz Klodginski, UC Davis (993-57-1207)

AMS Session on Operator Theory

8:00 AM – 10:10 AM

- 8:00AM *Bellman functions - what are they, and how do we use them?*
(882) **Janine Wittwer**, Williams College (993-47-122)
- 8:15AM *A criterion for weak k -hyponormality.* Preliminary report.
(883) **George R. Exner***, Bucknell University, **Il Bong Jung** and **Sang Soo Park**, Kyungpook University (993-47-650)
- 8:30AM *Targeted Frames and Decomposition of Positive Operators.*
(884) **Keri Kornelson*** and **David Larson**, Texas A&M University (993-47-937)
- 8:45AM *Circular Symmetry of Spectra of Composition Operators.*
(885) **Sivaram K Narayan**, Central Michigan University, and **Dawn E. Sadir***, Albion College (993-47-144)
- 9:00AM *On the Existence of solutions of Variational Inequalities in Banach Spaces.* Preliminary report.
(886) **Jinlu Li**, Shawnee State University (993-47-475)
- 9:15AM *About some generalizations of hyperbolic A -properness.*
(887) **Dan D. Pascali**, Courant Institute, New York University (993-47-1149)
- 9:30AM *The geometric mean in Banach $*$ -algebras.* Preliminary report.
▶ (888) **Bao Qi Feng**, Kent State University, Tuscarawas Campus (993-47-769)
- 9:45AM *C^* -algebra of The \mathbb{Z}^2 -tree.*
(889) **Menassie Ephrem***, Coastal Carolina University, and **Jack Spielberg**, Arizona State University (993-47-926)
- 10:00AM *Minimal Bratteli diagrams and dimension groups of AF C^* -algebras.*
(890) **Ryan J. Zerr**, University of North Dakota (993-47-757)

AMS Session on Statistics

8:00 AM – 9:55 AM

- 8:00AM *Assessing Occupational Exposure Via the One-way Random Effects Model.*
(891) **Kalimuthu Krishnamoorthy** and **Huizhen Guo***, University of Louisiana at Lafayette (993-62-383)
- 8:15AM *Detection of Changes in the arrival rates of a Poisson Process.*
(892) **Marlo Kay Brown**, SUNY Binghamton (993-62-976)
- 8:30AM *Estimating linear functionals of indirectly observed input functions.* Preliminary report.
(893) **C Klaassen**, University of Amsterdam, **Eun-Joo Lee*** and **Frits H Ruymgaart**, Texas Tech University (993-62-950)
- 8:45AM *On the Chernoff bound for efficiency of quantum hypothesis testing.*
(894) **Vladislav Karguine**, Cornerstone Research (993-62-373)
- 9:00AM *On Some Selection Problems with Applications to Lifetime Data.*
▶ (895) **Thomas T. John***, Syracuse University, and **Pinyuen Chen**, Department of Mathematics, Syracuse University (993-62-1550)
- 9:15AM *Estimating the Conditional Distribution Function.*
(896) **Rod Freed**, California State University at Dominguez Hills, and **Senem Alkan***, Bucci University (993-62-1096)

- 9:30AM *Comparing Two Methods of Handling Tied Event Times.* Preliminary report.
▶ (897) **Mouchumi Bhattacharyya**, University of the Pacific (993-62-1669)
- 9:45AM *Simulation Study of the Small Sample Properties of Maximum Likelihood Estimators in an Accelerated Failure Time Model with Censored Observations.*
(898) **Mahmoud A Yousef***, Central Missouri State University, and **Raja Nassar**, LA Tech University (993-62-1363)

MAA Session on Statistics Education Discourse on Inference

8:00 AM – 10:55 AM

- Organizers: **John D. McKenzie, Jr.**, Babson College
Carolyn K. Cuff, Westminster College
- 8:00AM *Why Do We Check Assumptions for Inference?*
▶ (899) **Allan J. Rossman*** and **Beth L. Chance**, Cal Poly - San Luis Obispo (993-N1-407)
- 8:15AM *Developing an Understanding of Confidence Intervals for Proportions.*
(900) **Daniel J Teague**, NC School of Science and Mathematics (993-N1-744)
- 8:30AM *Order Statistics, Uniform Distributions, and Confidence Intervals.*
▶ (901) **Michael I Ratliff**, Northern Arizona University (993-N1-560)
- 8:45AM *Question based presentation of inferential methods.*
▶ (902) **Michael D Landrigan**, Idaho State University (993-N1-548)
- 9:00AM *What does a P-value mean?*
(903) **Patricia B Humphrey**, Georgia Southern University (993-N1-544)
- 9:15AM *Hands-on experiments in inferential statistics.* Preliminary report.
▶ (904) **Mohammad Salmassi**, Framingham State College (993-N1-491)
- 9:30AM *Using Simulations to Teach the Meaning of the P-Value.*
▶ (905) **Murray H. Siegel**, Sam Houston State University (993-N1-28)
- 9:45AM *Using Visual Tools in the Teaching of Hypothesis Testing.*
(906) **Christopher J. Lacke**, Rowan University (993-N1-392)
- 10:00AM *Using Simulations, Permutations and Randomizations to Help Students Understand P-values.* Preliminary report.
▶ (907) **Robin H Lock**, St. Lawrence University (993-N1-502)
- 10:15AM *Teaching Statistical Inference to In-service Middle School Teachers : Methodologies, Activities, and Projects.* Preliminary report.
▶ (908) **Barbara A Wainwright**, Salisbury University (993-N1-559)
- 10:30AM *An Interdisciplinary Approach to Teaching Statistics to Undergraduate Life Science Majors Provides Numerous Opportunities for Data Analysis Projects Involving Inference.*
▶ (909) **Deborah Lurie***, **James Watrous**, Saint Joseph's University, and **DeniseMarie Ratterman**, Saint Joseph's University (993-N1-266)
- 10:45AM *Hypothesis Test Selection: A Practical Method.* Preliminary report.
▶ (910) **Sue B Schou**, Idaho State University (993-N1-32)

MAA Session on Math and the Arts, II

8:00 AM – 10:55 AM

Organizers: **Ann Robertson**, Connecticut College
John M. Sullivan, University of Illinois, Urbana
Reza Sarhangi, Towson University
Nathaniel A. Friedman, State University of New York, Albany

- 8:00AM *Visualizing Mathematics through Digital Photography*. Preliminary report.
 ▶ (911) **Marcia Birken**, Rochester Institute of Technology (993-01-481)
- 8:20AM *Vectors, Computer Art and Toy Story*.
 ▶ (912) **Timothy P. Chartier**, Davidson College (993-01-929)
- 8:40AM *Computational Aesthetics: Mathematical Methods for Evaluating Art*.
 ▶ (913) **Gary R. Greenfield**, University of Richmond (993-01-840)
- 8:55AM Break
- 9:20AM *Recursion in Nature, Mathematics and Art*. Preliminary report.
 ▶ (914) **Anne M. Burns**, Long Island University, C.W. Post Campus (993-01-657)
- 9:40AM *Dahlia Flowers in Art, Nature, and Mathematics*. Preliminary report.
 ▶ (915) **Gwen Laura Fisher**, Cal Poly State University, San Luis Obispo (993-01-274)
- 10:00AM *Tilings & Quilts*.
 ▶ (916) **Mary Candace Williams**, Pima Community College (993-01-848)
- 10:20AM *Myriad of Mosaics*.
 ▶ (917) **Maria K Robinson**, Seattle University (993-01-1385)
- 10:40AM *Discovery or Creation?: Mathematical Platonism and the Visual Arts*.
 ▶ (918) **Mark D. Schlatter**, Centenary College of Louisiana (993-01-368)

MAA Session on Applications of Mathematics in Computer Science

8:00 AM – 10:55 AM

Organizer: **William A. Marion**, Valparaiso University

- 8:00AM *An Application of Binomial Trees for Pricing a Stock Option*.
 ▶ (919) **Daniel Birmajer**, Nazareth College (993-P1-736)
- 8:15AM *Programming to Complete Magic Squares*. Preliminary report.
 ▶ (920) **N. R. Nandakumar***, Delaware State University, and **Michael J. Bosse**, Morgan State University (993-P1-323)
- 8:30AM *Check Digits and Error Correction*. Preliminary report.
 ▶ (921) **Lew Ludwig**, Denison University (993-P1-291)
- 8:45AM *From Cyclic Sums to Projective Planes*.
 ▶ (922) **Roger E. Zarnowski**, Angelo State University (993-P1-808)
- 9:00AM *A Catalan Project in Discrete Mathematics*.
 ▶ (923) **Brian Hopkins**, Saint Peter's College (993-P1-869)
- 9:15AM *An Analytic Approach to a Tic-Tac-Toe Program*. Preliminary report.
 ▶ (924) **John Gately**, Roosevelt University (993-P1-979)

- 9:30AM *Mapping a 1-to-1 Correspondence Between N and Q Using Imbedded Loops, Conditionals, and Arrays*. Preliminary report.
 ▶ (925) **N. R. Nandakumar***, Delaware State University, and **Michael J. Bosse**, Morgan State University (993-P1-324)

- 9:45AM *One Time Pad Encryption*.
 ▶ (926) **Robert P. Webber**, Longwood University (993-P1-91)

- 10:00AM *A Programming Pearl*.
 ▶ (927) **Arnold Lebow**, Yeshiva University (993-P1-786)

- 10:15AM *"Magic Numbers" Approach to Introducing Binary Number Representation in Introductory Computer Science Courses*.
 ▶ (928) **Gerald W. Kruse**, Juniata College (993-P1-667)

- 10:30AM *Understanding the Magic: Teaching Cryptography with Just the Right Amount of Mathematics*.
 ▶ (929) **Joshua Holden**, Rose-Hulman Institute of Technology (993-P1-247)

- 10:45AM *The Perfect Shuffle: Mathematical Apologetics*. Preliminary report.
 ▶ (930) **David J Hunter**, Westmont College (993-P1-806)

MAA Session on Mathematics Experiences in Business, Industry, and Government

8:00 AM – 10:35 AM

Organizers: **Philip E. Gustafson**, Mesa State College
Michael G. Monticino, University of North Texas

- 8:10AM *Mathematics and Materials-Stretching Hooke's Law*.
 ▶ (931) **Stanley J Russell***, Motorola (Retired), and **Frank J Attanucci**, Scottsdale Community College (993-Q1-21)

- 8:25AM *Mathematical Models in Transportation Planning and Traffic Operations*.
 ▶ (932) **Donald A. Sokol**, Lisle, Illinois (993-Q1-136)

- 8:40AM *Developing and Validating a Metric for the Hiring of Fee Based Practitioners for the United States Military Entrance Processing Command*. Preliminary report.
 ▶ (933) **Randy E White*** and **Edgar K Rugenstein**, United States Military Academy (993-Q1-241)

- 8:55AM *Designing a Robust Range Imaging System*.
 (934) **Nathan D Cahill***, **Lawrence A Ray** and **Joseph F Revelli**, Eastman Kodak Company (993-Q1-1592)

- 9:10AM *PSL Preservers and Barker Codes of Odd Length*.
 ▶ (935) **Gregory Emmett Coxson**, Lockheed Martin Naval Electronic and Surveillance (993-Q1-30)

- 9:25AM *A Leg in Both Worlds: Consulting in Academics*.
 ▶ (936) **Michael G Monticino**, University of North Texas (993-Q1-1313)

- 9:40AM *Industry Problems That Require Concepts Rather Than Technical Detail*. Preliminary report.
 ▶ (937) **Richard J Cleary**, Bentley College (993-Q1-336)

- 9:55AM *Development of a Mathematics Course for Biotechnology through an Industrial Externship*.
 ▶ (938) **Kenneth M. Levasseur**, UMass Lowell (993-Q1-98)

- 10:10AM *Mathematics in the Hedge Funds Arena*.
 ▶ (939) **Ranjan Bhaduri**, Northwater Capital Management Inc. (993-Q1-1113)

- 10:25AM *The Life and Death of a Silicon Valley Startup Company*. Preliminary report.
 ▶ (940) **Mark Stamp**, San Jose State University (993-Q1-1660)

MAA General Contributed Paper Session, V

8:00 AM – 10:40 AM

Organizers: **Laura J. Wallace**, California State University, San Bernardino
Jacqueline A. Jensen, Sam Houston State University
Gary W. Towsley, SUNY at Geneseo
Michael A. Jones, Montclair State University
Shawnee L. McMurrin, California State University at San Bernardino

- 8:00AM *Encouraging Artistic Expression via Mathematical Exploration in the Core Curriculum.*
▶ (941) **John C Nardo**, Oglethorpe University (993-Z1-445)
- 8:15AM *Linking Art, Geometry, and Calculus.*
▶ (942) **Ruth G. Favro*** and **David E. Bindschadler**, Lawrence Technological University (993-Z1-1319)
- 8:30AM *The Effects of Using Notebook Computers (MS Excel) in an Undergraduate Business Calculus Course.* Preliminary report.
▶ (943) **Stephanie P. Edwards*** and **Clarre Johnston**, University of Dayton (993-Z1-379)
- 8:45AM *Finding and Using Pre-Calculus Learning Objects.* Preliminary report.
(944) **Robert H Hoar** and **Jeff S. Baggett***, University of Wisconsin – La Crosse (993-Z1-1631)
- 9:00AM *Modeling in Elementary Calculus.* Preliminary report.
▶ (945) **Thomas C Craven**, University of Hawaii (993-Z1-474)
- 9:15AM *Circular Inversion with Geometer's Sketchpad.* Preliminary report.
▶ (946) **Colin L Starr**, Willamette University (993-Z1-219)
- 9:30AM Break.
- 9:45AM *Tracking student success in an integrated calculus/precalculus course.*
(947) **Laura A Taelman**, James Madison University (993-Z1-451)
- 10:00AM *An Upper-Division Geometry Course Designed around the NCTM Standards.* Preliminary report.
▶ (948) **Robert Talbert**, Franklin College (993-Z1-339)
- 10:15AM *Making Geometry Come Alive with The Geometer's Sketchpad.*
▶ (949) **Dawn R Slavens**, Midwestern State University (993-Z1-595)
- 10:30AM *DIP-Based Projects for Linear Algebra.*
▶ (950) **Mohamed Allali**, Chapman University (993-Z1-398)

PME Council

8:00 AM – 11:00 AM

AMS-MAA Special Session on History of Mathematics, I

8:30 AM – 10:50 AM

Organizers: **Joseph W. Dauben**, Lehman College (CUNY)
Karen V. H. Parshall, University of Virginia
David E. Zitarelli, Temple University

8:30AM *Analytic Geometry: Descartes versus Fermat.*
▶ (951) **Maria Sol de Mora**, ICREA, Barcelona (993-01-310)

9:00AM *The Brachistochrone Problem and its Sequels.*
(952) **Rüdiger Thiele**, University of Leipzig (993-01-627)

- 9:30AM *Is the English Version of the Theory of Incommensurability Commensurable with Its Chinese Translation?*
▶ (953) **Yibao Xu**, CUNY, Graduate Center & BMCC (993-01-694)
- 10:00AM *Science in Translation: The Transmission of Probability Theory into late Imperial Chinese Mathematical Culture (1880-1911).*
(954) **Andrea Eberhard-Bréard**, CUNY Graduate Center (New York) / CNRS (Paris) (993-01-583)
- 10:30AM *"Everybody makes errors": The intersection of De Morgan's logic and probability, 1837-1847.*
▶ (955) **Adrian Rice**, Randolph-Macon College (993-01-205)

AMS Invited Address

9:00 AM – 9:50 AM

- (956) *Almost every observation, a mathematical theory of measurement.*
James A. Yorke, University of Maryland (993-37-05)

ASL Invited Address

9:00 AM – 9:50 AM

- (957) *The proof-theoretic strength of some combinatorial principles.*
Steffen Lempp, University of Wisconsin

MAA Minicourse #12: Part B

9:00 AM – 11:00 AM

Incorporating discrete mathematics in the preparation of K-12 mathematics teachers
Organizer: **Lolina Alvarez**, New Mexico State University

MAA Minicourse #1: Part B

9:00 AM – 11:00 AM

Designing and evaluating assessments for introductory statistics.
Organizers: **Beth L. Chance**, California Polytech State University, San Luis Obispo
Robert C. Delmas, University of Minnesota
Allan J. Rossman, California Polytech State University, San Luis Obispo

MAA Minicourse #7: Part B

9:00 AM – 11:00 AM

Origami in undergraduate mathematics courses.
Organizer: **Thomas C. Hull**, Merrimack College

MAA Special Presentation

9:00 AM – 11:00 AM

Mathematics for business decisions (repeated from 1:00 p.m. to 3:00 p.m. and 5:00 p.m. to 7:00 p.m., Friday).
Organizers: **Richard B. Thompson**, University of Arizona
Christopher Lamoureux, University of Arizona

MAA Poster Session on Projects Supported by the NSF

9:00 AM – 11:00 AM

*Assessment of student learning in undergraduate mathematics: Works in progress.*Organizers: **William E. Haver**, Virginia Commonwealth University
Bernard L. Madison, University of Arkansas**MAA Project NExT Panel Discussion**

9:00 AM – 10:30 AM

*Writing expository mathematics.*Organizers: **Jed Herman**, University of Wisconsin at Stevens Point**Jennifer Hontz**, Meredith College**George W. Moss**, University of Virginia's College at WisePanelists: **Lowell W. Beineke**, Indiana University-Purdue**Ezra Brown**, Virginia Tech**Frank A. Farris**, Santa Clara University**Underwood Dudley**, DePaul University**Keith J. Devlin**, Stanford University**MAA Special Presentation**

9:00 AM – 10:20 AM

*Proposal writing workshop for grant applications to the NSF division of undergraduate education.*Organizers: **Elizabeth J. Teles**, NSF Division of Undergraduate Education**Calvin L. Williams**, NSF Division of Undergraduate Education**Lee L. Zia**, NSF Division of Undergraduate Education**MAA Panel Discussion**

9:00 AM – 10:20 AM

*Preparing mathematicians to educate teachers.*Organizers: **Alan C. Tucker**, SUNY at Stony Brook**Bernard L. Madison**, University of Arkansas at FayettevillePanelists: **Ed Dubinsky**, Cincinnati, Ohio**Alan C. Tucker**, SUNY at Stony Brook**Exhibits and Book Sales**

9:30 AM – 5:30 PM

Mathematical Art Exhibit

9:30 AM – 5:30 PM

Organizers: **Robert Fathauer**, Tessellations Company, Phoenix, Arizona**Nat Friedman**, ISAMA, SUNY at Albany**Reza Sarhangi**, Bridges Conference, Towson University**ASL Invited Address**

10:00 AM – 10:50 AM

(958) *On theories of modules of fields with endomorphisms.***Francoise M. Point**, University of Mons-Hainaut**AMS Special Presentation**

10:00 AM – 11:00 AM

*Who wants to be a mathematician?*Organizers: **Michael A. Breen**, AMS**Annette W. Emerson**, AMS**William T. Butterworth**, Barat College of DePaul University**Math on the Web**

10:00 AM – 5:30 PM

*Go to the Math on the Web Pavilion for the complete schedule of presentations.***AMS Invited Address**

10:05 AM – 10:55 AM

(959) *Random planar curves and conformal invariance.***Gregory F. Lawler**, Cornell University (993-60-11)**AMS-MAA Invited Address**

11:10 AM – NOON

(960) *Mathematical challenges in molecular biology.***Bonnie Berger**, Massachusetts Institute of Technology (993-92-03)**AMS Colloquium Lectures: Lecture III**

1:00 PM – 2:00 PM

(961) *Conformal invariants and partial differential equations. Part III.***Sun-Yang Alice Chang**, Princeton University (993-53-10)**ASL Invited Address**

1:00 PM – 1:50 PM

(962) *Cofinal types of topological directed orders.***Slawomir Solecki**, University of Illinois Urbana**MAA Student Lecture**

1:00 PM – 1:50 PM

▶ (963) *Fractal Calculus Project.***Mark M Meerschaert**, University of Nevada (993-A0-532)**AMS-MAA Special Session on Mathematical Techniques in Musical Analysis, II**

1:00 PM – 5:50 PM

Organizers: **Judith L. Baxter**, University of Illinois at Chicago**Robert W. Peck**, Louisiana State University

- 1:00PM *Filtered Point Symmetry and Dynamical Voice-Leading*. Preliminary report.
 ▶ (964) **Jack Douthett***, TVI Community College, and **Richard Plotkin**, University of Chicago (993-37-632)
- 1:30PM *Spirlz*. Preliminary report.
 ▶ (965) **Stephen Soderberg**, Library of Congress (993-00-1310)
- 2:00PM *Classification Schemes of Global Musical Compositions and Grothendieck Topoi*.
 (966) **Guerino B. Mazzola**, CS Department, University of Zurich (993-18-85)
- 2:30PM *A computer-aided exploration of the transformational process in Xenakis' Nomos Alpha*.
 (967) **Moreno Andreatta**, Ircam-Cnrs (993-20-1108)
- 3:00PM *Tone System and Mental Process*. Preliminary report.
 (968) **Thomas Noll**, Technical University of Berlin (993-51-1485)
- 3:30PM *Pitch-Class Isometries*. Preliminary report.
 ▶ (969) **Robert W. Peck**, Louisiana State University (993-55-899)
- 4:00PM *Pitch combinatoriality in gapped spaces*.
 ▶ (970) **Jon Wild**, Harvard University (993-00-1397)
- 4:30PM *Statistical Aspects of John Cage's Etudes Australes*. Preliminary report.
 ▶ (971) **Murray Bremner*** and **Mik Bickis**, University of Saskatchewan (993-62-236)
- 5:00PM *A Mathematical Model describing the Metricity of Musical Pieces*.
 ▶ (972) **Anja Volk**, DJE Department of Industrial and Systems Engineering (993-92-1590)
- 5:30PM Discussion.

AMS-MAA Special Session on History of Mathematics, II

1:00 PM – 3:50 PM

Organizers: **Joseph W. Dauben**, Lehman College (CUNY)
Karen V. H. Parshall, University of Virginia
David E. Zitarelli, Temple University

- 1:00PM *Conceptions of General Analysis in Nineteenth-Century Mathematics*. Preliminary report.
 ▶ (973) **Craig G Fraser**, University of Toronto (993-01-226)
- 1:30PM *Creating a Mathematical Area: The Case of Arthur Cayley, J. J. Sylvester, and Invariant Theory*.
 ▶ (974) **Karen V. H. Parshall**, University of Virginia (993-01-734)
- 2:00PM *On Weierstrass' theory of analytic functions*.
 (975) **Umberto Bottazzini**, Università di Palermo, Italy (993-01-615)
- 2:30PM *Jules Tannery and the Mathematical Research Community in France, 1870–1914*. Preliminary report.
 ▶ (976) **W Thomas Archibald**, Acadia University (993-01-221)
- 3:00PM *"Some unsolved problems of theoretical dynamics". An unpublished paper by George Birkhoff*. Preliminary report.
 (977) **June E Barrow-Green**, Open University, UK (993-01-597)
- 3:30PM *Who invented Steiner triple systems – and why?*
 ▶ (978) **Robin J. Wilson**, Open University, UK (993-01-352)

AMS-SIAM Special Session on Mathematical Modeling in Neuroscience, Biomedicine, Genetics, and Epidemiology, III

1:00 PM – 5:50 PM

Organizers: **Steven M. Baer**, Arizona State University
Ivo D. Dinov, University of California Los Angeles
Frank C. Hoppensteadt, Arizona State University
Hal L. Smith, Arizona State University

- 1:00PM *Modelling the spatio-temporal dynamics of nuclear proteins*. Preliminary report.
 ▶ (979) **Gerda de Vries**, University of Alberta (993-92-1666)
- 1:30PM *A double epidemic model for the SARS propagation*.
 ▶ (980) **Tuen Wai Ng***, The University of Hong Kong, **Gabriel Turinici**, Inria Rocquencourt Domaine de Voluceau, Rocquencou, and **Antoine Danchin**, Génétique des Génomés Bactériens, Institut Pasteur (993-92-542)
- 2:00PM *Global Kinetic Imaging for Fluoro-Deoxy-Glucose with Positron Emission Tomography*.
 (981) **Cristina Negoita*** and **Rosemary A Renaut**, Arizona State University (993-92-1067)
- 2:30PM *Improving the Accuracy of Segmentation Algorithms for Magnetic Resonance Imaging*.
 ▶ (982) **Rick Archibald***, The Center for System Science and Engineering Rese, **Kewei Chen**, Arizona Center for Alzheimer's Disease Research, **Anne Gelb** and **Rosemary Renaut**, Arizona State University (993-65-480)
- 3:00PM *Feature Selection as a Precursor to Modeling in High-Dimensional Scientific Discovery*.
 (983) **David A Peterson***, **Charles W Anderson**, **Michael J Kirby** and **Michael H Thaut**, Colorado State University (993-68-1341)
- 3:30PM *Modeling mixed microbial growth: Connecting theory and experiment*. Preliminary report.
 ▶ (984) **Sergei S Pilyugin***, University of Florida, **Gregory T Reeves**, Princeton University, and **Atul Narang**, University of Florida (993-92-1162)
- 4:00PM *Dynamic Behavior of a Delay-Differential Equation Model for the Hormonal Regulation of the Menstrual Cycle*.
 (985) **Leona Harris Clark***, US Environmental Protection Agency, **Paul M Schlosser**, CIIT Centers for Health Research, and **James F Selgrade**, North Carolina State University (993-92-974)
- 4:30PM *Sports-related concussion: An application of functional magnetic resonance imaging*.
 ▶ (986) **William Eddy**, Carnegie Mellon University (993-92-887)
- 5:00PM *Two-dimensional finite element analysis to assess flow characteristics of an in vitro aneurysm model*.
 (987) **Dawn A Lott***, **Michael Siegel**, **Hans R Chaudhry**, New Jersey Institute of Technology, and **Charles J Prestigiacomo**, New Jersey Medical School (993-76-624)
- 5:30PM *Singular Vectors and Protein Motifs in Mathematical Phylogeny*.
 (988) **Jeffery J. Leader***, Rose-Hulman Inst. of Tech., and **Gary W. Stuart**, Indiana State University (993-92-1421)

AMS-SIAM Special Session on Classical and Nonlinear Special Functions, II

1:00 PM – 5:50 PM

Organizers: **Peter A. Clarkson**, University of Kent
Francisco Marcellan, Universidad Carlos III
Peter A. McCoy, U. S. Naval Academy

- 1:00PM *The Painlevé property: a Riemann-Hilbert approach.* (989) **Percy A Deift**, Courant Institute, NYU (993-34-1175)
- 1:30PM *Sequence of distribution functions involving Painlevé II.* (990) **Jinho Baik**, University of Michigan (993-60-829)
- 2:00PM *Rational Solutions of the Painlevé Equations and Associated Special Polynomials.* (991) **Peter A Clarkson**, University of Kent (993-34-596)
- 2:30PM *Painlevé Transcendents and Random matrices.* (992) **Alexander R Its**, Indiana University Purdue University Indianapolis (993-33-856)
- 3:00PM *Justification of the Existence of a Group of Asymptotics of the General Fifth Painlevé Transcendent.* (993) **Youmin Lu***, Bloomsburg University, and **Zhoude Shao**, Millersville University (993-34-1249)
- 3:30PM *Accurate calculation of Mathieu functions with an application to acoustic radiation from elliptic cylinders.* (994) **Arnie Lee Van Buren*** and **Jeffrey E Boisvert**, Naval Undersea Warfare Center (993-33-668)
- 4:00PM *Digital Library of Mathematical Functions: A Project Report.* (995) **Daniel W Lozier**, National Institute of Standards and Technology (993-33-1146)
- 4:30PM *The Ince equation.* (996) **Hans W Volkmer**, University of Wisconsin-Milwaukee (993-33-715)
- 5:00PM *A New Asymptotic Series for the Gamma Function and Improved Stirling Formula Estimates.* (997) **Xiquan Shi*** and **Fengshan Liu**, Delaware State University (993-33-279)
- 5:30PM *The Role of Orthogonal Polynomials in the Analysis of Laser Propagation.* Preliminary report. (998) **Reza Malek-Madani** and **Peter A. McCoy***, U.S. Naval Academy (993-33-986)

AMS-AWM Special Session on Coding, Geometry, and Hyperbolic Dynamics, III

1:00 PM – 5:50 PM

Organizers: **Svetlana R. Katok**, The Pennsylvania State University
Boris Hasselblatt, Tufts University

- 1:00PM *A proof of the Pugh-Shub theorem.* (999) **Keith Burns*** and **Amie Wilkinson**, Northwestern University (993-37-45)
- 1:30PM *Stability of mixing for hyperbolic flows.* (1000) **Michael Field***, University of Houston, **Ian Melbourne**, University of Surrey, and **Andrew Torok**, University of Houston (993-37-411)
- 2:00PM *Absolutely Continuous Invariant Measures for Non-Uniformly Expanding Maps.* Preliminary report. (1001) **Huyi Hu***, Michigan State University, and **Sandro Vaienti**, Centre de Physique Théorique, CNRS (993-37-460)
- 2:30PM *Equilibrium States for Maps of the Interval.* (1002) **Samuel Senti***, IUPUI, and **Yakov Pesin**, The Pennsylvania State University (993-37-436)

3:00PM *Typicality of recurrence for (aperiodic) Lorentz gases.* Preliminary report. (1003) **Marco Lenci**, Stevens Institute of Technology (993-37-584)

- 3:30PM *Modeling a Gas of Hard Non-Spheres.* (1004) **John D Cowan**, Tufts University (993-37-406)
- 4:00PM *A topological model for a perturbed quadratic family.* Preliminary report. (1005) **Robert L Devaney**, Boston University, **Mónica Moreno Rocha***, Tufts University, and **Stefan Siegmund**, Boston University (993-37-1002)
- 4:30PM *Dimension product structure of hyperbolic sets.* (1006) **Boris Hasselblatt***, Tufts University, and **Jörg Schmeling**, Lund Institute of Technology (993-37-626)
- 5:00PM *Smoothness of Linearization Near a Hyperbolic Fixed Point.* (1007) **Misha Guysinsky**, Pennsylvania State University, **Boris Hasselblatt**, Tufts University, and **Victoria Rayskin***, UCLA (993-37-66)
- 5:30PM *Hyperbolicity, Homogeneity, and Labor-Managed Oligopolies.* (1008) **Marek R Rychlik***, University of Arizona, and **Weiye Li**, Los Alamos National Laboratory (993-34-1066)

AMS Special Session on Current Events

1:00 PM – 5:10 PM

Organizer: **David Eisenbud**, Mathematical Sciences Research Institute and University of California Berkeley

- 1:00PM *The Interior-Point Revolution in Optimization: History, Recent Developments, and Lasting Consequences.* (1009) **Margaret H. Wright**, Computer Science Department, Courant Institute of Mathematical Sciences (993-49-1022)
- 2:00PM *What is motivic integration?* (1010) **Thomas C Hales**, University of Pittsburgh (993-14-1309)
- 3:00PM *It is easy to determine whether or not a given integer is prime.* (1011) **Andrew Granville**, Université de Montréal (993-11-695)
- 4:00PM Break
- 4:30PM *Perelman's recent work on the classification of 3-manifolds.* Preliminary report. (1012) **John W Morgan**, Columbia University (993-57-161)

AMS Special Session on Continued Fractions, II

1:00 PM – 5:50 PM

Organizers: **James G. McLaughlin**, Trinity College
Nancy J. Wyshinski, Trinity College

- 1:00PM *Analytic Theory and Application of Continued Fractions, A Survey.* (1013) **William B. Jones**, University of Colorado, Boulder (993-30-1195)
- 2:00PM *Transcendence of continued fractions with bounded partial quotients.* Preliminary report. (1014) **J. Leslie Davison**, Laurentian University (993-11-930)
- 2:30PM *Truncated rational moment problems and quadratures.* Preliminary report. (1015) **Xin Li**, University of Central Florida (993-41-1335)

- 3:00PM *Simultaneous diophantine approximation to successive powers of a real algebraic integer.*
(1016) **Doug Hensley**, Texas A&M University (993-11-1164)
- 3:30PM *Continued Fractions Associated with Solution of a Wave Equation.* Preliminary report.
(1017) **Brian A. Hagler**, University of Texas of the Permian Basin (993-33-849)
- ▶ 4:00PM *An Euler-Minding theorem for G -continued fractions.*
(1018) **Geumlan Choi***, University of Illinois, and **Douglas Bowman**, Northern Illinois University (993-11-1026)
- 4:30PM *On a class of classical polynomials, uniformly approximating the checkmark function.*
(1019) **P D Dragnev***, **D A Legg** and **D W Townsend**, Indiana-Purdue University (993-41-1073)
- 5:00PM *The Many Vistas of Continued Fractions.*
(1020) **Richard A Mollin**, University of Calgary (993-11-756)
- 5:30PM *Applications of Brooks's Continued Fraction Parameter to Riemann Surfaces and QC Maps.*
(1021) **G Brock Williams**, Texas Tech University (993-30-111)

AMS Special Session on Modern Function Theory, I

1:00 PM – 5:50 PM

Organizers: **Beth Schaubroeck**, U. S. Air Force Academy
Peter L. Duren, University of Michigan, Ann Arbor
John A. Pfaltzgraff, University of North Carolina at Chapel Hill

- 1:00PM *Trajectories of quadratic differentials on algebraic Riemann surfaces and Hermite-Pade approximants.*
(1022) **Alexander I. Aptekarev**, Keldysh Institute of Applied Mathematics, Moscow, Russia (993-30-775)
- 2:00PM *Strong asymptotics for Jacobi polynomials with varying nonstandard parameters.*
(1023) **A.B.J. Kuijlaars**, Katholieke Universiteit Leuven, and **A. Martinez-Finkelshtein***, University of Almería (993-33-832)
- 3:00PM *Semiclassical Asymptotics for General Orthogonal Polynomials with Discrete Weights.*
(1024) **Jinho Baik**, University of Michigan, **Thomas Kriecherbauer**, Ruhr-Universitaet, Bochum, **Kenneth McLaughlin**, University of North Carolina, and **Peter Miller***, University of Michigan (993-41-1533)
- 3:30PM *Random growth models and Riemann-Hilbert problems.*
(1025) **Jinho Baik**, University of Michigan (993-60-943)
- 4:00PM *Asymptotic analysis of Random Matrices and Riemann-Hilbert problems.*
(1026) **Kenneth Dean T-R McLaughlin**, University of North Carolina at Chapel Hill (993-60-1615)
- 4:30PM *Construction of weighted biharmonic Green functions.*
(1027) **Rachel J Weir**, University of Virginia (993-30-801)
- 5:00PM *Sampling and Interpolation on Riemann Surfaces.*
(1028) **Alexander P Schuster***, San Francisco State University, and **Dror Varolin**, University of Illinois (993-30-1324)
- 5:30PM *Finite unions of interpolating sequences.*
(1029) Preliminary report.
Daniel H Luecking, University of Arkansas (993-30-1194)

AMS Special Session on Smooth Dynamical Systems and Applications, I

1:00 PM – 5:50 PM

Organizers: **Qiu-dong Wang**, University of Arizona
Maciej P. Wojtkowski, University of Arizona

- ▶ 1:00PM *Transition to chaos in random dynamical systems.*
(1030) **Ying-Cheng Lai**, Arizona State University (993-37-49)
- 1:30PM *The Central Limit Theorem for Non-Gibbsian measures.*
(1031) **Nicolai T A Haydn**, University of Southern California (993-37-1425)
- 2:00PM *Asymptotic behavior of continuity statistic for time series analysis.*
(1032) **Takashi Nishikawa***, Southern Methodist University, **Ying-Cheng Lai**, Arizona State University, and **Louis M. Pecora**, Naval Research Laboratory (993-37-766)
- 2:30PM *Hyperbolic regular polynomial endomorphisms of \mathbb{C}^2 : topology of Julia sets.* Preliminary report.
(1033) **Malgorzata S. Stawiska**, Purdue University (993-32-812)
- 3:00PM *Tube-log Riemann Surfaces.*
(1034) **Ricardo Perez Marco**, UCLA (993-37-1239)
- 3:30PM *Spectrum and Geometric Realization of Pisot Tiling Spaces (preliminary report).* Preliminary report.
(1035) **Jaroslawn M Kwapisz**, Montana State University (993-37-1201)
- 4:00PM *Non-contractible isolating blocks.*
(1036) **George A Kozłowski**, **Krystyna M Kuperberg***, Auburn University, and **Klaudiusz Wojcik**, Jagiellonian University (993-58-1135)
- 4:30PM *Long time asymptotics in averaging.*
(1037) **Dmitry Dolgopyat**, University of Maryland (993-37-784)
- 5:00PM *Remarkable Dynamics of an Overcompensatory Leslie Population Model.* Preliminary report.
(1038) **Howard Weiss*** and **Ilie Ugarcovici**, Penn State University (993-37-949)
- 5:30PM *Singularity confinement and algebraic integrability.*
(1039) **Stephane Lafortune*** and **Alain Goriely**, University of Arizona (993-39-566)

AMS Special Session on Arithmetical Algebraic Geometry, I

1:00 PM – 5:50 PM

Organizers: **Kirti Joshi**, University of Arizona
Minhyong Kim, University of Arizona
Adrian Vasiu, University of Arizona

- 1:00PM *Slopes of the U_p operator acting on overconvergent modular forms.*
(1040) **L J Kilford**, California Institute of Technology (993-11-726)
- 1:30PM *Crystalline cohomology and homotopy theory.*
(1041) **Martin Olsson**, MIT (993-11-684)
- 2:00PM *Vanishing Cycles in Rigid Cohomology.* Preliminary report.
(1042) **Richard M. Crew**, University of Florida (993-14-1187)
- 2:30PM *Overconvergence and the de Rham-Witt complex.* Preliminary report.
(1043) **James M Borger**, University of Chicago (993-14-725)

- 3:00PM *Drinfel'd-Ihara relations for p-adic multi-zeta values.*
(1044) **Sinan Unver**, University of Chicago (993-14-891)
- 3:30PM *The de Rham-Witt complex in mixed characteristic.*
(1045) **Lars Hesselholt**, Massachusetts Institute of Technology (993-14-1529)
- 4:00PM *Tate classes on a product of modular surfaces.*
(1046) Preliminary report.
Andrew H Knightly, University of Rochester (993-11-1247)
- 4:30PM *Pseudo-differential equations connected with p-adic forms and Igusa's local zeta functions.*
(1047) Preliminary report.
W. A. Zuniga, Barry U. (993-14-772)
- 5:00PM *A Geometric Jacquet-Langlands Correspondence.*
(1048) **David F Helm**, Harvard University (993-11-1252)
- 5:30PM *p-adic Lafforgue: a road map.* Preliminary report.
(1049) **Kiran S Kedlaya**, MIT (993-11-353)

Ahmed Mohammed, Ball State University
John M. Neuberger, Northern Arizona State University
John W. Neuberger, University of North Texas

- 1:00PM *Integrability of Blow-up solutions to some non-linear differential equations.* Preliminary report.
(1059) **Michael A. Karls*** and **Ahmed Mohammed**, Ball State University (993-34-568)
- 1:30PM *Harnack Type Inequalities for some Semilinear Elliptic Equations with Critical Sobolev Exponent.*
(1060) **Lei Zhang**, Texas A&M (993-35-811)
- 2:00PM *The IVP for the nonlinear heat equation in weighted Sobolev spaces.*
(1061) **Victor L Shapiro**, University of California at Riverside (993-35-53)
- 2:30PM *Some multiplicity results for asymptotically linear problems in \mathbb{R}^N .*
(1062) **Francois A van Heerden**, Utah State University (993-35-1268)
- 3:00PM *Positive Solutions For A Class Of Elliptic Boundary Value Problems.* Preliminary report.
(1063) **Stephen B. Robinson*** and **Andrew Arndt**, Wake Forest University (993-35-1519)
- 3:30PM *Upper estimates for solutions to superlinear nonsymmetric elliptic boundary value problems.*
(1064) Preliminary report.
Alfonso Castro*, Harvey Mudd College, and **Monica Clapp**, Universidad Nacional Autonoma de Mexico (993-35-1370)
- 4:00PM *Area-minimizing surfaces in 3D polytopes in R^4 , and invariant minimizers in R^n .*
(1065) **Frank Morgan**, Williams College (993-49-154)
- 4:30PM *Continuous Newton's Method and a Nash-Moser Inverse Function Theorem.*
(1066) **J W Neuberger**, University of North Texas (993-35-641)
- 5:00PM *Models for Josephson junctions.*
(1067) **Jacob Rubinstein**, Indiana University (993-35-830)
- 5:30PM *Some recent results concerning ∞ -harmonic functions.*
(1068) **Tilak Bhattacharya**, Bishop's University (993-35-579)

AMS Special Session on Fixed Points: Theory and Application, III

1:00 PM – 5:20 PM

Organizers: **Robert F. Brown**, University of California Los Angeles

Mark S. Burgin, University of California Los Angeles

- 1:00PM *Groupoids and fibered addition and product formulae for Nielsen Numbers.* Preliminary report.
(1050) **Philip R. Heath**, Memorial University of Newfoundland (993-55-546)
- 1:30PM *Lefschetz and Nielsen numbers in Control Theory.*
(1051) **Peter Saveliev**, Marshall University (993-55-186)
- 2:00PM *Homotopy Minimal Periods on Solvmanifolds.*
(1052) **Edward C Keppelmann***, University of Nevada Reno, and **Waclaw Marzantowicz**, A. Mickiewicz U of Poznan (993-57-140)
- 2:30PM *Characterizing Fixed Point Sets in a Given Homotopy Class.*
(1053) **Christina L Soderlund**, UCLA (993-55-106)
- 3:00PM *The Lefschetz-Hopf Theorem and Axioms for the Lefschetz Number.*
(1054) **Martin Arkowitz***, Dartmouth College, and **Robert F Brown**, University of California, Los Angeles (993-55-90)
- 3:30PM *Transfers and Jiang's Nielsen theory for periodic points.* Preliminary report.
(1055) **Daniel Henry Gottlieb**, Purdue (993-55-36)
- 4:00PM *A Type of Nonlinear Vector and Matrix Equations and Their Corresponding Sequences.*
(1056) **Xiquan Shi** and **Fengshan Liu***, Delaware State University (993-15-193)
- 4:30PM *On the preimage $f^{-1}(a)$ of a point.* Preliminary report.
(1057) **Peter N Wong***, Bates College, and **Daciberg L Goncalves**, University of Sao Paulo (993-55-1558)
- 5:00PM *Iteratively Regularized Gauss-Newton-type Algorithm with Simultaneous Updates of Inverse Derivative.*
(1058) **Alexandra Smirnova**, Georgia State University (993-65-1625)

AMS Special Session on Nonlinear Partial Differential Equations and Variational Problems, II

1:00 PM – 5:50 PM

Organizers: **David A. Hartenstine**, University of Utah

AMS Special Session on Low-Dimensional Topology, II

1:00 PM – 5:50 PM

Organizer: **Tim D. Cochran**, Rice University

- 1:00PM *Distance calculations in the curve complex.*
(1069) **John Hempel**, Rice University (993-57-1359)
- 1:30PM *Orderability of certain 3-manifold groups.*
(1070) Preliminary report.
Sergio Fenley, Florida State University, **Rachel Dedwydd Roberts***, **John Shreshian**, Washington University in St Louis, and **Melanie Stein**, Trinity College (993-57-1297)
- 2:00PM *Higher-Order Linking Forms for 3-Manifolds.*
(1071) Preliminary report.
Constance Leidy, Rice University (993-57-988)
- 2:30PM *Singular symplectic forms on 4-manifolds.*
(1072) **Robion C. Kirby***, University of California, Berkeley, and **T. David Gay**, University of Quebec at Montreal (993-57-396)

- 3:00PM *On the Homotopy Classification of 2-Complexes.*
(1073) Preliminary report.
Jens Harlander, Western Kentucky University, and
Jacqueline A Jensen*, Sam Houston State
University (993-55-933)
- 3:30PM *Generalizations of quandle cocycle invariants and
(1074) Alexander modules from quandle modules.*
Masahico Saito, University of South Florida
(993-57-851)
- 4:00PM *The topology of 4-manifolds which admit a
(1075) symplectic form and a circle action.* Preliminary
report.
Scott J Baldrige, Indiana University (993-57-619)
- 4:30PM *On a characterization of nugatory crossings.*
(1076) **Xiao-Song Lin**, University of California, Riverside
(993-57-1289)
- 5:00PM *A topological IHX relation in three and four
(1077) dimensions.*
James Conant*, University of Tennessee, Knoxville,
Rob Schneiderman, Courant Institute, and **Peter
Teichner**, UC San Diego (993-57-204)
- ▶ 5:30PM *Finite Abelian Group Actions on Orientable
(1078) S^1 -Bundles Over Orientable Surfaces.* Preliminary
report.
Caroline Maher Boulis, Florida State University
(993-55-841)

MAA Minicourse #13: Part B

1:00 PM – 3:00 PM

The Fibonacci and Catalan numbers.
Organizer: **Ralph P. Grimaldi**, Rose-Hulman
Institute of Technology

MAA Minicourse #2: Part B

1:00 PM – 3:00 PM

Hands-on discrete math with technology.
Organizers: **Douglas E. Ensley**, Shippensburg
University
Kate McGiveny, Shippensburg
University

MAA Minicourse #8: Part B

1:00 PM – 3:00 PM

Some mathematics of Leonhard Euler.
Organizers: **William W. Dunham**, Muhlenberg
College
Edward C. Sandifer, Western
Connecticut State University

AMS Session on Geometry

1:00 PM – 5:25 PM

- ▶ 1:00PM *A new solution for Hilbert's third problem.*
(1079) **David Benko**, Texas A and M University (993-51-92)
- ▶ 1:15PM *A Euclidean Area Theorem via Laguerre Geometry.*
(1080) **Robert D. Knight**, University of Guam
(993-51-1241)
- 1:30PM *Fuzzy Geometry of Space.*
(1081) **Reza R Ahangar**, Kansas Wesleyan University
(993-51-1701)
- ▶ 1:45PM *Even Astral Configurations.*
(1082) **Leah Wrenn Berman**, Ursinus College (993-52-209)

- 2:00PM *A Fine Classification of Closed Planar Sets
(1083) According to Their Non-Convexity.*
Ziva Deutsch*, Jerusalem College, Israel, and
Micha A. Perles, Hebrew University (993-52-234)
- 2:15PM *An Integral Formula On Seifert Bundles.*
(1084) **A Fawaz**, The University of Texas of the Permian
Basin (993-53-1325)
- 2:30PM *Lie groups of automorphisms of para-f-manifolds.*
(1085) Preliminary report.
A. Bucki, Oklahoma City, OK (993-53-1407)
- 2:45PM *One-Dimensional Metric Foliations on Compact
(1086) Semisimple Lie Groups.* Preliminary report.
Marius I Munteanu, SUNY-Oneonta (993-53-1619)
- 3:00PM *A Notion of Rectifiability for Hypersurfaces in
(1087) Carnot Groups.*
Daniel R Cole, Dartmouth College (993-53-1652)
- 3:15PM Break
- 3:30PM *Ehresmann Connection Related to Orbit
(1088) Stratification in Compact Semi Simple Lie Algebras.*
Preliminary report.
Roxana Costinescu*, Millersville University of
Pennsylvania, and **Serge Preston**, Portland State
University (993-53-1671)
- 3:45PM *Total Gauss curvature of complete minimal
(1089) submanifolds.* Preliminary report.
Tracy Bowers, Moravian College (993-53-1685)
- 4:00PM *The minimal marked length spectrum of
(1090) Riemannian two-step nilmanifolds.*
Ruth Gornet, University of Texas at Arlington, and
Maura B Mast*, University of Massachusetts Boston
(993-53-1687)
- 4:15PM *Special PL manifolds as PL shape o-fibrators.*
(1091) Preliminary report.
Violeta Vasilevska, The University of Tennessee
(993-57-1037)
- 4:30PM *A Morse Theory Approach to studying
(1092) Graph-Configuration Spaces.*
David G.C. Handron, Carnegie Mellon University
(993-57-1314)
- 4:45PM *Diagrammatic Reducibility and Labeled Oriented
(1093) Tree Complexes.* Preliminary report.
Travis R Kelm, St. Edward's University
(993-57-1612)
- 5:00PM *On m-sectorial Schrödinger operators with singular
(1094) potentials on manifolds of bounded geometry.*
Ognjen B Milatovic, University of Toledo
(993-58-458)
- 5:15PM *A New Homotopy Invariant for Distinguishing
(1095) $[G, 2]$ -Complexes.* Preliminary report.
Katherine S. Byler, California State University,
Fresno (993-57-1088)

AMS Session on Probability and Stochastics

1:00 PM – 4:10 PM

- ▶ 1:00PM *An improved site percolation threshold universal
(1096) formula for two-dimensional matching lattices.*
Preliminary report.
John C. Wierman, Johns Hopkins University
(993-60-277)
- ▶ 1:15PM *Random Harmonic series.* Preliminary report.
(1097) **David Baker**, University of California, Santa Barbara
(993-60-1158)
- 1:30PM Break
- ▶ 1:45PM *Decompositions of Exponential Distributions on
(1098) Semigroups.* Preliminary report.
Kyle Siegrist* and **Boris Kunin**, University of
Alabama in Huntsville (993-60-1572)

- 2:00PM *Transient Solution to the Time-Dependent Multi-server Poisson Queue*. Preliminary report.
▶ (1099) **Barbara Haas Margolius**, Cleveland State University (993-60-127)
- 2:15PM *An Invariance Principle for Semimartingale Reflecting Brownian Motions in Piecewise Smooth Domains*.
(1100) **W Kang*** and **R J Williams**, UCSD (993-60-113)
- 2:30PM Break
- 2:45PM *Malliavin calculus applications to hypoelliptic heat kernel inequalities*.
(1101) **Tai Melcher**, University of California, San Diego (993-60-1703)
- 3:00PM *Ergodic Type Theorems for Actions of Semi-groups with Finite Number of Generators on von Neumann Algebras*.
(1102) **Genady Ya. Grabarnik***, IBM Thomas J. Watson Research Center, **Alexander A Katz**, St. John's University, and **Laura Shwartz**, UNISA (993-60-1112)
- 3:15PM *Kendall distribution functions*.
(1103) **Roger B. Nelsen***, Lewis & Clark College, **José Juan Quesada Molina**, Universidad de Granada, **José Antonio Rodríguez Lallena** and **Manuel Ubeda Flores**, Universidad de Almería (993-60-872)
- 3:30PM *On Convergence of Choquet Capacity Functionals*. Preliminary report.
(1104) **Ding Feng*** and **Tonghui Wang**, New Mexico State University (993-60-622)
- 3:45PM *Limits of Finite State Markov Chains*. Preliminary report.
▶ (1105) **Michael L Green**, Cal Poly Pomona (993-60-828)
- 4:00PM *Conditional integral transforms and convolution products*. Preliminary report.
(1106) **Bong Jin Kim**, Daejin University, **Byoung Soo Kim**, Yonsei University, and **David L. Skoug***, University of Nebraska-Lincoln (993-60-1257)
- 2:30PM *Bounds on the run length of Hamiltonian cycles in grid graphs*.
▶ (1113) **Margaret Isabelle Doig**, University of Notre Dame (993-05-1103)
- 2:45PM *Some topics on circular colorings*. Preliminary report.
▶ (1114) **Che Zhongyuan**, Penn State Beaver (993-05-1082)
- 3:00PM *Unit bar-visibility representations of triangulated polygons*. Preliminary report.
(1115) **Alice M Dean***, Skidmore College, **Ellen Gethner**, University of Colorado at Denver, and **Joan P Hutchinson**, Macalester College (993-05-1077)
- 3:15PM *Flexibility of Toroidal Embeddings*.
▶ (1116) **Neil Robertson**, Ohio State University, **Xiaoya Zha***, Middle Tennessee State University, and **Yue Zhao**, University of Central Florida (993-05-871)
- 3:30PM *The Structure of Uniformly 2-Connected Graphs*.
▶ (1117) **Donald A Nelson**, Middle Tennessee State University (993-05-800)
- 3:45PM Break
- 4:00PM *Pebbling Diameter Three Graphs*. Preliminary report.
▶ (1118) **Boris Bukh**, University of California, Berkeley (993-05-781)
- 4:15PM *Domination iDot Critical Graphs*. Preliminary report.
▶ (1119) **Tamara A Burton*** and **Melissa M Matthews**, Rochester Institute of Technology (993-05-259)
- 4:30PM *Ordered Colorings in Graphs*. Preliminary report.
▶ (1120) **Darren A Narayan*** and **Victor Kostyuk**, Rochester Institute of Technology (993-05-257)
- 4:45PM Break
- 5:00PM *Cages of degree k are k-edge-connected*.
▶ (1121) **Michael H. Moriarty**, Worcester, Massachusetts, and **Peter R. Christopher***, Worcester Polytechnic Institute (993-05-1192)
- 5:15PM *The incidence coloring conjecture for graphs of maximum degree 3*.
▶ (1122) **Maksim I Maydanskiy**, UC Berkeley (993-05-588)
- 5:30PM *Radio-Chromatic Numbers for Powers of Paths*. Preliminary report.
▶ (1123) **Allen J Schwenk**, Western Michigan University (993-05-1366)
- 5:45PM *The linear complexity of the adjacency matrix of a graph*. Preliminary report.
▶ (1124) **David L. Neel**, Seattle University, and **Michael E. Orrison***, Harvey Mudd College (993-05-1551)
- 6:00PM *On the subword complexity of finite words*.
▶ (1125) **Irina Gheorghiciuc**, University of Pennsylvania (993-05-146)
- 6:15PM *Independent Sets In Triangle-Free Cubic Planar Graphs*.
▶ (1126) **Christopher Carl Heckman***, Arizona State University, and **Robin Thomas**, Georgia Institute of Technology (993-05-514)

AMS Session on Graph Theory

1:00 PM – 6:25 PM

- 1:00PM *Homogeneous Embeddings and Stratified Graphs*.
(1107) **Gary Chartrand**, Western Michigan University, **Donald W Vanderjagt**, Grand Valley State University, and **Ping Zhang***, Western Michigan University (993-05-589)
- 1:15PM *Graph powers and k-ordered Hamiltonicity*. Preliminary report.
▶ (1108) **Denis Chebikin**, MIT (993-05-1606)
- 1:30PM *γ -labelings of graphs*.
(1109) **Gary Chartrand**, Western Michigan University, **David Erwin***, Trinity College, **Donald W Vanderjagt**, Grand Valley State University, and **Ping Zhang**, Western Michigan University (993-05-1600)
- 1:45PM *Multidesigns of the multipartite graph*.
▶ (1110) **Atif Abueida***, University of Dayton, and **Mike Daven**, Mount Saint Mary College (993-05-1588)
- 2:00PM *New Bounds on Isoperimetric Numbers of Platonic Graphs*.
(1111) **Dominic Lanphier**, Kansas State University, and **Jason Rosenhouse***, James Madison University (993-05-1514)
- 2:15PM *The Elimination Procedure for the Competition Number is Not Optimal*. Preliminary report.
▶ (1112) **Stephen G. Hartke**, Rutgers University (993-05-1127)

MAA Session on Math and the Arts, III

1:00 PM – 4:55 PM

- Organizers: **Ann Robertson**, Connecticut College
John M. Sullivan, University of Illinois, Urbana
Reza Sarhangi, Towson University
Nathaniel A. Friedman, State University of New York, Albany
- 1:00PM *The Art of Star Polygons*. Preliminary report.
▶ (1127) **Reza Sarhangi**, Towson University (993-01-1626)

- 1:20PM *Visualizing the tightening of knots.* Preliminary report.
▶ (1128) **Jason Cantarella***, University of Georgia, **Michael Piatek** and **Eric Rawdon**, Duquesne University (993-01-1419)
- 1:40PM *Geometric Representations of n th Hulls of Knotted Curves.* Preliminary report.
▶ (1129) **John W. Foreman**, University of Georgia (993-01-1422)
- 2:00PM *What's the Best Way to Make Polyhedral Models?*
▶ (1130) **Helmer Aslaksen**, National University of Singapore (993-01-1219)
- 2:15PM Break
- 2:40PM *Mathematics for poets (and drummers): The mathematics of rhythm.*
▶ (1131) **Rachel W Hall**, Saint Joseph's University (993-01-505)
- 3:00PM *A Mathematical Measure of Preference in African Rhythm.* Preliminary report.
▶ (1132) **Godfried T. Toussaint**, School of Computer Science, McGill University (993-01-845)
- 3:20PM *Triangular Music.*
▶ (1133) **Jonathan L Merzel*** and **Michael D Golden**, Soka University of America (993-01-301)
- 3:40PM *Teaching Basic Music Theory from a Mathematical Perspective.*
▶ (1134) **Timothy A Johnson**, Ithaca College (993-01-942)
- 3:55PM Break
- 4:20PM *Art, Mathematics, and Visualization.*
▶ (1135) **Pamela Davis Kivelson**, Stanford University, and **Katherine Socha***, Michigan State University (993-01-397)
- 4:40PM *Art and Mathematics: A Liberal Arts Mathematics course.*
(1136) **David Hartz**, College of St Benedict (993-01-1543)

MAA Session on Teaching and Learning of Undergraduate Mathematics, I

1:00 PM – 3:55 PM

Organizers: **Anne E. Brown**, Indiana University South Bend
Marilyn P. Carlson, Arizona State University
Draga D. Vidakovic, Georgia State University

- 1:00PM *Following the path of evolution: Student constructions of the concept of solution to a differential equation.*
▶ (1137) **Debasree Raychaudhuri**, California State University at Los Angeles (993-R1-1383)
- 1:30PM *Lizzie and subgroups: A case study report on the role of affect.* Preliminary report.
▶ (1138) **Jennifer A Bergner**, Salisbury University (993-R1-365)
- 2:00PM *A Theoretical Model for Describing and Assessing Students' Understanding of the Function Concept.*
▶ (1139) **Brian R O'Callaghan**, Southeastern Louisiana University (993-R1-275)
- 2:30PM *Undergraduates' understanding of distance and angle as they explore Euclidean, spherical, and taxicab geometries.* Preliminary report.
▶ (1140) **Stephen D Blair**, Portland State University (993-R1-750)
- 3:00PM *Exploring the Culture of a Non-Traditional Mathematics Classroom.*
▶ (1141) **Carol E. Seaman*** and **Jennifer Earles Szydlak**, University of Wisconsin Oshkosh (993-R1-160)

- 3:30PM *An Examination of the Knowledge Base for Teaching and Instructional Practice of Two Undergraduate Mathematics Faculty Teaching Calculus.*
▶ (1142) **Kimberly B. Santucci***, **Thomas C. DeFranco** and **Jean McGivney-Burrelle**, University of Connecticut (993-R1-421)

MAA Session on My Favorite Demo: Innovative Strategies for Mathematics Instructors, I

1:00 PM – 3:55 PM

Organizers: **David R. Hill**, Temple University
Lila F. Roberts, Georgia Southern University

- 1:00PM *Demonstrating Linear Transformations with Morphing.*
▶ (1143) **John F. Putz**, Alma College (993-S1-220)
- 1:15PM *Computer Visualizations for Calculus.*
▶ (1144) **Lew Ludwig***, Denison University, and **Keith Howard**, Kenyon College (993-S1-418)
- 1:30PM *Exploring Distributions and Random Samples with Sampler(TM).*
▶ (1145) **Clifford H. Wagner**, Pennsylvania State University at Harrisburg (993-S1-428)
- 1:45PM *Motivating the Dihedral Group Through Quilting Squares.*
(1146) **James E Hamblin**, Shippensburg University (993-S1-531)
- 2:00PM *Visualizing Mathematical Models via Spreadsheets: Part I - Population Models.*
▶ (1147) **Deane E. Arganbright***, University of Tennessee at Martin, and **Erich Neuwirth**, University of Vienna (993-S1-223)
- 2:30PM *Visualizing Mathematical Models via Spreadsheets: Part II—Retirement Financing.*
▶ (1148) **Erich Neuwirth***, University of Vienna, and **Deane E. Arganbright**, University of Tennessee at Martin (993-S1-225)
- 3:00PM *Maple Demos for Multivariable Calculus.*
▶ (1149) **Karl J Havlak**, Angelo State University (993-S1-188)
- 3:15PM *Cross-sections and contours using Play-Doh.*
▶ (1150) **Pallavi Jayawant**, University of Arizona (993-S1-500)
- 3:30PM *From the Unit Circle to the Trigonometric Functions.*
▶ (1151) **Sarah L Mabrouk**, Framingham State College (993-S1-557)
- 3:45PM *Discovering the Five Platonic Solids.*
▶ (1152) **Jackie A Hall**, Longwood University (993-S1-487)

MAA Session on Mathematical Models of the Environment

1:00 PM – 3:55 PM

Organizers: **Karen D. Bolinger**, Clarion University
William D. Stone, New Mexico Institute of Mining & Technology
Ahlam E. Tannouri, Morgan State University

- 1:00PM *Applied Graph Theory in the Classroom.*
▶ (1153) **Kimberly Jordan Burch**, Montclair State University (993-T1-1532)
- 1:15PM *Mathematical Models in "The Iowa Environment".*
▶ (1154) **Daniel Alexander**, Drake University (993-T1-1534)
- 1:30PM *A Stochastic Model of Wind Velocities at the Kennedy Space Center.*
▶ (1155) **Brian E. Smith***, McGill University, and **Francis J. Merceret**, National Aeronautics and Space Administration (993-T1-270)

- 1:45PM *Modeling the Color Changes in Tree Foliage: A Differential Equations Group Project.*
▶ (1156) **Michael R. Huber*** and **Brian J. Lunday**, United States Military Academy (993-T1-179)
- 2:00PM *Modeling Population Genetics.*
▶ (1157) **William P. Fox***, **Jeffrey Camper** and **Richard D. West**, Francis Marion University (993-T1-1535)
- 2:20PM *An Air Pollution Transport Model.*
▶ (1158) **James A. Walsh**, Oberlin College (993-T1-62)
- 2:40PM *Remote Sensing Techniques.*
▶ (1159) **Elyn Rykken**, Muhlenberg College (993-T1-227)
- 3:00PM *Modeling the Spread of a Carrier Dependent Infectious Disease: Effect of Migration from Environmentally Degraded Habitat.*
(1160) **Prawal Sinha**, Indian Institute of Technology Kanpur (993-T1-84)
- 3:20PM *Population Growth Mathematical Models.*
▶ (1161) **S. Narasimha Murthy**, Addis Ababa University (993-T1-23)
- 3:40PM *Polynomial Models for Real World Applications.*
▶ (1162) **Michael J. Bosse***, Morgan State University, and **N. R. Nandakumar**, Delaware State University (993-T1-317)

MAA Poster Session on Projects Supported by the NSF Division of Undergraduate Education.

1:00 PM – 3:00 PM

- Organizer: **Jon W. Scott**, Montgomery College
- 1:00PM *Development of Interactive Material for the Constructivist Teaching of Mathematical Proof to Future Teachers.*
(1163) **Doug Ensley** and **Winston Crawley***, Shippensburg University
- 1:00PM *Demos with Positive Impact.*
(1164) **David R Hill***, Temple University, and **Lila F Roberts**, Georgia College and State University
- 1:00PM *Collaborative Research: A Problem Based Calculus Sequence.*
(1165) **Charles Allen*** and **Carol Browning**, Drury University
- 1:00PM *Collaborative Research: A Problem Based Calculus Sequence.*
(1166) **Ted Mahavier*** and **Dale Daniel**, Lamar University
- 1:00PM *Collaborative Research: A Problem Based Calculus Sequence.*
(1167) **Shing So**, Central Missouri State University
- 1:00PM *The PascGalois Project: Visualizing Abstract Algebra.*
(1168) **Michael Bardzell*** and **Kathleen Shannon**, Salisbury University
- 1:00PM *Seeing the Connections: Promoting Profound Understanding of Secondary Mathematics.*
(1169) **Steve Benson***, Education Development Center, **Karen Graham**, University of New Hampshire, **Neil Portnoy**, Stony Brook University, and **Al Cuoco**, Education Development Center
- 1:00PM *Teaching Introductory Combinatorics by Guided Group Discovery.*
(1170) **Kenneth Bogart**, Dartmouth College
- 1:00PM *Mathematics On Demand.*
(1171) **Linda Braddy***, **Anne E Fine** and **Mickle Duggan**, East Central University
- 1:00PM *Quantitative Methods for Public Policy.*
(1172) **David Bressoud**, Macalester College
- 1:00PM *Incorporating Technology and Multidisciplinary Applications in a Team-Taught Lecture-Laboratory Calculus Course.*
(1173) **Shea D Burns**, North Carolina A&T State University
- 1:00PM *Teacher Preparation, Mathematics and Technology: A National Dialogue.*
(1174) **Ruth Collins**, Delaware Technical and Community College
- 1:00PM *Lexington Collaborative for Reform and Improvement of Middle Mathematics.*
(1175) **Lillie Crowley***, Lexington Community College, and **Carl Lee**, University of Kentucky
- 1:00PM *Improving Mathematical Skill and Attitudes of Under-prepared College Freshmen.*
(1176) **Rosalie Dance*** and **Ludence A Romney**, University of the Virgin Islands
- 1:00PM *Promoting Active Learning and Collaboration in Calculus with the Investigative Classroom.*
(1177) **Meighan I Dillon**, Southern Polytechnic State University
- 1:00PM *Community College Mathematics Integration Project.*
(1178) **Stephen Drake***, Northwestern Michigan College, and **Carolyn Drake**, Dennon Museum Center
- 1:00PM *Bridging the Vector Calculus Gap: Episode II.*
(1179) **Tevean Dray*** and **Corinne A Manogue**, Oregon State University
- 1:00PM *Interactive Modular Mathematics Education.*
(1180) **William Feldman*** and **Wayne Mackey**, University of Arkansas
- 1:00PM *Motivating Geometry through Computation and Visualization.*
(1181) **David Finn**, Rose-Hulman Institute of Technology
- 1:00PM *Discovery-based Science and Mathematics in an Environmental Context.*
(1182) **Stephanie Fitchett***, Florida Atlantic University, and **Blake Mellor**, Loyola Marymount University
- 1:00PM *Enhancing the Mathematical Understanding of Students in Chemistry.*
(1183) **Shahriar Shahriari*** and **Erica Flapan**, Pomona College
- 1:00PM *A Problem and Reasoning Based Curriculum for Preservice Elementary Educators: Understanding Mathematics Deeply for Teaching.*
(1184) **Judith Flowers**, University of Michigan-Dearborn
- 1:00PM *Using Both the ALEKS Learning and Assessment Computer Program and Conceptual Activities in a College Developmental Mathematics Course.*
(1185) **Richard Goldthwait**, Youngstown State University
- 1:00PM *Collaborative Research: Adaptation and Implementation of Activity and Web-Based Materials into Post-Calculus Introductory Probability and Statistics Courses.*
(1186) **Tracy Goodson-Espy**, University of Alabama in Huntsville
- 1:00PM *Collaborative Research: Adaptation and Implementation of Activity and Web-Based Materials into Post-Calculus Introductory Probability and Statistics Courses.*
(1187) **M. Leigh Lunsford**, University of Alabama in Huntsville
- 1:00PM *Collaborative Research: Adaptation and Implementation of Activity and Web-Based Materials into Post-Calculus Introductory Probability and Statistics Courses.*
(1188) **Ginger Holmes Rowell**, Middle Tennessee State University

- 1:00PM *Establishing the National Curve Bank.*
(1189) **Shirley B Gray***, **Stewart Venit** and **Randolf Cooper**, California State University Los Angeles
- 1:00PM *WeBWork in the Mathematics Curriculum.*
(1190) **Jeffrey J Holt**, University of Virginia
- 1:00PM *Training Environmental Statisticians - Tomorrow's Problem Solvers.*
(1191) **William F Hunt***, **Kimberly Weems** and **William Swallow**, North Carolina State University
- 1:00PM *Enhancing Student Preparation for Calculus via a Web-Based Homework System.*
(1192) **Michael D Hvidsten*** and **Charles Pastor**, Gustavus Adolphus College
- 1:00PM *Exploring Geometry: Integrated Textbook and Software for College Geometry.*
(1193) **Michael D Hvidsten**, Gustavus Adolphus College
- 1:00PM *A Sophomore-Level Transition Course.*
(1194) **Michael A Jones*** and **Arup Mukherjee**, Montclair State University
- 1:00PM *Development of an Undergraduate Diffraction Course.*
(1195) **David Kammler**, Southern Illinois University, Carbondale
- 1:00PM *Phaser: A Universal Simulator for Dynamical Systems Built on Java Technology.*
(1196) **Huseyin Kocak*** and **Brian Coomes**, University of Miami
- 1:00PM *Core Mathematics.*
(1197) **Gary Krahn*** and **Don Small**, U.S. Military Academy
- 1:00PM *Teaching Discrete Mathematics via Primary Historical Sources.*
(1198) **Jerry Lodder**, New Mexico State University
- 1:00PM *Improving Preservice Mathematics Teachers' Understanding of Fundamental Concepts in the Secondary Mathematics Curriculum.*
(1199) **John Lorch***, **Elizabeth Bremigan** and **Ralph Bremigan**, Ball State University
- 1:00PM *Reform College Algebra in a Tribal College Setting.*
(1200) **Russell Lundgren**, Chief Dull Knife College
- 1:00PM *Mathematics for Future Secondary Teachers.*
(1201) **James J Madden**, Louisiana State University & Agricultural and Mechanical College
- 1:00PM *Knot Theory for Preservice and Practicing Secondary Mathematics Teachers.*
(1202) **Neil Portnoy**, Stony Brook University, and **Thomas Mattman***, California State University, Chico
- 1:00PM *Implementation of WeBWork Delivering Internet-Based Homework In College Algebra Classes.*
(1203) **Coreen Mett*** and **Neil Sigmon**, Radford University
- 1:00PM *Broadening the Scope of Statistical Education through Technology.*
(1204) **Deborah Nolan*** and **Terence Speed**, University of California Berkeley
- 1:00PM *A Course in Scientific Simulation.*
(1205) **Mike O'Leary**, Towson University
- 1:00PM *WeBWork - a Web-Based Homework System.*
(1206) **Arnold K Pizer***, **Michael E Gage** and **Vicki Roth**, University of Rochester
- 1:00PM *A Computer Activity Approach to College Geometry.*
(1207) **Barbara E Reynolds***, Cardinal Stritch University, and **William E Fenton**, Bellarmine University
- 1:00PM *Biomathematics in the Undergraduate Curriculum.*
(1208) **Raina Robeva***, **Robin Davies**, **James Kirkwood**, Sweet Briar College, **Michael Johnson**, **Boris Kovatchev** and **Marty Straume**, University of Virginia

- 1:00PM *Applying Advanced Distributed Teaching and Learning to Pre-Calculus Mathematics.*
(1209) **Hal Schlais**, University of Wisconsin System, **Robert Hoar***, University of Wisconsin-La Crosse, and **Paul Sundheim**, University of Wisconsin Colleges
- 1:00PM *The Probability/Statistics Object Library.*
(1210) **Kyle Siegrist**, University of Alabama in Huntsville
- 1:00PM *Improving Calculus: Developing Concepts Through Good Questions.*
(1211) **Maria Terrell**, Cornell University
- 1:00PM *Stem and Tendril: Vertically Integrated Statistics Laboratories.*
(1212) **John Verzani***, **Andrew Poje** and **Deborah S. Franzblau**, The College of Staten Island
- 1:00PM *Project WELCOME.*
(1213) **James E White***, The Mathwright Library, **Dan Kalman**, American University, and **William Hawkins**, University of the District of Columbia
- 1:00PM *A Versatile, Technology-Intensive EarthMath.*
(1214) **Nancy Zumoff***, Kennesaw State University, **Christopher Schaufele**, retired, **Paul Latiolais**, Portland State University, and **Philippe Laval**, Kennesaw State University
- 1:00PM *Pathways through Algebra.*
(1215) **Wade Ellis***, West Valley College, and **Terrie Teegarden**, San Diego Mesa College
- 1:00PM *Web-Based Math Homework.*
(1216) **John W Jones**, Arizona State University
- 1:00PM *Adapting Innovative Projects for Student Improvement.*
(1217) **Mary Kay Abbey*** and **Jon Scott**, Montgomery College

MAA Special Presentation

1:00 PM – 3:00 PM

Mathematics for business decisions (repeated from 5:00 p.m. to 7:00 p.m., Friday).

Organizers: **Richard B. Thompson**, University of Arizona
Christopher Lamoureux, University of Arizona

MAA Panel Discussion

1:00 PM – 2:20 PM

Voices of the partner disciplines: Building on the MAA curriculum foundations project.

Organizers: **Tevian Dray**, Oregon State University
Deborah Hughes Hallett, University of Arizona
Matthias Kowski, Arizona State University
William G. McCallum, University of Arizona

Panelists: **Corinne A. Manogue**, Oregon State University
Ron Roedel, Arizona State University
Michael Zeilik, University of New Mexico

MAA Panel Discussion

1:00 PM – 2:20 PM

*Session for chairs: The chair's role in teaching teachers.*Organizers: **Catherine M. Murphy**, Purdue University Calumet**Daniel P. Maki**, Indiana UniversityPanelists: **Jim Lewis**, University of Nebraska-Lincoln**Alan C. Tucker**, SUNY at Stony Brook**ASL Invited Address**

2:00 PM – 2:50 PM

(1218) *Vaught's Conjecture.*
R.W. Knight, Oxford, UK**MAA Session on Philosophy of Mathematics**

2:00 PM – 6:30 PM

Organizers: **Roger A. Simons**, Rhode Island College**Satish C. Bhatnagar**, University of Nevada, Las Vegas▶ 2:00PM (1219) *Philosophy of Mathematics: What, Who, Where, How and Why.***Charles R. Hampton**, The College of Wooster (993-U1-528)▶ 2:25PM (1220) *On The Nature of Mathematical Thought and Inquiry: A Prelusive Suggestion.***Padraig M McLoughlin**, Morehouse College (993-U1-1331)▶ 2:50PM (1221) *The Interpretation of Probability is Perhaps an Ill-Posed Question.***Paolo Rocchi**, IBM (993-U1-185)

3:10PM Minireception sponsored by the SIGMAA on the Philosophy of Mathematics.

3:40PM (1222) *When is a proof a proof?***Joseph Auslander**, University of Maryland College Park (993-U1-1266)▶ 4:05PM (1223) *The Poetic View of Mathematics.***Jerry P. King**, Lehigh University (993-U1-1080)▶ 4:30PM (1224) *"You cannot solder an Abyss with Air"— the Role of Metaphor in Mathematics.* Preliminary report.**Lawrence D'Antonio**, Ramapo College of New Jersey (993-U1-376)

4:50PM Minireception sponsored by the SIGMAA on the Philosophy of Mathematics.

▶ 5:20PM (1225) *The NonEuclidean Revolution Makes Relativism Available to the Rest of the World.* Preliminary report.**Michael J. Bosse**, Morgan State University (993-U1-294)▶ 5:45PM (1226) *The tension and the balance between mathematical concepts and student constructions of it.***Debasree Raychaudhuri**, California State University at Los Angeles (993-U1-1564)▶ 6:10PM (1227) *On Godel's Proof and the Relation Between Mathematics and the Physical World.* Preliminary report.**G. Arthur Mihram***, Princeton, N.J., and **Danielle Mihram**, University of Southern California (993-U1-408)**NAM Granville-Brown-Haynes Session of Presentations by Recent Doctoral Recipients in the Mathematical Sciences**

2:15 PM – 4:00 PM

RMMC Board of Directors

2:15 PM – 4:10 PM

MAA Presentations by Teaching Award Recipients

2:30 PM – 4:00 PM

(1228) *Functions for the world.*
Thomas A. Garrity, Williams College(1229) *Clueless.*
Olympia Nicodemi, SUNY at Geneseo(1230) *A S.N.A.P. Math Fair.*
Andrew C.-F. Liu, University of Alberta**MAA Invited Paper Session on Assessment of Student Learning in Undergraduate Mathematics**

2:30 PM – 6:25 PM

Organizers: **Bernard L. Madison**, University of Arkansas at Fayetteville**William E. Haver**, Virginia Commonwealth University▶ 2:30PM (1231) *Assessment of a New American Program in the Middle East.*
Thomas W Rishel, Weill Cornell Medical College (993-Z3-46)▶ 2:50PM (1232) *An assessment of the contribution of two general education mathematics courses in the quantitative reasoning skills of students.*
Aimee J Ellington, Virginia Commonwealth University (993-Z3-63)▶ 3:10PM (1233) *Core Assessment- Past, Present, Future.* Preliminary report.
Melissa A Hardeman* and **Tracy A Watson**, University of Arkansas at Little Rock (993-Z3-267)3:30PM (1234) *Involving the Entire Department in Assessment.* Preliminary report.
Dick Jardine, Keene State College (993-Z3-605)▶ 3:50PM (1235) *Assessing the Mathematics Major with a Bottom-Up Approach.* Preliminary report.
Sarah V. Cook, Washburn University (993-Z3-520)▶ 4:10PM (1236) *Assessment-To Make It Work, Keep It Simple.*
Thomas C. McMillan* and **Jim Fulmer**, University of Arkansas at Little Rock (993-Z3-246)▶ 4:30PM (1237) *An online mathematics assessment, placement and exit testing project.* Preliminary report.
Jerry A Johnson*, **Inmaculada Aban** and **Jeff Mortensen**, University of Nevada, Reno (993-Z3-89)▶ 4:50PM (1238) *Undergraduate Program Assessment at a Research I University.* Preliminary report.
Katherine J. Mawhinney*, Appalachian State University, and **Jeffrey S. Scroggs**, North Carolina State University (993-Z3-519)▶ 5:10PM (1239) *Lessons Learned: Assessment Results at a Two-Year College.* Preliminary report.
Larry A Burgess* and **Richard P Vaughn**, Paradise Valley Community College (993-Z3-303)5:30PM (1240) *Assessing the Mathematics Major: A Triangulated Approach.* Preliminary report.
Katherine Safford Ramus* and **Brian P. Hopkins**, Saint Peter's College (993-Z3-638)

- 5:50PM *Developing an Appropriate and Effective Culminating Experience for Your Mathematics Majors*. Preliminary report.
▶ (1241) **M Paul Latiolais***, **Joyce O'Halloran** and **Karen Marrongelle**, Portland State University (993-Z3-877)
- 6:10PM *Using Portfolios for Departmental Assessment*.
(1242) **Scott A Smith*** and **Laurie B Hopkins**, Columbia College (993-Z3-922)

MAA Invited Paper Session on the Use of Hand-Held Technology in College and University Developmental Algebra Classrooms

2:30 PM – 5:30 PM

Organizers: **Wade Ellis, Jr.**, West Valley College
Edward D. Laughbaum, The Ohio State University

- 2:30PM *Using Technology to Connect Developmental Mathematics to College Algebra*.
▶ (1243) **Selina Vasquez**, Southwest Texas State University (993-Z4-99)
- 3:00PM *Using Hand Held Technology to Address Math Anxiety in the Developmental Mathematics Classroom*.
▶ (1244) **Peg Greene**, Florida Community College at Jacksonville (993-Z4-73)
- 3:30PM *Intermediate Algebra for the Visual Learner: Using a Graphing Calculator to "See" Characteristics of Quadratic Functions*.
▶ (1245) **Katherine R Struve**, Columbus State Community College (993-Z4-476)
- 4:00PM *Using Handheld Software Applications (Apps) to Visualize Geometric Behaviors of Functions and their Relation to Real-World Data*.
(1246) **Margo L. Mankus**, Texas Instruments (993-Z4-325)
- 4:30PM *Impact of hand-held technology on student learning and curriculum dynamics*.
▶ (1247) **Mercedes A McGowan**, William Rainey Harper College (993-Z4-803)
- 5:00PM *Developmental Algebra with Function as an Underlying Theme*.
(1248) **Edward D Laughbaum**, The Ohio State University (993-Z4-48)

AMS Committee on Science Policy-AMS Committee on the Profession Panel Discussion

2:30 PM – 4:00 PM

A walk through the math pipeline from end to end.

Moderator: **Jane Hawkins**, University of North Carolina at Chapel Hill

Panelists: **James Sethian**, University of California Berkeley
Olga R. Beaver, Williams College
Jessica S. Sidman, Mount Holyoke College
James Bonn, CNA Corporation
Timothy W. Lant, Arizona State University
Angela Herro, Arizona State University

MAA Minicourse #14: Part B

3:15 PM – 5:15 PM

Introduction to mathematical card tricks.
Organizers: **Colm K. Mulcahy**, Spelman College
Jeffrey A. Ehme, Spelman College

MAA Minicourse #3: Part B

3:15 PM – 5:15 PM

Computation and discovery in the number theory classroom.
Organizer: **Clifford A. Reiter**, Lafayette College

MAA Minicourse #9: Part B

3:15 PM – 5:15 PM

PMET: Preparing mathematicians to educate teachers, grades 7-12.
Organizers: **Holly Hirst**, Appalachian State University
Jack Y. Narayan, SUNY College at Oswego

ASL Invited Address

3:30 PM – 4:20 PM

- (1249) *The type-definable group configuration under the generalized type-amalgamation.*
Byunghan Kim, Massachusetts Institute of Technology

London Mathematical Society

3:30 PM – 5:00 PM

This session includes a Society meeting and an Invited Address by Gerard van der Geer.

MAA Committee on Undergraduate Student Activities and Chapters Undergraduate Poster Session

4:00 PM – 6:30 PM

Organizer: **Mario U. Martelli**, Claremont McKenna College

MAA Invited Paper Session on WeBWork, a Web-Based Homework System, II

4:10 PM – 7:00 PM

Organizers: **Michael E. Gage**, University of Rochester
Arnold K. Pizer, University of Rochester
Vicki Roth, University of Rochester
Jeffrey J. Holt, University of Virginia
John W. Jones, Arizona State University

- 4:10PM *WeBWork Effectiveness in Rutgers Calculus*.
▶ (1250) **Charles A Weibel*** and **Lew Hirsch**, Rutgers University (993-Z2-1243)
- 4:40PM *Using WeBWork at the Secondary School Level*.
(1251) **Mark W Schmitt**, Detroit Country Day School (993-Z2-1381)
- 5:10PM *Responding to Webwork*.
▶ (1252) **Jeff Achter**, Colorado State University (993-Z2-897)
- 5:40PM *WeBWork Developments at Union College: New Problems, Answer Checkers and Graders for Multivariable Calculus*.
▶ (1253) **Davide P Cervone**, Union College (993-Z2-1210)
- 6:10PM *Running a Large WeBWork Operation (Part 1)*.
(1254) **William K Ziemer**, California State University Long Beach (993-Z2-1011)

- 6:40PM *Running a Large WeBWork Operation (Part 2).*
 ▶ (1255) Preliminary report.
John W Jones*, Arizona State University, and
Jeffrey J Holt, University of Virginia (993-Z2-994)

AMS-MAA Government Speaker

4:20 PM – 5:10 PM

- (1256) *Title to be announced.*
Michael S. Turner, National Science Foundation
 (993-00-1741)

ASL Session for Contributed Papers, I

4:30 PM – 5:15 PM

- 4:30PM *A substructure of the lattice of Pi_1^0 classes.*
 (1257) **Rebecca Weber**, University of Notre Dame
 4:55PM *Dynamical topological logic of Cantor space.*
 (1258) **Grigori Mints*** and **Ting Zhang**, Stanford University

SIGMAA on Research on Undergraduate Mathematics Education

4:30 PM – 6:30 PM

Business meeting and invited address by Chris Rasmussen.

Organizer: **Anne E. Brown**, Indiana University
 South Bend

MAA Special Presentation

5:00 PM – 7:00 PM

Mathematics for business decisions.

Organizers: **Richard B. Thompson**, University of
 Arizona
Christopher Lamoureux, University of
 Arizona

MAA Business, Industry and Government Welcoming Reception

5:00 PM – 6:00 PM

University of Michigan Reception

5:00 PM – 7:00 PM

University of Illinois at Urbana-Champaign Department of Mathematics Reception

5:15 PM – 7:15 PM

NAM Reception, Banquet, and Cox-Talbot Address

5:30 PM – 9:00 PM

New Mexico State University Mathematics Association Reception

5:30 PM – 7:00 PM

University of Wisconsin-Madison Department of Mathematics Reception

5:30 PM – 7:00 PM

MAA Panel Discussion

5:45 PM – 7:00 PM

Environmental mathematics.

Organizer: **Patricia Clark Kenschaft**, Montclair
 State University

Panelists: **Mohammed Moazzam**, Salisbury State
 University
Barry Schiller, Rhode Island College
William Stone, New Mexico Institute of
 Mining and Technology

Mathematical Reviews Reception

6:00 PM – 7:00 PM

SIGMAA on the History of Mathematics Annual Meeting and Inaugural Annual Address

6:00 PM – 8:30 PM

Organizer: **Amy Shell-Gellasch**, SIAM-Germany

MAA Authors' Reception

6:00 PM – 7:30 PM

MAA Musical Presentation

7:00 PM – 8:30 PM

The mathematics of acoustic paradoxes.

Presenter: **Erich Neuwirth**, University of Vienna

MAA Project NEXt Reception

8:30 PM – 10:30 PM

Saturday, January 10

Joint Meetings Registration

7:30 AM – 2:00 PM

AMS Session on Combinatorics, II

7:45 AM – 10:40 AM

- 7:45AM *Probabilistic Analysis of the Random Dynamic*
 ▶ (1259) *Assignment Problem.*
Michael Z Spivey, Samford University (993-05-208)
- 8:00AM *Guessing Secrets.* Preliminary report.
 ▶ (1260) **Eden Hochbaum***, Brown University, and
Boris Bukh, University of California, Berkeley
 (993-05-1120)
- 8:15AM *A Multiplicity Problem Related to Schur Numbers.*
 ▶ (1261) **Daniel Schaal***, South Dakota State University, and
Hunter Snevily, University of Idaho (993-05-1654)
- 8:30AM *A Multiplicity Problem for a Linear Inequality.*
 ▶ (1262) **Wojciech Kosek***, Colorado College, **Daniel Schaal**,
 South Dakota State University, and **Dusty Sabo**,
 Southern Oregon University (993-05-1664)
- 8:45AM *How many Squares are there, Mr. Franklin?:*
 ▶ (1263) *Constructing and Enumerating Franklin Squares.*
Maya Mohsin Ahmed, UC Davis (993-05-835)
- 9:00AM *Three-Color Rado Numbers for an Inequality.*
 ▶ (1264) **Brenda J Johnson*** and **Daniel Schaal**, South
 Dakota State University (993-05-944)

- 9:15AM *Totally Magic Labelings of Graphs.*
 ▶ (1265) **Bill Calhoun***, **Kevin Ferland**, **Lisa Lister** and **John Polhill**, Bloomsburg University (993-05-1349)
- 9:30AM Break
- 9:45AM *On the Number of Binary Necklaces of Length n where 0's and 1's are Interchangeable.* Preliminary report.
 ▶ (1266) **William L Crowley**, United States Military Academy, West Point (993-05-1672)
- 10:00AM *Coloring metric spaces.*
 (1267) **Jeong-Hyun Kang*** and **Zoltan Furedi**, University of Illinois at Urbana-Champaign (993-05-1678)
- 10:15AM *Hadamard's 0-1 determinant problem.* Preliminary report.
 ▶ (1268) **Radoslav M. Dimitric**, Texas A&M University (993-05-249)
- 10:30AM *Regular Difference Triangle Sets and Monotonic Directed Designs.*
 (1269) **Wensong Chu***, **Charles J Colbourn**, Arizona State University, and **Solomon W Golomb**, University of Southern California (993-05-1094)

AMS Special Session on Nonassociative Algebra, I

8:00 AM – 10:50 AM

Organizers: **Murray R. Bremner**, University of Saskatchewan
Irvin R. Hentzel, Iowa State University
Luiz A. Peresi, University of Sao Paulo

- 8:00AM *Iterated loop algebras.* Preliminary report.
 (1270) **Bruce N. Allison**, University of Alberta (993-17-1188)
- 8:30AM *Gradings on Simple Nonassociative Algebras.*
 (1271) **Yuri Bahturin**, Memorial University of Newfoundland (993-17-901)
- 9:00AM *Cohomology of Frobenius kernels.*
 (1272) **Christopher P Bendel***, University of Wisconsin-Stout, **Daniel K Nakano**, University of Georgia, and **Cornelius Pillen**, University of South Alabama (993-20-977)
- 9:30AM *Intermediate Wakimoto modules for Affine $\mathfrak{sl}(n+1)$.*
 (1273) **Ben L Cox***, College of Charleston, and **Vyacheslav Futorny**, University of Sydney (993-17-1133)
- 10:00AM *Hopf duals, algebraic groups, and Jordan pairs.* Preliminary report.
 (1274) **John R. Faulkner**, University of Virginia (993-17-269)
- 10:30AM *An estimate of the number of parameters defining the varieties of n -dimensional alternative and Jordan algebras.*
 (1275) **Iryna Kashuba**, University of Sao Paulo (993-17-1101)

AMS Special Session on Competitive and Adaptive Dynamics in Ecology, II

8:00 AM – 10:50 AM

Organizers: **Carlos Castillo-Chavez**, Los Alamos National Laboratory
Yang Kuang, Arizona State University
Bai-Lian Li, University of California Riverside
Horst R. Thieme, Arizona State University

- 8:00AM *Periodic coexistence of four species on three essential resources.*
 (1276) **Bingtuan Li***, University of Louisville, and **Hal L Smith**, Arizona State University (993-92-1085)

- 8:30AM *Effects of stoichiometry on growth and reproduction of individual organisms and on population dynamics.* Preliminary report.
 (1277) **Roger M Nisbet***, UCSB, and **Edward McCauley**, University of Calgary (993-92-1093)
- 9:00AM *Competition and biological stoichiometry: linking rRNA:protein ratio in cells to species competition in food webs via N:P ratios.*
 (1278) **Irakli Loladze***, **Simon A. Levin**, Princeton University, **Yang Kuang**, **James J. Elser**, Arizona State University, **Bo Deng**, University of Nebraska, Lincoln, and **William F. Fagan**, University of Maryland, College Park (993-92-1083)
- 9:30AM *Interpretation of the May-Leonard Model of Three Species Competition as a Food Web in a Chemostat.*
 ▶ (1279) **Gail S.K. Wolkowicz**, McMaster University (993-92-1027)
- 10:00AM *Discrete May-Leonard Competition Model—the Ricker Type.* Preliminary report.
 (1280) **Lih-Ing Wu Roeger**, Texas Tech University (993-39-524)
- 10:30AM *Investigating the Mechanisms of Androgen-Independent Relapse Associated with Human Prostate Cancer.*
 ▶ (1281) **Trachette Jackson**, University of Michigan (993-92-762)

AMS Special Session on Multiscale and Oscillatory Phenomena: Modeling, Numerical Techniques, and Applications, II

8:00 AM – 10:50 AM

Organizers: **Richard Tsai**, Princeton University
Luminita A. Vese, University of California Los Angeles

- 8:00AM *Computing Multivalued Solutions to Hyperbolic Equations and Applications to Geometric Optics and Schrodinger Equations.*
 (1282) **Stanley J Osher**, Level Set Systems, Inc (993-65-758)
- 9:00AM *Coupled Continuum and Atomistic Modeling of Solids.*
 (1283) **Xiantao Li**, Princeton University (993-74-153)
- 9:30AM *ENO Wavelet-ELLAM Schemes for Linear Transport Equations with Piecewise Smooth Data.* Preliminary report.
 (1284) **Jiangguo Liu***, **Bojan Popov**, Texas A&M University, **Hong Wang**, University of South Carolina, and **Richard E. Ewing**, Texas A&M University (993-65-96)
- 10:00AM *Curvelets and Linear Hyperbolic Equations.*
 (1285) **Emmanuel J Candes** and **Laurent Demanet***, California Institute of Technology (993-35-1714)
- 10:30AM *Analysis of a discontinuous Galerkin and eddy viscosity method for Navier-Stokes.*
 (1286) **S Kaya*** and **Beatrice Riviere**, University of Pittsburgh (993-76-745)

AMS Special Session on Modern Function Theory, II

8:00 AM – 10:50 AM

Organizers: **Beth Schaubroeck**, U. S. Air Force Academy
Peter L. Duren, University of Michigan, Ann Arbor
John A. Pfaltzgraff, University of North Carolina at Chapel Hill

8:00AM *Holomorphic mappings of circular domains onto convex domains in n dimensional space.* Preliminary report.
(1287) **Ted J Suffridge**, University of Kentucky (993-32-630)

8:30AM *Construction of convex mappings of p -balls in \mathbb{C}^2 .* Preliminary report.
(1288) **Jerry R. Muir, Jr.***, Rose-Hulman Institute of Technology, and **Ted J. Suffridge**, University of Kentucky (993-32-955)

9:00AM *Regularity properties of Loewner chains in several variables.*
(1289) **Ian Graham***, University of Toronto, **Gabriela Kohr** and **Mirela Kohr**, Babes-Bolyai University (993-32-893)

9:30AM *On Hyperbolically Convex Functions.* Preliminary report.
▶ (1290) **Roger W Barnard***, Texas Tech University, **G Lenny Ornas**, McNeese State University, **Kent Pearce** and **G Brock Williams**, Texas Tech University (993-30-656)

10:00AM *Maximizing A Class of Functionals over Hyperbolically Convex Functions.*
(1291) **Gerard L Ornas***, **Roger W Barnard** and **Kent Pearce**, Texas Tech University (993-30-142)

10:30AM *Convexity properties of the hyperbolic density.* Preliminary report.
(1292) **William Ma***, Pennsylvania College of Technology, and **David Minda**, University of Cincinnati (993-30-138)

AMS Special Session on Smooth Dynamical Systems and Applications, II

8:00 AM – 10:40 AM

Organizers: **Qiu-dong Wang**, University of Arizona
Maciej P. Wojtkowski, University of Arizona

8:00AM *Generic hydrodynamic instability via contact homology.*
(1293) **Robert Christ***, University of Illinois, Urbana-Champaign, and **John Etnyre**, University of Pennsylvania (993-37-1528)

9:00AM *Diophantine approximation and self-conformal measures.* Preliminary report.
(1294) **Mariusz Urbanski**, University of North Texas (993-37-231)

10:00AM *Actions of lattices on low-dimensional manifolds.*
(1295) **John Franks***, Northwestern University, and **Michael Handel**, Lehman College CUNY (993-37-1177)

AMS Special Session on Geometric Structures on Manifolds, I

8:00 AM – 10:50 AM

Organizers: **Tedi C. Draghici**, Florida International University
Gueo V. Grantcharov, Florida International University
Philippe Rukimbura, Florida International University

8:00AM *Timelike minimal surfaces via loop groups.*
(1296) **Magdalena D Toda***, Texas Tech University, and **Junichi Inoguchi**, Utsunomyia University, Japan (993-53-155)

8:30AM *New symplectic 4-manifolds with $b_+=1$.* Preliminary report.
(1297) **Scott J Baldridge**, Indiana University (993-53-620)

9:00AM *On the geometric structures necessary for Nahm transform.* Preliminary report.
(1298) **Marcos Jardim**, University of Massachusetts at Amherst (993-53-228)

9:30AM *Calabi-Yau Connections with Torsion on Toric Bundles.*
(1299) **Yat Sun Poon***, UC Riverside, **Gueo Grantcharov**, Florida International University, and **Dimitar Grantcharov**, University of Alberta (993-53-1152)

10:00AM *Geometric Quantization of the Geodesic Flow of the Compact Rank-One Symmetric Spaces.* Preliminary report.
(1300) **Dimitar V Grantcharov**, University of Alberta (993-51-1068)

10:30AM *Geometric Inequalities for Submanifolds in Sasakian Manifolds.* Preliminary report.
(1301) **Ion Mihai**, Bucharest University (993-53-119)

AMS Special Session on Arithmetical Algebraic Geometry, II

8:00 AM – 10:50 AM

Organizers: **Kirti Joshi**, University of Arizona
Minhyong Kim, University of Arizona
Adrian Vasiu, University of Arizona

8:00AM *p -adic Periods of Modular Elliptic Curves.*
(1302) **Shuzo Takahashi**, University of Arizona (993-11-1091)

8:30AM *The Motivic DGA.*
(1303) **Roy Joshua**, Institute for Advanced Study/Ohio State University (993-14-873)

9:00AM *Gaussian Hypergeometric Functions, and Traces of Hecke Operators.*
(1304) **Sharon M Frechette***, College of the Holy Cross, **Ken Ono**, University of Wisconsin, Madison, and **Matthew Papanikolas**, Texas A&M University (993-11-141)

9:30AM *On the p -order of the Shafarevich-Tate groups of elliptic curves via Kolyvagin's method.*
(1305) **Byungchul Cha**, Johns Hopkins University (993-11-1286)

10:00AM *The number of extensions of a number field with fixed degree and bounded discriminant.*
(1306) **Jordan S Ellenberg***, Princeton University, and **Akshay Venkatesh**, Massachusetts Institute of Technology (993-11-903)

10:30AM *The rank of the Mordell-Weil groups of elliptic curves over large fields.*
(1307) **Bo-Hae Im**, Indiana University, Bloomington (993-11-814)

AMS Special Session on Value Distribution Theory in Classical and p -Adic Function Theory, I

8:00 AM – 10:50 AM

Organizers: **Alain Escassut**, Université Blaise Pascal
Ilpo Laine, University of Joensuu
Chung-Chun Yang, Hong Kong University of Science and Technology

8:00AM *Interplay of coefficient behavior and solution behavior for complex differential equations in the unit disk.* Preliminary report.
(1308) **Linda R. Sons**, Northern Illinois University (993-30-1369)

- 8:30AM (1309) *Linear differential equations and logarithmic derivative estimates.*
Igor Chyzykov, Lviv National University, **Gary G Gundersen***, University of New Orleans, and **Janne Heittokangas**, University of Joensuu (993-30-995)
- 9:00AM (1310) *Growth estimates for analytic solutions of complex linear differential equations.* Preliminary report.
Janne Heittokangas, University of Illinois at Urbana-Champaign, **Risto Korhonen***, Loughborough University, and **Jouni Rattya**, University of Joensuu (993-34-776)
- 9:30AM (1311) *On solutions of linear differential equations with bounded Nevanlinna characteristic.* Preliminary report.
Janne Heittokangas*, University of Illinois at Urbana-Champaign, **Risto Korhonen**, Loughborough University, and **Jouni Rättyä**, University of Joensuu (993-30-590)
- 10:00AM (1312) *Random iteration of analytic maps.*
Tuen Wai Ng*, The University of Hong Kong, **Alan F. Beardon**, T. K. Carne, University of Cambridge, and **David Minda**, University of Cincinnati (993-30-970)
- 10:30AM (1313) *Ultrametric Gelfand Transforms.*
Nicolas Mainetti, LLAIC - Universite d'Auvergne (993-13-1233)

AMS Special Session on Nonlinear Partial Differential Equations and Variational Problems, III

8:00 AM – 10:50 AM

Organizers: **David A. Hartenstine**, University of Utah
Ahmed Mohammed, Ball State University
John M. Neuberger, Northern Arizona State University
John W. Neuberger, University of North Texas

- 8:00AM (1314) *A Variational Approach to Solving the Time-Dependent Ginzburg-Landau Equations in Three Space Dimensions.* Preliminary report.
Patricia E Bauman*, **Hala Jadallah** and **Daniel Phillips**, Purdue University (993-35-1549)
- 8:30AM (1315) *On Generalized and Viscosity Solutions of Nonlinear Elliptic Equations.*
David Hartenstine* and **Klaus Schmitt**, University of Utah (993-35-839)
- 9:00AM (1316) *Domain geometry and the Pohozaev Identity.*
Jeff S McGough*, **Gregg T Stubbendieck**, South Dakota School of Mines and Technology, and **Jeff Mortensen**, University of Nevada Reno (993-35-634)
- 9:30AM (1317) *Solvability of parabolic variational inequalities in Banach spaces.*
Matthew Rudd, University of Texas at Austin (993-35-1150)
- 10:00AM (1318) *Young measure minimizers in nonlinear membrane theory.*
Marian Bocea, Carnegie Mellon University (993-49-120)
- 10:30AM (1319) *Existence and Asymptotic Boundary Behavior of Blow-up Solutions to Weighted Quasilinear Equations.* Preliminary report.
Ahmed Mohammed, Ball State University (993-35-1211)

AMS Special Session on Low-Dimensional Topology, III

8:00 AM – 10:50 AM

- Organizer: **Tim D. Cochran**, Rice University
- 8:00AM (1320) *Filtrations of Classical Knots.*
Tim D Cochran, Rice University (993-57-1168)
- 8:30AM (1321) *New obstructions to doubly slicing knots.*
Taehee Kim, Rice University (993-57-1184)
- 9:00AM (1322) *Concordance of boundary links.*
Jerome P Levine, Brandeis University (993-57-975)
- 9:30AM (1323) *The Doubled-Delta Move on Ordered Links.* Preliminary report.
Carol Gwosdz Gee, Rice University (993-57-1180)
- 10:00AM (1324) *The $H_3(PSL(2, C), Z)$ class and Chern-Simons invariant of a hyperbolic 3-manifold.*
Walter D Neumann, Barnard College, Columbia University (993-57-911)
- 10:30AM (1325) *Spin Bordism Invariants of the Mapping Class Group.*
Aaron Heap, Rice University (993-55-707)

AMS Session on History, Foundation and Mathematics Education

8:00 AM – 9:55 AM

- 8:00AM (1326) *If People Were Papers and Papers Were People.* Preliminary report.
Jerrold W. Grossman, Oakland University (993-01-639)
- 8:15AM (1327) *Undecidable Lattices of Finite Dimensional Steinitz Exchange Systems.* Preliminary report.
Lisa R Galminas*, Northwestern State University of LA, and **John W Rosenthal**, Ithaca College (993-03-1644)
- 8:30AM (1328) *Embedding modular lattices as principal filters in the lattice of Computably Enumerable Vector Spaces.* Preliminary report.
Rumen D Dimitrov, Western Illinois University (993-03-1674)
- 8:45AM (1329) *Geometric Reasoning.*
Tevian Dray* and **Corinne A. Manogue**, Oregon State University (993-97-1594)
- 9:00AM (1330) *The number sense of preservice elementary school teachers.* Preliminary report.
Yea-ling Tsao, Overseas Chinese Institute of Technology (993-97-280)
- 9:15AM (1331) *Getting Students to Discuss Linear Algebra via Email.*
Matt Insall, University of Missouri- Rolla (993-97-576)
- 9:30AM (1332) *Mathematical Connections: For Example, "How To Teach Radicals In Less Than 5 Minutes" (Grades 6-16).* Preliminary report.
Juli D'Ann Ratheal, West Texas A & M University (993-97-1147)
- 9:45AM (1333) *Teacher Reflection and Collaboration in the Form of Lesson Study: The Effects on Student Achievement in Mathematics.*
Diane Barrett* and **Laurie Riggs**, Cal Poly, Pomona (993-97-1585)

MAA Session on Teaching and Learning of Undergraduate Mathematics, II

8:00 AM – 10:55 AM

Organizers: **Anne E. Brown**, Indiana University South Bend

Marilyn P. Carlson, Arizona State University

Draga D. Vidakovic, Georgia State University

- 8:00AM *Mathematics Anxiety and Learned Helplessness*. Preliminary report. ▶ (1334)
Joseph Franke Kolacinski, University of Miami (993-R1-498)
- 8:20AM *Strange Attractors and Chaos as a Theoretical Framework for Understanding the Dynamics of Student Attitudes toward Mathematics*. ▶ (1335)
Zaur Berkaliyev, California State University (993-R1-347)
- 8:40AM *Improving student performance and sense-making in Liberal Arts Mathematics*. ▶ (1336)
Shandy Hauk*, **Robert A. Powers**, **April D. Judd** and **Jenq-Jong Tsay**, U. of Northern Colorado (993-R1-1399)
- 9:00AM *Using Web Based Technology to enhance College Algebra*. ▶ (1337)
Gary Hagerty, Black Hills State University (993-R1-264)
- 9:20AM *When We Need The Sage On The Stage*. ▶ (1338)
Patricia L Hale, Cal Poly Pomona (993-R1-195)
- 9:40AM *Student use of software to verify geometrical statements*. Preliminary report. (1339)
Jeff Connor*, **Barbara Grover** and **Laura Moss**, Ohio University (993-R1-1317)
- 10:00AM *A Transformation of Pre-service Mathematics Teachers' Definitions of Mathematics*. ▶ (1340)
Carmen Marie Latterell, University of Minnesota Duluth (993-R1-19)
- 10:20AM *Characteristics of Prospective Teachers' Posed Problems*. ▶ (1341)
Todd A. Grundmeier, California Polytechnic State University, San Luis (993-R1-283)
- 10:40AM *Undergraduate Mathematical Knowledge for High School Teaching*. Preliminary report. ▶ (1342)
Bradford R Findell* and **R Judith Reed**, University of Georgia (993-R1-1416)

MAA Session on My Favorite Demo: Innovative Strategies for Mathematics Instructors, II

8:00 AM – 10:55 AM

Organizers: **David R. Hill**, Temple University
Lila F. Roberts, Georgia Southern University

- 8:00AM *The Utility of Catenaries to Electric Utilities*. ▶ (1343)
Sharon M. Barrs, **James P. Braselton**, **Lorraine M. Braselton**, Georgia Southern University, and **Lila F. Roberts***, Georgia College & State University (993-S1-377)
- 8:15AM *Seeing is believing: Visuals on Demand*. Preliminary report. ▶ (1344)
Jennifer A Bergner*, Salisbury University, and **Donald Spickler**, Salisbury University (993-S1-388)
- 8:30AM *Our Favorite Level Curves and Linear Regression Demos*. ▶ (1345)
Agnes M. Rash*, Saint Joseph's University, and **Jean Marie McDill**, California Polytechnic State U. (993-S1-401)
- 8:45AM *Using a POP quiz to Introduce Statistics to the Weary*. Preliminary report. ▶ (1346)
Jane M Wilburne, Shippensburg University (993-S1-390)

- 9:00AM *Tablet PC and Mathematics: A Match Made in Heaven*. ▶ (1347)
Bert Wachsmuth, Seton Hall University (993-S1-437)
- 9:15AM *Pulling Ropes and Plumbing Lines: Introducing Geometry with a Neolithic Tool Kit*. ▶ (1348)
Stephen J Luecking, DePaul University (993-S1-282)
- 9:30AM *The Curved Cube*. Preliminary report. ▶ (1349)
Roland Minton*, Roanoke College, and **Gregory Minton**, Salem High School (993-S1-302)
- 9:45AM *Taylor Series : The Movie*. ▶ (1350)
Rachel W Hall, Saint Joseph's University (993-S1-507)
- 10:00AM *Using technology to illustrate level curves*. ▶ (1351)
Jeffrey L. Hirst* and **Holly P. Hirst**, Appalachian State University (993-S1-427)
- 10:15AM *Visual aids for volumes of revolution and 3D functions in Calculus*. Preliminary report. (1352)
Tamara B Veenstra, University of Redlands (993-S1-363)
- 10:30AM *Voronoi Diagrams and the Geometric Notion of Proximity*. ▶ (1353)
Bruno Guerrieri, Florida A&M University (993-S1-345)
- 10:45AM *Discovering Derivative Rules*. (1354)
Sharon Sue Emerson-Stonnell, Longwood University (993-S1-545)

MAA Session on Focus on Integrating Graphic Handhelds into Collegiate Mathematics

8:00 AM – 10:55 AM

Organizers: **Charles E. Hofmann**, LaSalle University
Joseph R. Fiedler, California State University, Bakersfield

- 8:00AM *About the experiences how to integrate computers or CAS-calculators in Mathematical Education in Austria*. ▶ (1355)
Otto Wurnig, Institute of Mathematics (993-V1-364)
- 8:15AM *New Ways of Assessment in CAS-oriented mathematical Education - New Experiences, First results*. ▶ (1356)
Otto Wurnig, Institute of Mathematics (993-V1-362)
- 8:30AM *Integrating algebra-capable calculators into a number theory with cryptography course*. ▶ (1357)
David B Gove, California State University, Bakersfield (993-V1-765)
- 8:45AM *Palm Pilot Mathematics & Programming*. ▶ (1358)
Preliminary report.
Olga Yiparaki, IBM (993-V1-405)
- 9:00AM *Using a TI-83 to Motivate Theorems and Reinforce Concepts in Precalculus Classes*. ▶ (1359)
James A. Nickerson, Gallaudet University (993-V1-378)
- 9:15AM *Impact of Graphing Calculator Use on Precalculus Students' Understanding of Polynomial, Rational, and Exponential Functions: Results and Reflections*. (1360)
Becky Krakowski, University of Dayton (993-V1-419)
- 9:30AM *Discovering Derivatives of Familiar Functions Using a Graphing Calculator*. ▶ (1361)
Murray H. Siegel, Sam Houston State University (993-V1-29)
- 9:45AM *Enhancing University Students' Mathematical Understanding Through the Use of Handheld Data Collection Devices*. Preliminary report. ▶ (1362)
Jorgen J Berglund, CSU, Chico (993-V1-328)

- 10:00AM *Modeling Heat Flow in a Thermos.*
▶ (1363) **Michael A. Karls*** and **James E. Scherschel**, Ball State University (993-V1-289)
- 10:15AM *Meaningful Contexts and Calculator Exploration Increase Students' Mathematical Understanding.*
▶ (1364) **James Sandefur**, Georgetown University (993-V1-537)
- 10:30AM *Using Handheld Technology In The Classroom: Lessons From Novices.*
▶ (1365) **Gregory N Hartman***, University of Arizona, and **Russel O Carlson**, University of Arizona (993-V1-486)
- 10:45AM *Constructing Geometric Understandings for Prospective Elementary Teachers through Dynamic Visualization on the TI 83+.*
(1366) **Barbara Johnson Pence**, San Jose State Univ (993-V1-1030)

Shawnee L. McMurrin, California State University at San Bernardino

- 8:00AM *Counting Handshakes to Sums of Powers of Integers.*
▶ (1376) **Thomas J Pfaff**, Ithaca College (993-Z1-237)
- 8:15AM *Leg-slope generation of Pythagorean triples.*
▶ (1377) Preliminary report.
Daniel Drucker*, Wayne State University, and **Fat C Lam**, Gallaudet University (993-Z1-1013)
- 8:30AM *Partitions and Groups.* Preliminary report.
▶ (1378) **Michael J. Grady**, Southern Utah University (993-Z1-97)
- 8:45AM *Catenary or Parabola?*
(1379) **Curtis J. Feist**, Southern Oregon University (993-Z1-1346)
- 9:00AM *A Demonstration of Teaching and Applying Baye's Formula.*
▶ (1380) **Paul Kochanowski*** and **Morteza Shafii-Mousavi**, Indiana University South Bend (993-Z1-202)
- 9:15AM *Safety Deposit: what it really costs us.* Preliminary report.
(1381) **Youngna Choi***, Montclair State University, and **Yeomin Yoon**, Seton Hall University (993-Z1-415)
- 9:30AM *Temperature Models for Two Room Systems.*
▶ (1382) **J K Denny*** and **C A Yackel**, Mercer University (993-Z1-239)
- 9:45AM *Will the Real Most Valuable Player Please Stand Up?*
▶ (1383) Preliminary report.
Joseph Evan* and **Daniel J. Ghezzi**, King's College (993-Z1-1143)
- 10:00AM *Teaching Combinatorics Using Guided Discovery.*
(1384) **Mark A Miller**, Marietta College (993-Z1-984)
- 10:15AM *Computer Science Majors Coding Graph Algorithms and Simulating Automata.*
▶ (1385) **Edward Aboufadel**, Grand Valley State University (993-Z1-194)
- 10:30AM *On general convergence and polynomiography in computing roots of unity.*
▶ (1386) **Yi Jin***, Rutgers University, and **Bahman Kalantari**, Rutgers University (993-Z1-1156)

MAA Session on Mathematics and Sports, I

8:00 AM – 10:55 AM

Organizers: **Sean L. Forman**, Saint Joseph's University

Douglas Drinen, University of the South

- 8:00AM *The Pythagorean Theorem of Baseball.*
▶ (1367) **Michael A Jones** and **Linda A Tappin***, Montclair State University (993-W1-796)
- 8:20AM *Run Production in Baseball: a Markov Chain Model.*
▶ (1368) **Thomas W. Polaski**, Winthrop University (993-W1-332)
- 8:40AM *Whether You Win or Lose, It's How the Overtime is Played: A Markov Chain Analysis of the National Football League's Overtime Rules.*
▶ (1369) **Michael A Jones**, Montclair State University (993-W1-372)
- 9:00AM *Moral Hazard on the Mound: the Economics of Plunking.*
▶ (1370) **Doug Drinen**, University of the South (993-W1-947)
- 9:20AM *May the Best Team Win: The Mathematics of Scoring a Cross-Country Running Race.*
▶ (1371) **Stephen Szydluk**, University of Wisconsin Oshkosh (993-W1-201)
- 9:40AM *The Tournament-Ranking Family of Four.*
▶ (1372) **Charles Redmond**, Mercyhurst College (993-W1-838)
- 10:00AM *Sabermetrics: Giving College Credit for Studying Baseball.*
▶ (1373) **Michael R Huber*** and **Gabriel Costa**, United States Military Academy (993-W1-190)
- 10:20AM *The New Football Coach's Dilemma: Overtime.*
▶ (1374) **Vince Schielack**, Texas A&M University (993-W1-504)
- 10:40AM *"Real" Data Comparisons, Game Theory, and Operations Research in the Game of Baseball.*
▶ (1375) **Robert V Stack** and **Monty G Fickel***, Chadron State College (993-W1-1117)

MAA General Contributed Paper Session, VI

8:00 AM – 10:40 AM

Organizers: **Laura J. Wallace**, California State University, San Bernardino
Jacqueline A. Jensen, Sam Houston State University
Gary W. Towsley, SUNY at Geneseo
Michael A. Jones, Montclair State University

AWM Workshop

8:20 AM – 5:00 PM

This session consists of several parts listed separately throughout this program. All meeting participants are invited to attend all presentations.

Organizers: **Catherine A. Roberts**, The College of the Holy Cross

Jodie D. Novak, University of Northern Colorado

AMS-MAA Special Session on History of Mathematics, III

8:30 AM – 10:50 AM

Organizers: **Joseph W. Dauben**, Lehman College (CUNY)

David E. Zitarelli, Temple University

- 8:30AM *Thomas Harriot's Treatise on Figurative Numbers and Finite Differences.* Preliminary report.
(1387) **Janet L. Beery**, University of Redlands (993-01-1078)
- 9:00AM *Humanizing mathematical biographies.* Preliminary report.
▶ (1388) **John W Dawson**, Penn State York (993-01-217)

- 9:30AM *Mathematician as Artist: Marston Morse*
 ▶ (1389) (1892-1977). Preliminary report.
Joanne E. Snow* and **Colleen M. Hoover**, Saint Mary's College (993-01-288)
- 10:00AM *Learning some of the basics of historical research through the movies.* Preliminary report.
 ▶ (1390) **Alejandro R. Garciadiego**, UNAM, Mexico (993-01-647)
- 10:30AM *Mathematics and Opera: The mathematical work of the opera singer Jerome Hines.* Preliminary report.
 ▶ (1391) **T. Christine Stevens**, Saint Louis University (993-01-675)

AWM Workshop: Presentations by Recent Women Ph.D.s and Graduate Students, I

8:30 AM – 10:20 AM

- 8:30AM *Finite-to-One Mappings on $\beta\mathbb{N} - \mathbb{N}$.*
 (1392) **Katherine J. Mawhinney**, Appalachian State University
- 9:00AM *Real and Topological Stable Rank.*
 (1393) **Marian K. Hukle**, University of Kansas
- 9:30AM *Measurably dominating randomness: some measurable similarities between set theory and recursion theory regarding dominating functions.*
 (1394) **Natasha Dobrinen*** and **Stephen G. Simpson**, The Pennsylvania State University
- 10:00AM *Inequalities for geometric lattice invariants.*
 (1395) **Kathryn Nyman**, Texas A&M University

AMS Committee on Education Panel Discussion

8:30 AM – 10:00 AM

The evaluation of state mathematics standards: How can mathematicians contribute?

- Moderator: **Roger E. Howe**, Yale University
 Panelists: **Johnny W. Lott**, NCTM and University of Montana
Laura McGiffert, Achieve, Inc.
R. James Milgram, Stanford University

MAA Invited Address

9:00 AM – 9:50 AM

- (1396) *When topology meets chemistry.*
Erica L. Flapan, Pomona College (993-A0-15)

ASL Invited Address

9:00 AM – 9:50 AM

- (1397) *Computable classification.*
Julia Knight, University of Notre Dame

MAA Minicourse #15: Part B

9:00 AM – 11:00 AM

- Fair enough? Mathematics of equity.*
 Organizers: **John C. Maceli**, Ithaca College
Stanley E. Seltzer, Ithaca College

MAA Minicourse #4: Part B

9:00 AM – 11:00 AM

- Java applets in teaching mathematics.*
 Organizers: **Joe Yanik**, Emporia State University

David M. Strong, Pepperdine University

MAA Panel Discussion

9:00 AM – 10:20 AM

Mathematicians and mathematics teacher educators working together to improve K-12 mathematics education.

- Organizer: **Jodie D. Novak**, University of Northern Colorado
 Panelists: **Jack Price**, National Council of Teachers of Mathematics
Judith E. Jacobs, NCTM and AMTE
Randall J. Swift, California State Polytech University Pomona
Jodie D. Novak, University of Northern Colorado

MAA Panel Discussion

9:00 AM – 10:20 AM

Doctorates in mathematics education: Where do they go? What do they do? How can mathematics departments contribute?

- Organizer: **Robert E. Reys**, University of Missouri-Columbia
 Panelists: **Douglas B. Aichele**, Oklahoma State University
Rick Billstein, University of Montana
Ira J. Papick, University of Missouri

AMS-MAA Committee on Teaching Assistants and Part-Time Instructors Panel Discussion

9:00 AM – 10:20 AM

Nonpermanent instructors: implications and issues.

- Organizers: **Teri J. Murphy**, University of Oklahoma
Natasha M. Speer, Michigan State University

NAM Panel Discussion

9:00 AM – 10:00 AM

Exhibits and Book Sales

9:00 AM – NOON

Mathematical Art Exhibit

9:00 AM – NOON

- Organizers: **Robert Fathauer**, Tessellations Company, Phoenix, Arizona
Nat Friedman, ISAMA, SUNY at Albany
Reza Sarhangi, Bridges Conference, Towson University

Employment Center

9:00 AM – NOON

Math on the Web

9:30 AM – 11:00 AM

Go to the Math on the Web Pavilion for the complete schedule of presentations.

ASL Invited Address

10:00 AM – 10:50 AM

(1398) *Supercompactness measures.*
Steve Jackson, University of North Texas

NAM Business Meeting

10:00 AM – 10:50 AM

MAA Retiring Presidential Address

10:05 AM – 10:50 AM

(1399) *Fallacies in elementary statistics.*
Ann E. Watkins, California State University, Northridge (993-A0-13)

AWM Workshop: Poster Session by Women Graduate Students

10:30 AM – 11:00 AM

- 10:30AM (1400) *On the Complexity of the Endomorphism Problem for Free Groups.*
Laura Ciobanu, Rutgers University
- 10:30AM (1401) *Lie 2-algebras.*
Alissa S. Crans, University of California, Riverside
- 10:30AM (1402) *Characterizing Multivariable Low-Pass Filters.*
Eva Curry, Rutgers University
- 10:30AM (1403) *Singularities in Conformal Geometry: from PDE to Topology.*
Maria del Mar Gonzalez, Princeton University
- 10:30AM (1404) *Convergence of a Spacetime Discontinuous Galerkin Method to a weak solution of Temple Systems.*
Katarina Jegdic, University of Illinois at Urbana-Champaign
- 10:30AM (1405) *Radial parts of invariant differential operators on Grassmann manifolds.*
Olga Kurgalina, Tufts University
- 10:30AM (1406) *r-matrices on Lie Superalgebras.*
Gizem Karaali, University of California, Berkeley
- 10:30AM (1407) *Density of Closed Geodesics in Compact Nilmanifolds Defined by Compact Semisimple \mathfrak{g} -modules.*
Rachelle DeCoste, University of North Carolina, Chapel Hill
- 10:30AM (1408) *Alternating Quadriseccants of Knots.*
Elizabeth Denne, University of Illinois at Urbana-Champaign
- 10:30AM (1409) *Application of the Generalized Singular Value Decomposition to Face Recognition.*
Peg Howland, University of Minnesota, Department of Computer Science and Engineering
- 10:30AM (1410) *Generalized Foulkes' Conjecture and Tableaux Construction.*
Rebecca Vessenes, California Institute of Technology
- 10:30AM (1411) *A Blowing Up Algorithm for Calculating Rings of Integers.*
Sarah Hutcheson Jahn, University of Illinois at Chicago

MAA Business Meeting

11:10 AM – 11:40 AM

AMS Business Meeting

11:45 AM – 12:15 PM

NAM Claytor-Woodard Lecture

1:00 PM – 1:50 PM

ASL Invited Address

1:00 PM – 1:50 PM

(1412) *Torsion-free groups in some o-minimal structures.*
Kobi Peterzil, Haifa, Israel

AMS-MAA Special Session on Mathematical Techniques in Musical Analysis, III

1:00 PM – 5:50 PM

Organizers: **Judith L. Baxter**, University of Illinois at Chicago
Robert W. Peck, Louisiana State University

- 1:00PM (1413) *Cardinality Equals Variety for Chords, with a Note on the Twin Primes Conjecture.*
David L. Clampitt, Yale University (993-11-1178)
- 1:30PM (1414) *Well-formed Scales and the Stern Brocot Tree.*
Norman A Carey, Eastman School of Music (993-11-1046)
- 2:00PM (1415) *Winding modes around the circle of fifths.*
Vittorio Cafagna* and Domenico Vicinanza, DMI - University of Salerno (993-05-935)
- 2:30PM (1416) *The Role of Mathematics in the Construction of Musical Scales.* Preliminary report.
Richard J Krantz, Metropolitan State College of Denver (993-00-737)
- 3:00PM (1417) *Aspects of Saturation and Ordering in Twelve-Tone Music.* Preliminary report.
Ciro G Scotto* and Robert D Morris, Eastman School of Music (993-20-1663)
- 3:30PM (1418) *A Topological Model of Motivic Analysis of Music: Theory and Implementation.*
Chantal Buteau, Swiss Federal Institute of Technology Zurich (993-54-1237)
- 4:00PM (1419) *A geometric model of continuous musical spaces.*
Clifton D Callender, Florida State University (993-51-1212)
- 4:30PM (1420) *Knots, Braids and Chord Diagrams, As New Musical Structures.*
Franck J. Jedrzejewski, Atomic Energy Commission (CEA-INSTN) (993-54-315)
- 5:00PM (1421) *Coincident histories or historical coincidence? Concurrent developments in nineteenth-century group theory and music theory.*
Nora A Engebretsen, Bowling Green State University (993-01-1646)
- 5:30PM Discussion.

AMS-MAA Special Session on History of Mathematics, IV

1:00 PM – 3:50 PM

Organizers: **Joseph W. Dauben**, Lehman College (CUNY)
David E. Zitarelli, Temple University

- 1:00PM (1422) *Contributions of Ferdinand Hassler to Early American Science*. Preliminary report.
V. Frederick Rickey, West Point (993-01-1007)
- 1:30PM (1423) *Edward V. Huntington and the Apportionment Debate of 1920–1940*. Preliminary report.
Thomas L. Bartlow, Villanova University (993-01-329)
- 2:00PM (1424) *The Texas-Polish Connection in Topology: Competition and Cooperation*.
Albert C. Lewis, Indiana Univ. - Purdue Univ. Indianapolis (993-01-356)
- 2:30PM (1425) *From Vienna to New York: Abraham Wald's Converging Communities*.
Patti W. Hunter, Westmont College (993-01-713)
- 3:00PM (1426) *A (very) brief history of the problem of resolution of singularities of algebraic surfaces*. Preliminary report.
Chris Christensen, Northern Kentucky University (993-01-102)
- 3:30PM (1427) *Algebraic topology chez Bourbaki*. Preliminary report.
John McCleary, Vassar College (993-01-664)

AMS Special Session on Nonassociative Algebra, II

1:00 PM – 5:50 PM

Organizers: **Murray R. Bremner**, University of Saskatchewan
Irvin R. Hentzel, Iowa State University
Luiz A. Peresi, University of Sao Paulo

- 1:00PM (1428) *Relatively free coalgebras*.
Mikhail V. Kochetov, Carleton University (993-17-1390)
- 1:30PM (1429) *Matrices over octonions and orbits of exceptional groups*.
Sergei Krutelevich, University of Ottawa (993-17-966)
- 2:00PM (1430) *Representations of rank 3 algebras*.
Georgia Benkart, University of Wisconsin, and **Alicia Labra***, Universidad de Chile (993-17-455)
- 2:30PM (1431) *One-sided Modules and unital bimodules over Jordan superalgebras*.
Consuelo Martínez, Universidad de Oviedo, Spain (993-17-802)
- 3:00PM (1432) *Identities in Jordan Algebras*.
Kevin M McCrimmon, University of Virginia (993-17-525)
- 3:30PM (1433) *Reciprocity between some bi-linear and tri-linear algebras*.
S. Okubo, University of Rochester (993-17-628)
- 4:00PM (1434) *Octonions and Exceptional Superalgebras*.
Michel L. Racine, University of Ottawa (993-17-1323)
- 4:30PM (1435) *Imbedding of Lie Triple Systems into Lie Algebras*. Preliminary report.
Oleg Smirnov, College of Charleston (993-17-1375)
- 5:00PM (1436) *Octonion Multiplication Theorems*.
John H Conway, Princeton University, and **Derek A Smith***, Lafayette College (993-17-1614)
- 5:30PM (1437) *Structurable tori*.
Yoji Yoshii, University of Saskatchewan (993-17-961)

AMS Special Session on Competitive and Adaptive Dynamics in Ecology, III

1:00 PM – 5:50 PM

Organizers: **Carlos Castillo-Chavez**, Los Alamos National Laboratory
Yang Kuang, Arizona State University
Bai-Lian Li, University of California Riverside
Horst R. Thieme, Arizona State University

- 1:00PM (1438) *Exactly Solvable Models of Nonlinear Population Dynamics Related to Biological Invasions*.
Sergei V. Petrovskii*, Shirshov Institute of Oceanology, **Bai-Lian Li**, Department of Botany and Plant Sciences, and **Horst Malchow**, Institute of Environmental Systems Research (993-92-969)
- 1:30PM (1439) *Modeling agricultural ecosystem dynamics under Bt resistant pest invasion*.
Alexander B Medvinsky*, Institute for Theoretical & Experimental Biophysics, Russian Academy of Sciences, **Andrew Y Morozov**, Department of Botany & Plant Sciences, University of California, **Vassili V Velkov**, Institute of Biochemistry & Physiology of Microorganisms, Russian Academy of Sciences, **Bai-Lian Li**, Department of Botany & Plant Sciences, University of California, **Mikhail S Sokolov**, Research Center for Toxicology and Hygienic Regulation of Biopreparations, and **Horst Malchow**, Institute of Environmental Systems Research, University of Osnabrueck (993-92-907)
- 2:00PM (1440) *Localized interactions and biological diversity*. Preliminary report.
Frederick R Adler*, University of Utah, and **Helene C Muller-Landau**, NCEAS (993-92-822)
- 2:30PM (1441) *Coexistence in a metapopulation model with explicit local competition dynamics*. Preliminary report.
Zhilan Feng*, **Rob Swihart**, Purdue University, **Yingfei Yi**, Georgia Institute of Technology, and **Huaiping Zhu**, York University (993-34-610)
- 3:00PM (1442) *On the impossibility of coexistence of infinitely many strategies*.
Mats Gyllenberg, University of Turku (993-92-727)
- 3:30PM (1443) *Climate and competition: the effect of moving range boundaries on habitat invasibility*.
A. B. Potapov* and **M. A. Lewis**, University of Alberta (993-92-698)
- 4:00PM (1444) *The Dynamics of Two Viral Infections in a Single Host Population with Applications to Hantavirus*.
Linda J. S. Allen*, Texas Tech University, **Michel Langlais**, University de Bordeaux, and **Carleton J. Phillips**, Texas Tech University (993-92-555)
- 4:30PM (1445) *Competition of pathogen strains against the background of host immune response*.
A. Pugliese, University of Trento (993-92-1246)
- 5:00PM (1446) *Dynamics of the Nonautonomous Beddington-DeAngelis Predator-Prey System*.
Meng Fan*, Northeast Normal University, and **Yang Kuang**, Arizona State University (993-34-1090)
- 5:30PM (1447) *An Age-structured Epidemic Model in a Patchy Environment*. Preliminary report.
Wendi Wang, Southwest Normal University, and **Xiaoqiang Zhao***, Memorial University of Newfoundland (993-34-761)

AMS Special Session on Multiscale and Oscillatory Phenomena: Modeling, Numerical Techniques, and Applications, III

1:00 PM – 5:50 PM

Organizers: **Richard Tsai**, Princeton University
Luminita A. Vese, University of California Los Angeles

- 1:00PM (1448) *A multiscale image representation using hierarchical (BV, L^2) decompositions.*
Eitan Tadmor*, University of Maryland, **Suzanne Nezzar** and **Luminita Vese**, University of California Los Angeles (993-41-719)
- 2:00PM (1449) *Functional minimization models for image decomposition and texture modeling.* Preliminary report.
Luminita A. Vese, UCLA (993-49-888)
- 2:30PM (1450) *Wavelet based schemes for image decomposition by variational functionals.*
Ingrid Daubechies, Princeton University, and **Gerd Teschke***, University of Bremen (993-49-1524)
- 3:00PM (1451) *Image Decomposition Via the Combination of Sparse Representations and a Variational Approach.* Preliminary report.
J.-L. Starck, CEA-Saclay, DAPNIA/SEDI-SAP, Service d'Astrophysiq, **M. Elad***, Computer Science Department, Technion Israel Insti, and **D. Donoho**, Department of Statistics, Stanford University (993-49-1231)
- 3:30PM (1452) *Solving a variational image restoration model which involves L^∞ constraints.* Preliminary report.
Stephane Lintner, Caltech, and **Francois Malgouyres***, Universite Paris 13 (993-49-774)
- 4:00PM (1453) *Restoration of wavelet coefficients by minimizing a specially designed objective function.* Preliminary report.
Sylvain Durand and **Mila Nikolova***, CMLA (CNRS-UMR 8536) (993-49-910)
- 4:30PM (1454) *Adaptive multivariate approximation: Comparing Wavelets and piecewise polynomials.*
Shai Dekel*, RealTimeImage, and **Dany Leviatan**, Tel-Aviv University (993-41-731)
- 5:00PM (1455) *Efficient algorithms for multiscale data processing.*
Anna C Gilbert, AT&T Labs-Research (993-68-158)
- 5:30PM Discussion.

AMS Special Session on Modern Function Theory, III

1:00 PM – 5:50 PM

Organizers: **Beth Schaubroeck**, U. S. Air Force Academy
Peter L. Duren, University of Michigan, Ann Arbor
John A. Pfaltzgraff, University of North Carolina at Chapel Hill

- 1:00PM (1456) *Schwarz-Christoffel maps to surfaces in space.*
Tobin A Driscoll*, University of Delaware, **Charles R Collins** and **Ken Stephenson**, University of Tennessee (993-30-1174)
- 2:00PM (1457) *Convergence of the Zipper Algorithm for Conformal Mapping.* Preliminary report.
Donald E. Marshall*, University of Washington, and **Steffen Rohde**, University of Washington (993-30-1515)

- 2:30PM (1458) *Hardy spaces, spaces of Dirichlet type, and univalent functions.*
Albert Baernstein II*, Washington University, **Daniel Girela** and **Jose Angel pelaez**, Universidad de Malaga (993-30-1332)
- 3:00PM (1459) *Landau's Theorem for Planar Harmonic Mappings.*
Michael Dorff*, Brigham Young University, and **Maria Nowak**, Maria Curie-Sklodowska University (993-30-705)
- 3:30PM (1460) *Univalent harmonic mappings and extremal length.* Preliminary report.
Allen Weitsman, Purdue University (993-30-957)
- 4:00PM (1461) *Harmonic Maps onto Star Shaped Domains.* Preliminary report.
Jane McDougall*, Colorado College, **Peter Duren**, University of Michigan, and **Beth Schaubroeck**, U. S. Air Force Academy (993-30-1657)
- 4:30PM (1462) *Symmetries of extremal functions for inequalities in univalent function theory.*
Eric D Schippers, University of Michigan, Ann Arbor (993-30-104)
- 5:00PM (1463) *Geometric and subordination properties of solutions of a differential equation: A preliminary report.* Preliminary report.
Stacey A Mueller, University of Kentucky (993-30-523)
- 5:30PM (1464) *Duals and Envelopes of Some Hardy-Lorentz spaces.*
Marc R Lengfield, Florida State University (993-46-770)

AMS Special Session on Smooth Dynamical Systems and Applications, III

1:00 PM – 4:50 PM

Organizers: **Qiu-dong Wang**, University of Arizona
Maciej P. Wojtkowski, University of Arizona

- ▶ 1:00PM (1465) *Application of Smooth Schur Factorizations in the Continuation of Separatrices.* Preliminary report.
Jorge L. Rebaza, Southwest Missouri State University (993-65-823)
- 1:30PM (1466) *The Brin quadrilateral argument for skew products over basic sets.* Preliminary report.
Keith Burns*, Northwestern University, and **Matthew Nicol**, University of Surrey (993-37-1339)
- 2:00PM (1467) *Strange Adding Machines.* Preliminary report.
Louis Block, **James Keesling**, University of Florida, and **Michal Misiurewicz***, Indiana University - Purdue University Indianapolis (993-37-687)
- 2:30PM (1468) *Double bracket equations, Volterra system and topology of the manifold of zero-diagonal Jacobi matrices with fixed spectrum.*
Alexei V. Penskoi, Centre de Recherches Mathematiques, Universite de (993-37-771)
- ▶ 3:00PM (1469) *The zero curvature equation and the reducibility problem for fiberwise linear dynamical systems.*
Ruben Flores Espinoza, Universidad de Sonora (993-34-1171)
- ▶ 3:30PM (1470) *From local to global ergodicity: An algebraic approach.*
Nandor Simanyi, The University of Alabama at Birmingham (993-37-485)
- 4:00PM (1471) *Billiards with slow mixing rates.* Preliminary report.
Nikolai I Chernov, University of Alabama at Birmingham (993-37-535)
- 4:30PM (1472) *Strange Attractors in Periodically-kicked Limit cycles and Hopf Bifurcations.*
Qidong Wang, University of Arizona (993-37-960)

AMS Special Session on Geometric Structures on Manifolds, II

1:00 PM – 5:50 PM

Organizers: **Tedi C. Draghici**, Florida International University
Gueo V. Grantcharov, Florida International University
Philippe Rukimbura, Florida International University

- 1:00PM (1473) *The Yamabe problem for almost Hermitian manifolds.*
Heberto del Rio*, CIMAT, and **Santiago R. Simanca**, IMS Stony Brook (993-58-1357)
- 1:30PM (1474) *Isotropic Kähler Hyperbolic Twistor Spaces.* Preliminary report.
D. E. Blair*, Michigan State University, **J. T. Davidov** and **O. K. Muskarov**, Bulgarian Academy of Sciences (993-53-167)
- 2:00PM (1475) *Contact manifolds and Dirac structures.* Preliminary report.
Aissa Wade, Penn State University, University Park (993-53-592)
- 2:30PM (1476) *Examples of non d_{ω} -exact locally conformal symplectic forms.*
Augustin Banyaga, The Pennsylvania State University, University Park PA 16802 (993-53-242)
- 3:00PM (1477) *The Einstein equations and G-structures.*
Richard Cleyton, UC Riverside (993-53-1639)
- 3:30PM (1478) *Einstein Metrics on Spheres.*
Charles P Boyer*, **Krzysztof Galicki**, University of New Mexico, and **János Kollár**, Princeton University (993-53-1044)
- 4:00PM (1479) *Low-Dimensional Homogeneous Einstein Manifolds.*
Christoph Boehm, Universitaet Kiel, and **Megan M Kerr***, Wellesley College (993-53-1254)
- 4:30PM (1480) *Classification of conformally-Einstein Kähler metrics.*
Gideon Maschler*, University of Toronto, and **Andrzej Derdzinski**, Ohio State University (993-53-968)
- 5:00PM (1481) *On the classification of weakly Bochner flat Kähler metrics on compact six-manifolds.* Preliminary report.
Christina Wiis Tonnesen-Friedman, Union College (993-53-678)
- 5:30PM (1482) *Kähler reduction of metrics with holonomy G_2 .*
Vestsilav D Apostolov, Université du Québec à Montréal (993-53-1377)

AMS Special Session on Arithmetical Algebraic Geometry, III

1:00 PM – 5:50 PM

Organizers: **Kirti Joshi**, University of Arizona
Minhyong Kim, University of Arizona
Adrian Vasiu, University of Arizona

- 1:00PM (1483) *New perspectives in Arakelov geometry.*
Caterina Consani*, University of Toronto, and **Matilde Marcolli**, MPI-Bonn (Germany) (993-14-992)
- 2:00PM (1484) *Around Mordell-Lang and Manin-Mumford.* Preliminary report.
A Pillay, University of Illinois at Urbana-Champaign (993-11-857)

- 3:00PM (1485) *Explicit local fundamental classes and Riemann-Roch via formal power series.* Preliminary report.
Henri A Gillet, University of Illinois at Chicago (993-14-1391)
- 3:30PM (1486) *Bloch's conductor formula and Milnor numbers of isolated singularities.*
Fabrice Orgogozo, Princeton University (993-14-1261)
- 4:00PM (1487) *Mahler measure and Coxeter links.*
Eriko Hironaka, Florida State University (993-11-509)
- 4:30PM (1488) *Hilbert's Tenth Problem for function fields of surfaces over C .*
Kirsten Eisentraeger, Institute for Advanced Study (993-11-1069)
- 5:00PM (1489) *Real aspects of the Kontsevich's moduli space of stable maps of genus zero curves.*
Seongchun Kwon, MSRI (993-14-51)
- 5:30PM (1490) *Shimura's conjecture over function fields.*
W. Dale Brownawell, Penn State University, and **Matthew A. Papanikolas***, Texas A&M University (993-11-1016)

AMS Special Session on Value Distribution Theory in Classical and p -Adic Function Theory, II

1:00 PM – 5:50 PM

Organizers: **Alain Escassut**, Université Blaise Pascal
Ilpo Laine, University of Joensuu
Chung-Chun Yang, Hong Kong University of Science and Technology

- 1:00PM (1491) *The Functional Equation $P(f) = Q(g)$ in a p -adic field.*
Alain P. Escassut*, Université Blaise Pascal, France, and **Chung C Yang**, University of Science and Technology of Hong Kong (993-11-1236)
- 1:30PM (1492) *Non-archimedean analogues of the Ahlfors Islands Theorem: holomorphic and meromorphic cases.*
Robert L. Benedetto, Amherst College (993-11-1086)
- 2:00PM (1493) *Logarithmic forms and rigid analytic Picard theorems.*
William Cherry*, University of North Texas, and **Min Ru**, University of Houston (993-32-573)
- 2:30PM (1494) *Entire solutions of certain partial differential equations.*
Bao Qin Li, Florida International University (993-32-807)
- 3:00PM (1495) *Hardy spaces on Hopf manifolds.* Preliminary report.
John Ryan*, University of Arkansas, and **R. S. Krausshar**, Ghent University, Belgium (993-58-1124)
- 3:30PM (1496) *On Spectral Theory for Non-Self-Adjoint Periodic Schrödinger Operators.*
Kwang C Shin, University of Missouri-Columbia (993-34-908)
- 4:00PM (1497) *$\cos \pi \rho$ type theorems for meromorphic functions.*
John Rossi*, Virginia Tech, and **P C Fenton**, University of Otago (993-30-547)
- 4:30PM (1498) *A note on frequency of the zeros of solutions to linear differential equations with polynomial coefficients.* Preliminary report.
Enid M Steinbart, Georgia Institute of Technology (993-34-1294)

- 5:00PM *On the location of the zeros of Bessel functions and complex oscillation theory.*
(1499) **Yik Man Chiang**, Hong Kong University of Science & Technology (993-30-1039)
- 5:30PM *Growth of Painlevé transcendents.*
▶ (1500) **Aimo Hinkkanen**, University of Illinois at Urbana-Champaign, and **Ilpo Laine***, University of Joensuu, Finland (993-30-1228)

AMS Special Session on Nonlinear Partial Differential Equations and Variational Problems, IV

1:00 PM – 5:50 PM

Organizers: **David A. Hartenstine**, University of Utah
Ahmed Mohammed, Ball State University
John M. Neuberger, Northern Arizona State University
John W. Neuberger, University of North Texas

- 1:00PM *Necksizes of singular Yamabe metrics on punctured spheres.* Preliminary report.
(1501) **Rob Kusner**, U. Mass. Amherst, and **Jesse Ratzkin***, U. Utah (993-53-1155)
- 1:30PM *Sobolev gradients: application to phase separation and shape memory materials.*
(1502) **Sultan Sial**, London, Ontario (993-82-633)
- 2:00PM *On indefinite Schrodinger equations.*
(1503) **Hossein T Tehrani***, **David Costa**, UNLV, and **Miguel Ramos**, University of Lisbon (993-35-1197)
- 2:30PM *Diffusion in Poro-Plastic Media.*
(1504) **R. E. Showalter***, Oregon State University, and **U. Stefanelli**, Istituto di Matematica Applicata e Tecnologie Informatiche – CNR (993-35-673)
- 3:00PM *Bubble clusters.* Preliminary report.
(1505) **Pablo Padilla***, University of Mexico, and **H Clara Garza**, IIMAS (993-35-683)
- ▶ 3:30PM *Spreading of electrically charged microdroplets.*
(1506) **Santiago I Betelu***, University of North Texas, and **Marco Fontelos**, Universidad Rey Juan Carlos (993-76-230)
- 4:00PM *A Variable Metric Descent Method for Curve and Surface Fairing.*
(1507) **Robert J Renka**, University of North Texas (993-65-661)
- 4:30PM *The Weyl Problem With Nonnegative Gaussian Curvature.*
(1508) **Marcus A. Khuri**, Stanford University (993-53-1523)
- 5:00PM *A variational method for the inverse groundwater problem.*
(1509) **Ian W. Knowles*** and **Aimin Yan**, University of Alabama at Birmingham (993-35-1342)
- 5:30PM *Existence result for periodic solutions of a class of Hamiltonian systems with super quadratic potential.*
(1510) **Leonard Karshima Shilgba**, Yokohama National University, Japan (993-37-348)

AMS Special Session on Low-Dimensional Topology, IV

1:00 PM – 5:20 PM

Organizer: **Tim D. Cochran**, Rice University

1:00PM *Knots and generalized Arf invariants.* Preliminary report.
(1511) **Kent E Orr***, Indiana University, Bloomington, and **Tim D Cochran**, Rice University (993-57-1675)

- 1:30PM *Khovanov homology of links in I-bundles over surfaces.* Preliminary report.
(1512) **Jozef H. Przytycki***, George Washington University, **Marta M. Asaeda**, University of Iowa, and **Adam S. Sikora**, S.U.N.Y. Buffalo and IAS (993-57-895)
- 2:00PM *A splitting formula for spectral flow on closed 3-manifolds.*
(1513) **Benjamin Himpel**, Indiana University, Bloomington (993-58-1199)
- 2:30PM *Perturbative and Integral Structures of TQFT's.* Preliminary report.
(1514) **Thomas Kerler**, The Ohio State University (993-57-1100)
- 3:00PM *Knot Concordance.* Preliminary report.
(1515) **Swatee Naik**, University of Nevada, Reno and Indiana University (993-57-642)
- 3:30PM *Type one invariants for knotted graphs, and criteria for graph planarity.* Preliminary report.
(1516) **Ted Stanford**, New Mexico State University (993-57-1242)
- 4:00PM *A classification of isometry groups of a Seifert fibered space N which is double covered by a lens space L .* Preliminary report.
(1517) **Ryo Ohashi**, Saint Louis University (993-57-467)
- 4:30PM *The Links-Gould invariant from the Kontsevich integral.*
(1518) **Nathan C Geer**, University of Oregon (993-54-953)
- 5:00PM *Energy minimization problems and other relations arising from electrodynamics on subdomains of S^3 .* Preliminary report.
(1519) **R Jason Parsley**, University of Pennsylvania (993-54-148)

MAA Minicourse #11: Part B

1:00 PM – 3:00 PM

Developing your department's assessment plan.
Organizers: **William G. Marion**, Valparaiso University
Bonnie Gold, Monmouth University

MAA Minicourse #16: Part B

1:00 PM – 3:00 PM

Getting students involved in undergraduate research.
Organizers: **Aparna W. Higgins**, University of Dayton
Joseph A. Gallian, University of Minnesota, Duluth

MAA Minicourse #5: Part B

1:00 PM – 3:00 PM

Visual linear algebra.
Organizers: **Eugene A. Herman**, Grinnell College
Michael D. Pepe, Seattle Central Community College
Eric P. Schulz, Walla Walla Community College

AMS Session on Combinatorics, III

1:00 PM – 3:40 PM

- 1:00PM *Optimal Pebbling (Part I)*. Preliminary report.
▶ (1520) **Tracii Friedman***, Mesa State College, and **Cynthia J. Wyels**, California Lutheran University (993-05-1547)
- 1:15PM *Optimal Pebbling (Part II)*. Preliminary report.
▶ (1521) **Cynthia J. Wyels***, California Lutheran University, and **Tracii Friedman**, Mesa State College (993-05-1552)
- 1:30PM *Graph Pegging and the Pegging Number*.
▶ (1522) **Geir T Helleloid***, Stanford University, **Philip Matchett**, Cambridge University, **David Moulton**, Princeton, New Jersey, and **Madeeha Khalid**, University of Warrick (993-05-561)
- 1:45PM *Graph Pegging: Powers and Products*.
▶ (1523) **Melanie Wood**, University of Cambridge (993-05-578)
- 2:00PM *Degree conditions for cross-intersecting set systems*.
(1524) **Zs. Szaniszló***, Valparaiso University, and **Zs. Tuza**, Computer and Automation Institute, Hungarian Academy of Sciences (993-05-431)
- 2:15PM *Ramsey Numbers of Stars Versus Wheels of Similar Sizes*.
▶ (1525) **Aleksandra Korolova**, MIT (993-05-1230)
- 2:30PM Break
- 2:45PM *Coupon Collecting with Quotas*.
▶ (1526) **Russell J. May**, Morehead State University (993-05-1183)
- 3:00PM *Topics in fractional domination of graphs*.
▶ (1527) **Robert R Rubalcaba***, Auburn University, **Matthew P Walsh**, Indiana-Purdue University, and **Peter D Johnson**, Auburn University (993-05-1616)
- 3:15PM *The Failure of Greedy-Type Algorithms*. Preliminary report.
▶ (1528) **Gareth L Bendall***, University of Kentucky, and **Francois Margot**, Carnegie Mellon University (993-05-530)
- 3:30PM *The Rényi-Ulam pathological liar game*. Preliminary report.
▶ (1529) **Robert B. Ellis***, Texas A&M University, **Vadim Ponomarenko**, Trinity University, and **Catherine H. Yan**, Texas A&M University (993-05-1345)

MAA Session on Uses of the WWW that Enrich and Promote Learning, II

1:00 PM – 3:15 PM

Organizers: **Marcelle Bessman**, Jacksonville University
Marcia P. Birken, Rochester Institute of Technology
Mary L. Platt, Salem State College
Brian E. Smith, McGill University

- 1:00PM *A Comprehensive Graphing System on the Web: Bringing Graphs to Life*.
▶ (1530) **Barry Cherkas**, Hunter College & Ph.D. Program in Urban Education (993-C1-360)
- 1:20PM *Using Blackboard to Motivate Students to Look for Mathematics*. Preliminary report.
▶ (1531) **Erica L Johnson**, St. John Fisher College (993-C1-1208)

- 1:40PM *Using Web-based materials featuring rich immersive settings, customizable actors and both Java- and Shock Wave-based Lite Applets in Mathematics and Science*.
▶ (1532) **Frank Wattenberg**, United States Military Academy (993-C1-192)
- 2:00PM *Heli-Math: A Web-based Student Engagement with Mathematical Sciences and a Helicopter*.
▶ (1533) **John A. Picciuto*** and **Mike Phillips**, United States Military Academy (993-C1-178)
- 2:20PM *Project REALMS—Rich Immersive and Interdisciplinary 3-D Settings to Grab and Hold Our Students*. Preliminary report.
▶ (1534) **Thomas Lainis***, **Frank Wattenberg**, **Eileen Kowalski** and **William Jones**, US Military Academy (993-C1-444)
- 2:40PM *Delivering Internet-Based Homework in Mathematics Classes at Radford University with WeBWork*. Preliminary report.
▶ (1535) **Neil P Sigmon*** and **Coreen Mett**, Radford University (993-Z1-198)
- 3:00PM *Wisconsin's Networking Project for Improvement of Mathematics Education*.
▶ (1536) **Linda G. Thompson**, Carroll College (993-C1-265)

MAA Session on Mathematics and Sports, II

1:00 PM – 3:15 PM

Organizers: **Sean L. Forman**, Saint Joseph's University
Douglas Drinen, University of the South

- 1:00PM *Factors Affecting Win-Loss Probability Of Baseball Games And The Accuracy Of Setting Odds*.
▶ (1537) **Philip B Riley**, James Madison University (993-W1-1253)
- 1:20PM *HORSEing Around with Mathematics*.
▶ (1538) **Paul R Coe***, Dominican University, and **William T Butterworth**, Barat College of DePaul University (993-W1-1503)
- 1:40PM *Using Sport to Teach Mathematics and Statistics*. Preliminary report.
▶ (1539) **Reza Noubary**, Bloomsburg University (993-W1-1562)
- 2:00PM *Modeling Spectator Movement In the Stadium*. Preliminary report.
▶ (1540) **Michael J. Bosse***, Morgan State University, and **N. R. Nandakumar**, Delaware State University (993-W1-316)
- 2:20PM *The Use of Sports Data in an Introductory, Applied Statistics Course*.
▶ (1541) **John D. McKenzie, Jr.**, Babson College (993-W1-489)
- 2:40PM *Productivity in the Game of Baseball*. Preliminary report.
▶ (1542) **C T Zahn**, San Diego, California (993-W1-709)
- 3:00PM *Monte Carlo Simulation of Baseball Seasons and NCAA Basketball Tourneys*. Preliminary report.
▶ (1543) **Sean L Forman**, Saint Joseph's University (993-W1-846)

MAA Session on Technology in Mathematics Teacher Preparation Courses, II

1:00 PM – 5:15 PM

Organizers: **Mary Ann Connors**, Westfield State College
Christine Browning, Michigan University, Kalamazoo

- 1:00PM *Effective Introduction to the Use of Geometer's Sketchpad For Pre-service Elementary Teachers.* Preliminary report.
▶ (1544) **Kimberly McGinley Vincent**, Washington State University (993-X1-492)
- 1:20PM *A Sketchpad Project for Future Elementary School Teachers.*
▶ (1545) **Timothy D Comar**, Benedictine University (993-X1-434)
- 1:40PM *Explorations with Geometer's Sketchpad.* Preliminary report.
▶ (1546) **Pallavi Jayawant**, University of Arizona (993-X1-503)
- 2:00PM *Discovering geometry in collaborative groups using Geometer's Sketchpad.* Preliminary report.
▶ (1547) **Vesna Kilibarda**, Indiana University Northwest (993-X1-245)
- 2:20PM *Technology in the Geometry Course for Prospective Elementary Teachers.*
(1548) **Barbara J Pence**, San Jose State University (993-X1-1029)
- 2:40PM *Integrated math and technology courses for prospective and practicing teachers.*
▶ (1549) **Patricia Baggett***, New Mexico State University, and **Andrzej Ehrenfeucht**, University of Colorado (993-X1-254)
- 3:00PM *Teacher Preparation in the Use of Computer Algebra Systems.* Preliminary report.
▶ (1550) **Michael J. Bosse***, Morgan State University, and **N. R. Nandakumar**, Delaware State University (993-X1-319)
- 3:20PM *Using Problem Solving to Develop a Game Winning Strategy.*
▶ (1551) **Dennis M Kern**, Texas A&M University-Texarkana (993-X1-342)
- 3:40PM *Comparing Experimental and Theoretical Probabilities: The Coin Flip Game.* Preliminary report.
▶ (1552) **Trisha A. Berghold**, San Jose State University (993-X1-587)
- 4:00PM *A Monte Carlo Simulation : Geometric Probability and the Law of Large Numbers.*
▶ (1553) **Rose Elaine Carbone**, Clarion University (993-X1-371)
- 4:20PM *Are we getting what we pay for?* Preliminary report.
▶ (1554) **Queen Wiggs**, The North Carolina School of Science and Mathematics (993-X1-599)
- 4:40PM *Virtual Manipulatives in the Mathematics for Elementary School Teachers Course.*
(1555) **A. Susan Gay**, University of Kansas (993-X1-488)
- 5:00PM *Preparing Teachers to Use Technology and Effective Pedagogy in a Mathematics Content Course.*
▶ (1556) **Rajee Amarasinghe**, California State University, Fresno (993-X1-330)
- 1:15PM *Creating Mathematics Ambassadors.* Preliminary report.
▶ (1558) **Dora Cardenas Ahmadi**, Morehead State University (993-Y1-564)
- 1:30PM *Games and Hands-On Activities to Enhance Learning of Mathematics for Non-science Majors.*
(1559) **Annala R Kelly**, University of Louisiana at Monroe (993-Y1-1539)
- 1:45PM *Encouraging Students to Read Mathematics.*
▶ (1560) **Mary D Shepherd**, Northwest Missouri State University (993-Y1-1582)
- 2:00PM *Negative Attitudes Towards Mathematics—How to Break the Vicious Cycle.* Preliminary report.
▶ (1561) **Margaret L Gruenwald**, University of Southern Indiana (993-Y1-617)
- 2:15PM *Changing the Focus from the Teacher to the Learner.* Preliminary report.
▶ (1562) **Janet Andersen**, Hope College (993-Y1-1380)
- 2:30PM *Changing Students' Perception of Mathematics through An Integrated, Collaborative, Field-Based Approach To Teaching and Learning Mathematics.* Preliminary report.
▶ (1563) **Hamide Dogan-Dunlap**, University of Texas at El Paso (993-Y1-1636)
- 2:45PM *Math and Basketball: A Skill-Building Paradigm.*
(1564) **Keri A. Kornelson**, Texas A&M University (993-Y1-936)
- 3:00PM *Encouraging Young Women to Persist in Mathematics.*
▶ (1565) **Carol G. Williams**, Abilene Christian University (993-Y1-50)
- 3:15PM *Improving Student's Attitudes Using Motivational Theory as a Basis for Classroom Management and Assessment.*
(1566) **Theresa A Laurent**, St Louis College of Pharmacy (993-Y1-327)
- 3:30PM *Constructing Puzzles To Promote Mathematical Thinking.* Preliminary report.
▶ (1567) **M. Munakata**, Montclair State University (993-Y1-341)
- 3:45PM *Math Anxiety as a Resource: Strategies for the First Days of Class.*
▶ (1568) **Debra K Borkovitz**, Wheelock College (993-Y1-380)
- 4:00PM *Math is a journey, not a destination.*
▶ (1569) **L. Christine Kinsey**, Canisius College, and **Teresa E. Moore***, Ithaca College (993-Y1-384)
- 4:15PM *Invert the Stereotypical Classroom and Multiply the Interest in Math.*
▶ (1570) **Teresa D. Magnus**, Rivier College, Nashua NH (993-Y1-446)
- 4:30PM *Teaching the "Neglected Constituency": A Mathematics Course for Preservice Elementary School Teachers (with Lessons for Other Courses).*
▶ (1571) **David G. Poole**, Trent University (993-Y1-552)
- 4:45PM *Opening Students' Hearts and Minds to Mathematics.* Preliminary report.
(1572) **Fang Chen**, Oxford College of Emory University (993-Y1-1679)
- 5:00PM *Problem-based Inquiry Seminar Courses.*
▶ (1573) Preliminary report. **John Koker**, University of Wisconsin Oshkosh (993-Y1-184)
- 5:15PM *Using group work and journals to enhance students' perceptions of their abilities to do mathematics in a "Math for Liberal Arts" course.*
▶ (1574) **Therese L Bennett**, Southern Connecticut State University (993-Y1-426)

MAA Session on Strategies that Work to Positively Change Student Attitudes Toward Mathematics, II

1:00 PM – 5:25 PM

Organizers: **Caren L. Diefenderfer**, Hollins University
Janet L. Anderson, Hope College
Elizabeth G. Yanik, Emporia State University

- 1:00PM *"If at First You Don't Succeed ...": Building Mathematical Confidence with Problem-Solving Portfolios.*
▶ (1557) **Penelope H Dunham**, Muhlenberg College (993-Y1-529)

MAA General Contributed Paper Session, VII

1:00 PM – 4:20 PM

Organizers: **Laura J. Wallace**, California State University, San Bernardino
Jacqueline A. Jensen, Sam Houston State University
Gary W. Towsley, SUNY at Geneseo
Michael A. Jones, Montclair State University
Shawnee L. McMurrin, California State University at San Bernardino

- ▶ 1:00PM (1575) *Calculator Detective: Preservice elementary teachers compare calculators and discover that machines do not replace thinking.* Preliminary report.
Susan L Addington, California State University San Bernardino (993-Z1-515)
- ▶ 1:15PM (1576) *Diffy.* Preliminary report.
Tracy Dawn Hamilton, California State University Sacramento (993-Z1-472)
- ▶ 1:30PM (1577) *Text Supplements that Help Instructors Teach: Experience and Vision.*
Larry Copes*, ISEM, St. Paul, MN, and **Joan Lewis**, Key Curriculum Press (993-Z1-1224)
- ▶ 1:45PM (1578) *Instructional Supplements for College Algebra and Below.*
Beth A. Osikiewicz, Kent State University – Tuscarawas (993-Z1-1176)
- ▶ 2:00PM (1579) *Experience Teaching Elementary Algebra with DevMap.*
M. Anne Dow, Maharishi University of Management (993-Z1-1610)
- ▶ 2:15PM (1580) *Reforming College Algebra.*
Elizabeth J. Kreston, University of the Incarnate Word (993-Z1-461)
- 2:25PM Break
- ▶ 2:45PM (1581) *Student Preparedness for Calculus.* Preliminary report.
R. N. Mohapatra, University of Central Florida (993-Z1-1700)
- ▶ 3:00PM (1582) *An Activities Based Topics Course in Mathematics for Liberal Arts Majors.* Preliminary report.
Jay A Malmstrom, Oklahoma City Community College (993-Z1-1355)
- ▶ 3:15PM (1583) *Definitions: Now and Then.* Preliminary report.
Greisy W Winicki - Landman, California State Polytechnic University, Pomona (993-Z1-868)
- ▶ 3:30PM (1584) *An analysis of undergraduate mathematics textbooks and courses for prospective elementary teachers.* Preliminary report.
Raven M. Wallace*, Michigan State University, **Helen Siedel** and **Andreas Stylianides**, University of Michigan (993-Z1-359)
- ▶ 3:45PM (1585) *Integrated Mathematics - A Function Approach (IMFA).*
James L. Smith, McCurdy School (993-Z1-892)
- ▶ 4:00PM (1586) *Problem-Driven Courses in the Middle School and Secondary Mathematics Preservice Curricula.*
Kathleen D. Lopez* and **Victor P. Schneider**, University of Louisiana at Lafayette (993-Z1-688)

MAA Invited Paper Session on Applications of Topology to Biology, Chemistry, and Physics

1:00 PM – 3:50 PM

Organizers: **Erica L. Flapan**, Pomona College
Dorothy Buck, Brown University

- ▶ 1:00PM (1587) *The Topology of DNA-Protein Interactions.*
Dorothy Buck, Brown University (993-Z5-1043)
- ▶ 1:30PM (1588) *Knotted Polygons in \mathbb{R}^3 .* Preliminary report.
Jorge Alberto Calvo, North Dakota State University (993-Z5-1255)
- ▶ 2:00PM (1589) *Minimum Lengths for Flat Knotted Bands of a Given Width.* Preliminary report.
Louis H. Kauffman, University of Illinois at Chicago (993-Z5-1487)
- ▶ 2:30PM (1590) *Knots in Dynamical Systems.*
Steve Kennedy, Carleton College (993-Z5-1603)
- ▶ 3:00PM (1591) *Detecting Topological and Geometric Information from a Discrete Set of Points in Euclidean Space.*
David Letscher, Saint Louis University (993-Z5-1584)
- ▶ 3:30PM (1592) *Braids and the Yang-Baxter Equation: An Application of Knot Theory to Physics.*
Alissa S. Crans, University of California, Riverside (993-Z5-1649)

MAA CUPM Subcommittee on Curriculum Renewal Across the First Two Years Panel Discussion

1:00 PM – 2:20 PM

What are colleges doing with students with AP placement?

Organizer: **Martin E. Flashman**, Humboldt State University
Panelists: **Shahriar Shahriari**, Pomona College
Morton Brown, University of Michigan
Wade Ellis, Jr., West Valley College
Susan Kornstein, The College Board

MAA Special Presentation

1:00 PM – 2:20 PM

Oral presentations: Let's talk about it!

Organizers: **Tom J. Linton**, Central College
Suzanne Doree, Augsburg College
Nancy L. Hagelgans, Ursinus College
Richard J. Jardine, Keene State University

MAA-Young Mathematicians Network Panel Discussion

1:00 PM – 2:20 PM

What can you do with a degree in mathematics?

Organizers: **John A. Vano**, University of Wisconsin Madison
Kim Roth, Wheeling Jesuit University
Panelists: **Andrew Sterrett, Jr.**, Denison University
Patrick D. McCray, Pfizer and Illinois Institute of Technology
David E. Hammett, Oakwood School, Burbank, California
Robert L. Wilson, University of Wisconsin, Madison

AWM Workshop Panel Discussion

1:00 PM – 2:25 PM

Shaping a career in mathematics.

Moderator: **Jodie D. Novak**, University of Northern Colorado

Panelists: **Tracy Fischer**, Motorola

Joan P. Hutchinson, Macalester College

Barbara L. Keyfitz, University of Houston

Rachel A. Kuske, University of British Columbia

Janet M. McShane, Northern Arizona University

Anne V. Shepler, University of North Texas

ASL Invited Address

2:00 PM – 2:50 PM

- (1593) *Canonical Structure in the Universe of Set Theory.*
Matthew Foreman, University of California, Irvine (993-03-1270)

AWM Workshop: Presentations by Recent Women Ph.D.s and Graduate Students, II

2:30 PM – 4:40 PM

- 2:30PM *Comparison of Histograms for Use in Cloud Modeling.*
(1594) **Lisa Bloomer**, Middle Tennessee State University
- 3:00PM *Combinatorial Results Motivated by Computational Biology.*
(1595) **Christine E. Heitsch**, University of Wisconsin, Madison
- 3:30PM *Implicitization via Syzygies.*
(1596) **Haohao Wang**, Southeast Missouri State University
- 4:00PM *A combinatorial approach to finding root multiplicities in some indefinite type Kac-Moody algebras.*
(1597) **Vicky Williams**, Appalachian State University
- 4:30PM Closing remarks.

MAA Panel Discussion

2:30 PM – 3:30 PM

Revisiting crossroads: Continuing the dialogue on two-year college mathematics.

Organizer: **Susan S. Wood**, J. Sargeant Reynolds Community College

Panelists: **Judy E. Ackerman**, Montgomery College

Susan S. Wood, J. Sargeant Reynolds Community College

MAA Special Presentation

2:45 PM – 4:45 PM

Informal session on actuarial education.

Organizers: **Krzysztof Ostaszewski**, Illinois State University

Curtis Huntington, University of Michigan

MAA CUPM Subcommittee on Curriculum Renewal Across the First Two Years

2:45 PM – 4:05 PM

How to implement curriculum change.

Organizer: **Donald B. Small**, U.S. Military Academy

Moderator: **Gary W. Krahn**, U.S. Military Academy

Panelists: **Mike Moody**, Olin University

Stephen B. Maurer, Swarthmore College

Jeff Floyd, Texas A & M University

MAA Minicourse #6: Part B

3:15 PM – 5:15 PM

Using interactive labs to explore abstract algebra topics.

Organizers: **Allen C. Hibbard**, Central College

Kenneth M. Levasseur, University of Massachusetts at Lowell

ASL Invited Address

3:30 PM – 4:20 PM

- (1598) *Quantum algorithms and group representation theory.*
Leonard Schulman, California Institute of Technology

MAA Session on Applications of Mathematics in Computer Science, II

3:30 PM – 4:25 PM

Organizer: **William A. Marion**, Valparaiso University

- 3:30PM *Applications of Algebras in Computer Science.*
▶ (1599) **John W. Davenport**, East Central University (993-P1-706)
- 3:45PM *An alternative representation of finite fields.*
(1600) **Ronald Mullin** and **Ayan Mahalanobis***, Florida Atlantic University (993-P1-825)
- 4:00PM *Examples of the Application of Statistics and Probability to Computer Science.* Preliminary report.
▶ (1601) **Juana Sanchez*** and **Yan He**, UCLA Dept of Statistics (993-P1-852)
- 4:15PM *Numeric Methods, Modeling and Computer Science Majors.*
(1602) **Paul J Kapitza**, Illinois Wesleyan University (993-P1-1001)

MAA Session on Focus on Integrating Graphic Handhelds into Collegiate Mathematics, II

3:30 PM – 4:25 PM

Organizers: **Charles E. Hofmann**, LaSalle University
Joseph R. Fiedler, California State University, Bakersfield

- 3:30PM *They know, we know, that they don't know: Integrating Technology into Teaching and Assessment.* Preliminary report.
▶ (1603) **Alex J Heidenberg***, **John Wasko** and **Elizabeth Schott**, United States Military Academy (993-V1-1330)
- 3:45PM *Exploring Families of Functions.*
▶ (1604) **Charles E Hofmann**, LaSalle University (993-V1-496)

- 4:00PM *Teaching Composition of Functions.*
 ▶ (1605) **Roseanne S Hofmann**, Montgomery County
 Community College (993-V1-497)
- 4:15PM *Integrating algebra-capable calculators into
 "Geometric Linear Algebra," a course for High
 School Teachers.*
 (1606) **Joseph R Fiedler**, CSU Bakersfield (993-V1-404)

AMS Banquet

7:30 PM – 10:00 PM

Michel L. Lapidus
 AMS Associate Secretary
 Riverside, California

James J. Tattersall
 MAA Associate Secretary
 Providence, Rhode Island

MAA Special Presentation

3:45 PM – 4:45 PM

Math Horizons, a magazine for students.
 Organizers: **Arthur T. Benjamin**, Harvey Mudd
 College
Jennifer J. Quinn, Occidental College

MAA CUPM Subcommittee on Curriculum Renewal Across the First Two Years Panel Discussion

4:15 PM – 5:35 PM

How to assess problem solving.
 Organizer: **Donald B. Small**, U.S. Military Academy
 Moderator: **Kathleen G. Snook**, Consortium for
 Mathematics and Its Applications
 Panelists: **Jack Bookman**, Duke University
Alex J. Heidenberg, U.S. Military
 Academy
William J. Haver, Virginia
 Commonwealth University
Bonnie Gold, Monmouth University

ASL Session for Contributed Papers, II

4:30 PM – 6:05 PM

- 4:30PM *Comparing classes of Finite Structures.*
 (1607) **Sara Miller***, **Wesley Calvert**, **D. Cummins** and **J.F.
 Knight**, University of Notre Dame
- 4:55PM *The isomorphism problem for classes of
 computable structures.*
 (1608) **Wesley Calvert**, University of Notre Dame
- 5:20PM Δ_n^0 -categorical structures need not be relatively
 (1609) $\Delta_n^0 + 1$ -categorical.
John Chisholm, Western Illinois University
- 5:45PM *Minima of initial segments of sequences of reals.*
 (1610) **Jeffrey L. Hirst**, Appalachian State University

ASL Session for Contributed Papers, III

4:30 PM – 6:05 PM

- 4:30PM *Ergodic theorems in subsystems of second order
 arithmetic.*
 (1611) **Ksenija Simic**, Carnegie Mellon University
- 4:55PM *The probabilistic method and Ramsey theory in
 bounded arithmetic.*
 (1612) **Kerry Ojakian**, Carnegie Mellon University Phone:
 none
- 5:20PM *Compatibility in logical varieties.*
 (1613) **Mark Burgin**, UCLA
- 5:45PM *On automorphism groups of countable
 arithmetically saturated models of Peano
 arithmetic.*
 (1614) **Ernek S. Nurkhaidarov**, University of Connecticut

AMS Banquet Reception

6:30 PM – 7:30 PM