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# Program of the Sessions

San Diego, California, January 6–9, 2008

## Friday, January 4

### *AMS Short Course on Applications of Knot Theory (Part I)*

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8:00 AM – 5:30 PM

Organizers: **Dorothy Buck**, Imperial College of London  
**Erica L. Flapan**, Pomona College

- 8:00AM Registration.  
10:15AM Opening remarks by Dorothy Buck and Erica Flapan.  
10:30AM *Introduction to knot theory.*  
(1) **Colin Adams**, Williams College  
2:00PM *Introduction to topological chirality.*  
(2) **Erica Flapan**, Pomona College  
3:30PM Break.  
4:00PM *Introduction to knots and DNA.*  
(3) **Dorothy Buck**, Imperial College London

### *MAA Short Course on Combinatorics: Past, Present, and Future (Part I)*

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8:00 AM – 5:00 PM

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

- 8:00AM Registration.  
9:00AM **Robin Wilson**, *Welcome and Introduction.*  
9:15AM *China.*  
(4) **Andrea Breard**, Université des Sciences et Technologies de Lille  
10:00AM *Combinatorics in the Islamic and Hebrew traditions.*  
(5) **Victor J. Katz**, University of the District of Columbia  
10:45AM Break.  
11:15AM *European combinatorics, 1200–1700.*  
(6) **Eberhard Knobloch**, Technical University of Berlin  
2:00PM *Latin squares.*  
(7) **Lars D. Andersen**, University of Aalborg  
2:45PM *Euler's 'De Partitio Numerorum'.*  
(8) **George E. Andrews**, Pennsylvania State University  
3:30PM Break.

- 4:00PM *Early graph theory.*  
(9) **Robin Wilson**, The Open University

## Saturday, January 5

### *MAA Short Course on Combinatorics: Past, Present, and Future (Part II)*

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9:00 AM – 5:00 PM

- Organizer: **Robin Wilson**, The Open University  
9:00AM *Triple systems, schoolgirls, and designs.*  
(10) **Robin Wilson**, The Open University  
9:45AM *Graphs and games: The game of Hex.*  
(11) **Bjarne Toft**, Southern Denmark University  
10:30AM Break.  
11:00AM *20th-century graph theory.*  
(12) **Lowell W. Beineke**, Indiana University-Purdue University  
2:00PM *Sister Celine as we knew her.*  
(13) **Herbert S. Wilf\***, University of Pennsylvania, Philadelphia, and **Lily Yen\***, Capilano College  
2:45PM *Combinatorics: The future and beyond.*  
(14) **Ronald L. Graham\***, University of California San Diego, and **Doron Zeilberger\***, Rutgers University  
3:30PM Break.  
4:00PM General Discussion.

### *MAA Board of Governors*

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9:00 AM – 5:00 PM

### *AMS Short Course on Applications of Knot Theory (Part II)*

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9:30 AM – 5:30 PM

Organizers: **Dorothy Buck**, Imperial College of London  
**Erica L. Flapan**, Pomona College

The time limit for each AMS contributed paper in the sessions is ten minutes. The time limit for each MAA contributed paper varies. In the Special Sessions the time limit varies from session to session and within sessions. To maintain the schedule, time limits will be strictly enforced. For papers with more than one author, an asterisk follows the name of the author who plans to present the paper at the meeting.

Papers flagged with a solid triangle (▶) have been designated by the author as being of possible interest to undergraduate students. Abstracts of papers presented in the sessions at this meeting will be found in Volume 29, Issue 1 of *Abstracts of papers presented to the American Mathematical Society*, ordered according to the numbers in parentheses following the listings.

## Program of the Sessions – Saturday, January 5 (cont'd.)

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- 9:30AM *Knots and physics.*  
(15) **Lou Kauffman**, University of Illinois at Chicago
- 11:00AM Break.
- 11:30AM *Single-stranded DNA topology.*  
(16) **Ned Seeman**, New York University
- 3:00PM *Long tangled filaments.*  
(17) **Jon Simon**, University of Iowa
- 4:30PM Break.
- 4:45PM Panel discussion.

### AMS Council

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1:30 PM – 10:00 PM

### Joint Meetings Registration

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3:00 PM – 7:00 PM

## Sunday, January 6

### Joint Meetings Registration

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7:30 AM – 4:00 PM

### MAA Session on Assessment of Student Learning in Undergraduate Mathematics, I

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7:30 AM – 10:55 AM

Organizers: **William O. Martin**, North Dakota State University  
**Bernard L. Madison**, University of Arkansas  
**Maura B. Mast**, University of Massachusetts-Boston  
**Kimberly M. Vincent**, Washington State University

- 7:30AM *Doing Away with Grades: A Mastery-Based Approach to Assessment.* Preliminary report.  
(18) **Jonathan K Hodge**, Grand Valley State University (1035-A5-437)
- 7:45AM *The Effect of Grading Quizzes on Subsequent Student Performance.*  
▶ (19) **John J. Schiller**, Temple University (1035-A5-678)
- 8:00AM *Using statistical methods for assessment of student learning.*  
▶ (20) **Jacob B Sloujitel**, Globe Institute of Technology (1035-A5-1092)
- 8:15AM *Developing a Survey to Assess Pre-Service Teachers Views and Uses of Problem-Solving in Mathematics.* Preliminary report.  
▶ (21) **Jane R Cushman**, Buffalo State College, SUNY (1035-A5-1350)
- 8:30AM *Decisions, Decisions, Decisions! Or Decision analysis of avoiding the prerequisite.* Preliminary report.  
▶ (22) **Joe Liddle**, University of Alaska Southeast (1035-A5-1390)
- 8:45AM *Mathematics Assessment at One Four-Year Institution: Closing the Loop.* Preliminary report.  
(23) **Kevin E. Charlwood**, Washburn University (1035-A5-881)
- 9:00AM *Assessment 101: Creating and Implementing an Assessment Plan for a Mathematics Program.* Preliminary report.  
▶ (24) **Lisa A Lister**, Bloomsburg University (1035-A5-1990)

- 9:15AM *Improving the Validity of Assessments in Undergraduate Mathematics: Lessons We Can Learn From the Analysis of High Stakes Tests.*  
▶ (25) **Erica Slate Young**, United States Military Academy at West Point (1035-A5-1785)
- 9:30AM *Out the Door: Using Exit Interviews as an Assessment Tool.* Preliminary report.  
▶ (26) **Sarah V. Cook**, Washburn University (1035-A5-613)
- 9:45AM *Assessment of Critical Thinking Skills in Introductory Business Statistics.*  
(27) **Sue B. Schou**, Idaho State University (1035-A5-1036)
- 10:00AM *Mathematics Readiness Assessment and Remediation Using Maple T.A. - A Model for Creating and Implementing Computer-Based Assessment and Remediation.*  
▶ (28) **Salvatrice F Keating\***, **Marsha Davis** and **Christian Yankov**, Eastern Connecticut State University (1035-A5-53)
- 10:15AM *Using SP Analysis to Detect Unexpected Test Item Performance.*  
▶ (29) **James H Fife**, Educational Testing Service (1035-A5-1643)
- 10:30AM *The Evolving Process of Mathematics Placement.* Preliminary report.  
(30) **Daniel Ray Miller**, Millikin University (1035-A5-929)
- 10:45AM *Assessing student attitude toward mathematics, their mathematical skills and critical thinking abilities in general education classrooms.*  
(31) **Debasree Raychaudhuri**, California State University at Los Angeles (1035-A5-1981)

### AMS-MAA Special Session on The Scholarship of Teaching and Learning in Mathematics, I

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8:00 AM – 10:50 AM

Organizers: **Curtis D. Bennett**, Loyola Marymount University  
**Jacqueline M. Dewar**, Loyola Marymount University

- 8:00AM *Developing scholarship of teaching and learning mathematics with in-service K-8 teachers.* Preliminary report.  
▶ (32) **David S. Allen**, **Andrew G. Bennett**, **Julia E. Bergner\*** and **Melisa J. Hancock**, Kansas State University (1035-97-1127)
- 8:30AM *Engaging graduate student teaching assistants and prospective teachers in expository research.* Preliminary report.  
▶ (33) **Elena Anne Marchisotto\*** and **Michael Cole**, California State University, Northridge (1035-97-697)
- 9:00AM *Comparing Methods of Instruction in Intermediate Algebra for College Students.* Preliminary report.  
▶ (34) **Susan Elaine Thompson**, Otterbein College (1035-97-222)
- 9:30AM *What Really Happens When Students Work Online?*  
▶ (35) **Andrew G Bennett**, Kansas State University (1035-97-1310)
- 10:00AM *Interactive Internet-based Teaching and Learning in Calculus and Geometry.*  
▶ (36) **Thomas F Banchoff**, Brown University (1035-97-725)
- 10:30AM *Building the Capacity of a Department of Mathematics to Engage in the Scholarship of Teaching and Learning.*  
▶ (37) **Simei Tong\*** and **Donald F. Reynolds**, University of Wisconsin-Eau Claire (1035-97-108)

**AMS-SIAM Special Session on Asymptotic Methods in Analysis with Applications, I**

8:00 AM – 10:55 AM

Organizers: **Diego Dominici**, SUNY New Paltz  
**Peter A. McCoy**, U.S. Naval Academy

- 8:00AM (38) *A  $\Gamma$ -convergence Result in Nonlinear Plate Theory.* Preliminary report.  
**Cristina Popovici**, North Dakota State University (1035-49-487)
- 8:30AM (39) *Difference equations: Asymptotics, Borel summability and applications.*  
**Ovidiu Costin**, The Ohio State University (1035-41-2019)
- 9:00AM (40) *Integral Formulas for the Asymmetric Simple Exclusion Process.*  
**Craig A Tracy\***, UC Davis, and **Harold Widom**, UC Santa Cruz (1035-60-131)
- 9:30AM (41) *Efficient evaluation of propagation and scattering of high-frequency acoustic and electromagnetic waves.* Preliminary report.  
**Oscar P Bruno**, Applied and Computational Mathematics, Caltech (1035-78-180)
- 10:00AM (42) *On the Shortest Queue Version of the Erlang Loss Model.*  
**Charles Knessl\***, University of Illinois at Chicago, and **Haishen Yao**, Queensborough Community College, CUNY (1035-41-755)
- 10:30AM (43) *Asymptotic estimation of  $\xi^{(2n)}(1/2)$ : Proof of a conjecture of Farmer and Rhoades.*  
**Mark W Coffey**, Colorado School of Mines (1035-30-718)

**AMS-SIAM Special Session on Environmental Mathematics: Some Mathematical Problems on Climate Change and Geophysical Fluid Dynamics, I**

8:00 AM – 10:40 AM

Organizers: **Samuel S. Shen**, San Diego State University  
**Gerald R. North**, Texas A&M University

- 8:00AM (44) *Status of Climate Change Research.*  
**Gerald R North**, Texas A&M University (1035-86-931)
- 9:00AM (45) *Greenhouse Effect, Atmospheric Brown Clouds and Climate Change: Scientific and Societal Dilemma.*  
**V. Ramanathan**, Scripps Institution of Oceanography (1035-58-1412)
- 10:00AM (46) *Some Simple Mathematics Used in Support of Climate Change Studies.* Preliminary report.  
**K. K. Tung**, University of Washington (1035-86-601)

**AMS-ASL Special Session on Set Theory and Banach Spaces, I**

8:00 AM – 10:40 AM

Organizers: **Christian Rosendal**, University of Illinois at Urbana-Champaign  
**Stevo B. Todorovic**, University of Toronto and CNRS, Université Paris 7

- 8:00AM (47) *Classes of Banach spaces admitting small universal spaces.* Preliminary report.  
**Pandelis Dodos**, Equipe d'Analyse Fonctionnelle, Université Paris 6 (1035-46-2024)

- 9:00AM (48) *Some problems in Banach spaces.* Preliminary report.  
**E. Odell**, University of Texas at Austin (1035-46-1190)

- 10:00AM (49) *Isometry groups of separable metric spaces.*  
**Maciej Malicki** and **Slawomir Solecki\***, University of Illinois (1035-03-1527)

**AMS-AWM Special Session on Zeta Functions of Graphs, Ramanujan Graphs, and Related Topics, I**

8:00 AM – 10:50 AM

Organizers: **Audrey A. Terras**, University of California San Diego  
**Matthew Horton**, Wellesley College

- 8:00AM (50) *Ihara zeta functions of graphs and digraphs.*  
**Matthew D. Horton**, Wellesley College (1035-05-390)
- 8:30AM (51) *Hypergraph zeta functions and isospectral digraphs.*  
**Christopher K. Storm\***, Adelphi University, and **Barry Balof**, Whitman College (1035-05-368)
- 9:00AM (52) *Determinants associated to Zeta matrices of posets and their relation to graph theory.*  
**Cristina M Ballantine\***, **Sharon M Frechette** and **John B Little**, College of the Holy Cross (1035-05-381)
- 9:30AM (53) *Zeta functions of buildings and Shimura varieties.* Preliminary report.  
**Jerome William Hoffman**, Louisiana State University (1035-14-1054)
- 10:00AM (54) *Equi-transmitting scattering matrices for quantum graphs.*  
**Jonathan Harrison\***, Baylor University, **Brian Winn**, Loughborough University, and **Uzy Smilansky**, The Weizmann Institute of Science (1035-43-70)
- 10:30AM (55) *Zeta functions of infinite graphs.* Preliminary report.  
**Sam Northshield**, SUNY-Plattsburgh (1035-05-1297)

**AMS Special Session on Automorphic Forms and Related Topics, I**

8:00 AM – 10:50 AM

Organizers: **Olav K. Richter**, University of North Texas  
**Kathrin Bringmann**, University of Minnesota  
**Harold M. Stark**, University of California San Diego

- 8:00AM (56) *Heegner divisors, L-functions, and Maass forms.*  
**Ken Ono**, University of Wisconsin at Madison (1035-11-507)
- 8:30AM (57) *Durfee symbol congruences and higher rank moments.*  
**Kathrin Bringmann**, University of Minnesota, **Frank Garvan**, University of Florida, and **Karl Mahlburg\***, Massachusetts Institute of Technology (1035-11-1693)
- 9:00AM (58) *Irreducibility of Hecke Polynomials.*  
**Scott Ahlgren**, University of Illinois (1035-11-1651)
- 9:30AM (59) *Paramodular Cusp Forms.*  
**David S Yuen**, Lake Forest College (1035-11-763)
- 10:00AM (60) *Arithmetic Trace Formula.*  
**Bernhard Heim**, MPI Mathematics Bonn (1035-11-883)

10:30AM *Averages and asymptotics of automorphic*  
(61) *L*-functions over families.  
**Paul Garrett**, University of Minnesota, Minneapolis  
(1035-11-1385)

**AMS Special Session on Recent Advances in  
Mathematical Biology, Ecology, and Epidemiology, I**

8:00 AM – 10:55 AM

Organizers: **Linda J. S. Allen**, Texas Tech University  
**Sophia R. Jang**, University of Louisiana  
at Lafayette  
**Lih-Ing W. Roeger**, Texas Tech  
University

8:00AM *Phenotypic oscillations and frequency-dependent*  
(62) *selection.*  
**J. M. Cushing\*** and **Sheree Lynn Arpin**, University  
of Arizona (1035-92-782)

8:30AM *A two compartment model of the marine*  
(63) *phage-host system.*  
**Joseph M. Mahaffy**, San Diego State University  
(1035-92-1689)

9:00AM *The Basic Reproduction Number in a Discrete-Time*  
(64) *Model for Hantavirus in Rodents.*  
**P. van den Driessche\***, University of Victoria,  
and **Linda J.S. Allen**, Texas Tech University  
(1035-92-597)

9:30AM *Reproductive Synchrony: An Egg-laying Model for*  
▶ (65) *Glaucous-winged Gulls.* Preliminary report.  
**Shandelle M. Henson\***, **James L. Hayward**,  
Andrews University, **Joseph G. Galusha**, Walla Walla  
University, and **J. M. Cushing**, University of Arizona  
(1035-92-1513)

10:00AM *Resonant and Attenuant Cycles in Periodically*  
(66) *Forced Population Models.* Preliminary report.  
**John E Franke**, North Carolina State University  
(1035-92-1017)

10:30AM *Optimal Dynamic Harvest in a Diffusive Renewable*  
▶ (67) *Resource.*  
**Suzanne Lenhart\***, University of Tennessee,  
**G. Herrera**, Bowdoin College, **H. R. Joshi**,  
Xavier University, and **M. Neubert**, Woods Hole  
Oceanographic Institute (1035-92-218)

**AMS Special Session on Progress in Commutative  
Algebra, I**

8:00 AM – 10:50 AM

Organizers: **Janet Striuli**, University of Nebraska,  
Lincoln  
**Sean M. Sather-Wagstaff**, North  
Dakota State University  
**Lars Winther Christensen**, Texas  
Tech University

8:00AM *A length inequality on multiplicities.* Preliminary  
(68) *report.*  
**C. Huneke\***, University of Kansas, **M. Mustata**,  
University of Michigan, **S. Takagi**, Kyushu  
University, and **K. Watanabe**, Nihon University  
(1035-13-856)

8:30AM *Matrix factorizations of the classical discriminant.*  
(69) **Bradford G Hovinen**, University of Toronto  
(1035-13-1563)

9:00AM *An extension of Hilbert-Samuel and Hilbert-Kunz*  
(70) *multiplicities to non-m-primary ideals.* Preliminary  
*report.*  
**Neil Epstein\***, University of Michigan, and **Yongwei**  
**Yao**, Georgia State University (1035-13-1759)

9:30AM *Multiplicity Bounds for Quadratic Monomial Ideals.*  
(71) **Manoj Kummini**, University of Kansas  
(1035-13-501)

10:00AM *Dedekind-like rings and their module categories.*  
(72) **Greg Piepmeyer\***, Univ. of Missouri-Columbia,  
and **Lee Klingler**, Florida Atlantic University  
(1035-13-1224)

10:30AM *Connected Sums and the Gorenstein Colength of an*  
(73) *Artinian Local Ring.* Preliminary report.  
**Ananthnarayan Hariharan**, University of Kansas  
(1035-13-1181)

**AMS Special Session on Hyperbolic Dynamical  
Systems, I**

8:00 AM – 10:40 AM

Organizers: **Todd L. Fisher**, Brigham Young  
University  
**Boris Hasselblatt**, Tufts University

8:00AM *Mixing for smooth dynamical systems.*  
(74) **M J Field**, University of Houston (1035-37-531)

8:30AM *Hölder forms and integrability of invariant*  
(75) *distributions.*  
**Slobodan N. Simić**, San Jose State University  
(1035-37-1214)

9:00AM *Quasi-Anosov diffeomorphisms of 3-manifolds.*  
(76) **Todd Fisher\***, Brigham Young University, and **Jana**  
**Rodriguez Hertz**, Facultad de Ingenieria -  
Universidad de la Republica (1035-37-1106)

9:30AM *Anosov Automorphisms on Nilmanifolds.*  
(77) **Meera G. Mainkar\***, Dartmouth College, and  
**Cynthia E. Will**, Universidad Nacional de Cordoba,  
Cordoba, Argentina (1035-37-1055)

10:00AM *On invariant volumes of codimension-one Anosov*  
(78) *flows.*  
**Masayuki Asaoka**, Kyoto University (1035-37-331)

**AMS Special Session on Interactions Between  
Noncommutative Algebra and Algebraic Geometry, I**

8:00 AM – 10:50 AM

Organizers: **Daniel S. Rogalski**, University of  
California San Diego  
**Lance W. Small**, University of  
California San Diego  
**James J. Zhang**, University of  
Washington

8:00AM *Some recent developments in quadratic growth.*  
(79) **Jason P Bell**, Simon Fraser University (1035-16-766)

8:30AM *The Poisson Dixmier-Moeglin equivalence.*  
(80) **K R Goodearl\***, University of California at Santa  
Barbara, and **S Launois**, University of Kent at  
Canterbury (1035-16-798)

9:00AM *A Shephard-Todd-Chevalley Theorem for Skew*  
(81) *Polynomial Rings.* Preliminary report.  
**Ellen E. Kirkman**, **James Kuzmanovich\***, Wake  
Forest University, and **James J Zhang**, University of  
Washington (1035-16-1192)

9:30AM *Reflections of Regular Algebras.*  
(82) **Ellen E. Kirkman\***, **James J. Kuzmanovich**, Wake  
Forest University, and **James J. Zhang**, University of  
Washington (1035-16-1293)

10:00AM *Watts Theorem for Schemes.*  
(83) **Adam Nyman\***, University of Montana, and **S. Paul**  
**Smith**, University of Washington (1035-14-627)

- 10:30AM *The geometry of birationally commutative graded rings.*  
(84)  
**Susan J. Sierra**, University of Michigan  
(1035-16-1700)

**AMS Special Session on Algebraic Topology, I**

8:00 AM – 10:40 AM

Organizers: **Nitu Kitchloo**, University of California San Diego  
**Ralph L. Cohen**, Stanford University  
**James P. Lin**, University of California San Diego  
**Justin Roberts**, University of California San Diego  
**Peter Teichner**, University of California Berkeley

- 8:00AM *String topology as a topological conformal field theory.*  
(85)  
**Mahmoud Zeinalian**, Long Island University  
(1035-55-1940)
- 9:00AM *String topology of classifying spaces.*  
(86)  
**Craig C. Westerland\***, University of Wisconsin–Madison, and **Kate Gruher**, Stanford University (1035-55-689)
- 10:00AM *Graph homology: Koszul and Verdier duality.*  
(87)  
**Andrey Lazarev**, University of Leicester, UK, and **Alexander A. Voronov\***, University of Minnesota, Minneapolis (1035-55-1471)

**AMS Special Session on Groups, Representations, and Character Theory, I**

8:00 AM – 10:50 AM

Organizers: **Manouchehr Misaghian**, Johnson C. Smith University  
**Mohammad Reza Darafsheh**, University of Tehran, Iran

- 8:00AM *Bounds on Cohomology Groups and Presentations.*  
▶ (88)  
Preliminary report.  
**Robert M. Guralnick**, University of Southern California (1035-20-484)
- 8:30AM *Decomposition of tensor products of irreducible unitary representations of the unitary group  $U(N)$ .*  
(89)  
**Tuong Ton-That\***, University of Iowa, and **William H Klink**, Department of Physics and Astronomy, University of Iowa (1035-22-426)
- 9:00AM *Groups with triality and Moufang loops.*  
(90)  
**Jonathan I Hall**, Michigan State University (1035-20-1328)
- 9:30AM *Quadratic Base Change for  $p$ -adic  $SL(2)$  as a theta-correspondence: Supercuspidal representations.*  
(91)  
**David C Manderscheid**, University of Nebraska - Lincoln (1035-22-1124)
- 10:00AM *Universal deformation rings for finite groups.*  
(92)  
Preliminary report.  
**Frauke M Bleher**, University of Iowa (1035-20-781)
- 10:30AM *Theta Correspondence for Unitary Groups in Two Variables.*  
(93)  
**Jitka Stehnova**, University of Iowa (1035-11-814)

**AMS Session on Partial Differential Equations, I**

8:00 AM – 10:55 AM

- 8:00AM *Computational modeling of chemical transport in blood and plasma flow coupled with a visco-elastic arterial wall model.*  
(94)  
**Shelly M McGee\***, Texas Tech University, and **Padmanabhan Seshaiyer**, George Mason University (1035-35-1058)
- 8:15AM *Singular Limits of Reaction Diffusion Equations of KPP type in an Infinite Cylinder.*  
(95)  
**Fernando Carreon**, Arizona State University (1035-35-1174)
- 8:30AM *Existence and Estimates of solutions to a singular Dirichlet problem for the Monge-Ampère equation.*  
(96)  
**Ahmed Mohammed**, Ball State University (1035-35-1366)
- 8:45AM *Long-time Error Estimation for the Extended Fisher-Kolmogorov Equation.*  
(97)  
**Champike Attanayake**, Bowling Green State University (1035-35-1447)
- 9:00AM *Local Solvability of Some Partial Differential Equations with Polynomial Coefficients: Criteria Arising from ODE Asymptotic Estimates.*  
(98)  
**Christopher J Winfield**, UW - Oshkosh (1035-35-1453)
- 9:15AM *On a unique solution to equations modeling incompressible fluid flow. Preliminary report.*  
(99)  
**Diane L. Denny**, Texas A&M University-Corpus Christi (1035-35-1608)
- 9:30AM *Rigorous asymptotic-numeric examination of the dynamics of semilinear parabolic equations.*  
▶ (100)  
**Michael Robinson**, Cornell University (1035-35-1473)
- 9:45AM Break
- 10:00AM *Methane activity in soils.*  
▶ (101)  
**R. Thelwell\***, James Madison University, **J. von Fischer**, **G. Butters** and **P. DuChateau**, Colorado State University (1035-35-1620)
- 10:15AM *Black Monotone Iterative Method for Parabolic Equations with Nonlinear Boundary Conditions. Preliminary report.*  
(102)  
**Xin Lu**, UNC Wilmington (1035-35-1686)
- 10:30AM *Flow of a surfactant-laden thin liquid film down an inclined plane.*  
(103)  
**Rachel Levy**, Harvey Mudd College (1035-35-1832)
- 10:45AM *Asymptotics of the Semiclassical Sine-Gordon Equation.*  
(104)  
**Robert J. Buckingham\*** and **Peter D. Miller**, University of Michigan, Ann Arbor (1035-35-1837)

**AMS Session on Algebra and Group Theory, I**

8:00 AM – 10:55 AM

- 8:00AM *Spectrally arbitrary patterns: The  $2n$  conjecture for  $n = 5$ .*  
(105)  
**Luz Maria DeAlba**, Drake University (1035-15-247)
- 8:15AM *Spectral Radius and Infinity Norm of Matrices.*  
(106)  
**Baodong Zheng**, Harbin Institute of Technology, China, and **Liancheng Wang\***, Kennesaw State University, USA (1035-15-434)
- 8:30AM Break
- 8:45AM *Submatrices of Laplacian Matrices for Graphs with Cut Vertices.*  
(107)  
**Jason J Moliterno**, Sacred Heart University (1035-15-610)

- 9:00AM *Use of Leibniz Matrices to Compute Determinants of Matrices With Generated Entries.* Preliminary report. **Yongzhi Yang, Luke D. Edholm\*** and **Jason Q. McClintic**, University of St Thomas (1035-15-1358)
- 9:15AM Break
- 9:30AM *Iterative Methods for Leontief Input-output Model.* Preliminary report. **Lala B. Krishna**, The University of Akron (1035-15-1038)
- 9:45AM *Generalizations of Frobenius algebras and representation theoretic proofs of fundamental results in Hopf algebras.* **Miodrag Cristian Iovanov**, State University of New York, Buffalo NY (1035-16-1827)
- 10:00AM *Noncommutative Algebras Associated to Polynomials over Skew Fields.* **David Nacin**, William Paterson University (1035-16-1168)
- 10:15AM *Rings determined by covers of groups.* Preliminary report. **G Alan Cannon**, Southeastern Louisiana University, **Carl J Maxson**, Texas A&M University, and **Kent M Neuberburg\***, Southeastern Louisiana University (1035-16-44)
- 10:30AM *On the commutativity of certain weakly periodic-like rings.* Preliminary report. **Adil Yaqub**, University of California, Santa Barbara (1035-16-186)
- 10:45AM *Rings Generated by Units.* **Ashish K. Srivastava**, St. Louis University, MO (1035-16-242)

### AMS Session on Algebra and Number Theory, I

8:00 AM – 10:55 AM

- 8:00AM *Number-Theoretic Weighted Transform for Large-Integer Arithmetic.* **Mark G Yarbrough**, University of Sioux Falls (1035-11-1094)
- 8:15AM *Nathanson Heights in Finite Vector Spaces.* **Joshua D. Batson**, Yale University (1035-11-1139)
- 8:30AM *The Mathematical Magic Of Triangular and Perfect Numbers.* **Mulatu Lemma**, Savannah State University (1035-11-1153)
- 8:45AM *An Asymptotic Formula for the Number of Abelian Extensions of a Number Field.* **Behailu Mammo**, Hofstra University (1035-11-1300)
- 9:00AM *On uniform bounds for rational points on rational curves and thin sets.* Preliminary report. **Patrick X Rault**, UW Madison (1035-11-1235)
- 9:15AM *Feedback, Control and the Distribution of Prime Numbers.* **Susan Hammond Marshall\*** and **Donald R. Smith**, Monmouth University (1035-11-1345)
- 9:30AM *Sums of cyclotomic polynomials.* Preliminary report. **Carrie E Finch\***, Washington & Lee University, and **Lenny Jones**, Shippensburg University (1035-11-1455)
- 9:45AM *On the Unit Group Analogue of Carmichael's Conjecture.* Preliminary report. **Jonathan Bayless**, Dartmouth College (1035-11-1485)
- 10:00AM *Algebraic Properties of a Family of Jacobi Polynomials.* **John T Cullinan**, Bard College (1035-11-1626)

- 10:15AM *A Few Remarks on Congruent Numbers.* **Terutake Abe\***, Texas A&M International University, **Ashvin Rajan**, Baltimore, MD, and **Francois Ramarosan**, Howard University (1035-11-1640)
- 10:30AM *Is the sum  $SS := 1 + \sqrt{2} + \ln(1 + \sqrt{2})$  a special number?* Preliminary report. **Sylvester Reese**, QCC-CUNY (1035-11-1699)
- 10:45AM *Towards a Proof of the Twin Prime Conjecture.* **Badih N. Ghusayni**, Lebanese University (1035-11-47)

### AMS Session on History of Mathematics

8:00 AM – 10:55 AM

- 8:00AM *Math as solace, math as addiction.* **Reuben Hersh** and **Vera John-Steiner\***, University of New Mexico (1035-01-13)
- 8:15AM *Roger Boscovich and the notion of continuity.* Preliminary report. **Radoslav Dimitric**, DIBR, Pittsburgh (1035-01-86)
- 8:30AM *History of the Movement for Applications of Undergraduate Mathematics: Advocacy and Outcome.* Preliminary report. **Walter Meyer**, Adelphi University (1035-01-107)
- 8:45AM *The history of origami geometric constructions.* **Thomas Hull**, Merrimack College (1035-01-138)
- 9:00AM *Al-Risala al-Muhitiyya (The Treatise on the Circumference).* Preliminary report. **Mohammad K. Azarian**, University of Evansville (1035-01-248)
- 9:15AM *Ten Principles in Teaching the Course History of Mathematics.* **Zengxiang Tong**, Otterbein College (1035-01-560)
- 9:30AM *Rare Chinese Mathematical Books in the David Eugene Smith Collection.* **Yibao Xu**, CUNY/BMCC (1035-01-617)
- 9:45AM *Development of Korean Mathematics in the late 19th and early 20th Centuries.* Preliminary report. **Sang-Gu Lee\***, Sungkyunkwan University, **Jihwa Noh**, University of Northern Iowa, and **Sung-Yell Song Song**, Iowa State University (1035-01-717)
- 10:00AM *The Mathematics of the Mayan Cross.* **M. Alejandra Sorto**, Texas State University - San Marcos (1035-01-1142)
- 10:15AM *Weierstrass's construction of the real numbers.* **J Christopher Tweddle**, University of Evansville (1035-01-1143)
- 10:30AM *The Enigma of Stanislaw Ulam: Mathematical Triumph in the Face of Brain Injury.* **Alexander G. Atwood**, Suffolk County Community College, Selden, NY (1035-01-1841)
- 10:45AM *Influence of the French on Elementary American Mathematics Textbooks, 1820-1850.* **Andrew B Perry**, Springfield College (1035-01-1932)

### MAA Session on Crossing the "Bridge to Higher Mathematics": What Works and Why, I

8:00 AM – 10:55 AM

- Organizer: **George J. Davis**, Georgia State University
- 8:00AM *The Foundations of Mathematics course at Southeastern.* **Charles A Matthews**, Southeastern Oklahoma State University (1035-F1-250)

- 8:20AM *A Two-Step Transition to Higher Mathematics.*  
 (140) **David C Marshall**, Monmouth University  
 (1035-F1-273)
- 8:40AM *A Concrete Transition to Abstract Mathematics.*  
 ▶ (141) **John J. Schiller**, Temple University (1035-F1-671)
- 9:00AM *Methods to Enhance Mathematical Writing and Thinking.* Preliminary report.  
 ▶ (142) **Saburo Matsumoto**, College of the Canyons  
 (1035-F1-684)
- 9:20AM *Crossing the Bridge to Higher Mathematics: Using a Modified Moore Approach to Assist Students Transitioning to Higher Mathematics.*  
 ▶ (143) **M. Pdraig McLoughlin**, Kutztown University of Pennsylvania (1035-F1-900)
- 9:40AM *Mathematical Reasoning at Winthrop University.*  
 ▶ (144) **Thomas W Polaski**, Winthrop University  
 (1035-F1-935)
- 10:00AM *The "Write" Transition to Abstract Mathematics.*  
 (145) **Penelope H. Dunham**, Muhlenberg College  
 (1035-F1-967)
- 10:20AM *When Time is Short: Using Notebooks to Supplement the Bridge Course.*  
 ▶ (146) **Karl-Dieter Crisman**, Gordon College  
 (1035-F1-1023)
- 10:40AM *Introduction to Mathematical Reasoning: A Case Study.* Preliminary report.  
 ▶ (147) **Anton Betten**, Colorado State University  
 (1035-F1-1051)

**MAA Session on Ethnomathematics and Its Uses in Teaching**

8:00 AM – 10:55 AM

Organizers: **Dorothee J. Blum**, Millersville University  
**Ximena P. Catepillan**, Millersville University  
**Robert E. Jamison**, Clemson University  
**Shems i. Alhaddad**, University of South Carolina  
**Amy Shell-Gellasch**, Pacific Lutheran University

- 8:00AM *South Africa Social Influences and Mathematics Education.* Preliminary report.  
 ▶ (148) **Anass Bayaga**, University of Fort Hare - South Africa (1035-J1-235)
- 8:20AM *A Java Drawing Program for Nitus, Kolam, Celtic Knots, etc.*  
 ▶ (149) **Darrah P. Chavey**, Beloit College (1035-J1-1925)
- 8:40AM *Teaching an Ethnomathematics Course through the Lens of Geometry.*  
 ▶ (150) **Ann Robertson**, Connecticut College  
 (1035-J1-1451)
- 9:00AM *Mathematics and Culture: A critical inquiry into the development of Mathematics.* Preliminary report.  
 ▶ (151) **Ann E Moskol**, Rhode Island college (1035-J1-1894)
- 9:20AM *Cultural study through mathematics.*  
 (152) **Kevin Hartshorn**, Moravian College (1035-J1-1454)
- 9:40AM *The Locus of Islamic Mathematics.*  
 ▶ (153) **William Branson**, St Cloud State University  
 (1035-J1-1724)
- 10:00AM *The Ethnomathematics of Weaving.*  
 ▶ (154) **Thomas E. Gilsdorf**, University of North Dakota  
 (1035-J1-200)
- 10:20AM *Maya Calendar Conversions.* Preliminary report.  
 ▶ (155) **Waclaw Szymanski\***, West Chester University, and  
**Ximena Catepillan**, Millersville University  
 (1035-J1-1459)

- 10:40AM *A Critical Thinking Assignment Involving Plimpton 322.*  
 ▶ (156) **Dorothee Jane Blum**, Millersville University of Pennsylvania (1035-J1-1867)

**MAA Session on Great Activities for an Introductory Statistics Class, I**

8:00 AM – 10:55 AM

Organizers: **Patricia B. Humphrey**, Georgian Southern University  
**Christopher J. Lacke**, Rowan University  
**Ginger Holmes-Rowell**, Middle Tennessee State University

- 8:00AM *Some (Fast) Food For Thought - Gathering and Using a Meaningful Data Set for College Students.* Preliminary report.  
 ▶ (157) **Chris Lacke**, Rowan University (1035-K1-1889)
- 8:20AM *Where Does Data Come From?? The Class!*  
 ▶ (158) **Sarah L Mabrouk**, Framingham State College  
 (1035-K1-1909)
- 8:40AM *"Two-Third of the Average" a Simple Day One Game to Jump Start an Introductory Statistics Course.*  
 ▶ (159) **William H Rybolt**, Babson College (1035-K1-1705)
- 9:00AM *Hands-on Correlation Activities in Introductory Statistics.*  
 ▶ (160) **Melvin G Royer**, Indiana Wesleyan University  
 (1035-K1-206)
- 9:20AM *Motivating Statistics-based Problem Solving through Monte-Carlo Simulation.*  
 ▶ (161) **Randal E. Hickman**, United States Military Academy, West Point (1035-K1-1895)
- 9:40AM *Innovative, Research-Based Activities for a First Course in Statistics.*  
 ▶ (162) **Robert delMas\***, **Joan Garfield** and **Andrew Zieffler**, University of Minnesota, Twin Cities  
 (1035-K1-1351)
- 10:00AM *Live Science-based Data Collection in Introductory Statistics.*  
 (163) **Timothy M Hendrix**, Meredith College  
 (1035-K1-1059)
- 10:20AM *What works? An overview of several group and individual activities implemented in Introductory Statistics.*  
 ▶ (164) **Catherine A Matos\***, Clayton State University, and **Aprillya Lanz**, Virginia Military Institute  
 (1035-K1-1822)
- 10:40AM *Which Team is the Most Popular?* Preliminary report.  
 ▶ (165) **Klay Kruczek**, Western Oregon University  
 (1035-K1-1836)

**MAA Session on Preparing Faculty for Success in a Problem-Solving and Technology-Rich Curriculum**

8:00 AM – 10:50 AM

Organizers: **Alex J. Heidenberg**, U.S. Military Academy  
**Gerald C. Kobylski**, U.S. Military Academy  
**Barbra Melendez**, U.S. Military Academy  
**Rodney Sturdivant**, U.S. Military Academy

- 8:00AM *An interactive website to help faculty incorporate applications of core mathematics courses.*  
 ▶ (166) **Fusun Akman**, Illinois State University  
 (1035-S1-1327)

- 8:30AM *Practice What You Preach: The Use of Problem Solving and Literature Review in Faculty Development.*  
 ► (167) **Bradley A Warner, Jadonna Brewton\*** and **Christopher Nelson**, United States Air Force Academy (1035-S1-1379)
- 9:00AM *Preparing Liberal Arts Faculty to Teach Modeling and Problem Solving at the College Algebra Level at Francis Marion University.*  
 (168) **Richard D West\***, Francis Marion University, and **William P Fox**, Naval Postgraduate School (1035-S1-640)
- 9:30AM *The IBL Workshop: A Model for Training Faculty to Teach Using Inquiry-Based Learning.*  
 (169) **Stan Yoshinobu**, California State University, Dominguez Hills (1035-S1-1114)
- 10:00AM *Professional Development for Adjunct Mathematics Faculty: Professional Development through Structured Lesson Planning.*  
 (170) **Matthew G Jones**, California State University, Dominguez Hills (1035-S1-371)
- 10:30AM *A Faculty Development Program Designed to Motivate Faculty to Reflect on How They Teach.*  
 (171) Preliminary report.  
**Gerald Kobylski\*** and **Heather Jackson**, United States Military Academy (1035-S1-1600)

**MAA Session on Research and Professional Development Activities for Math Majors, I**

8:00 AM – 10:55 AM

Organizers: **Suzanne M. Lenhart**, University of Tennessee  
**Mike O’Leary**, Towson University  
**Margaret M. Robinson**, Mount Holyoke College

- 8:00AM *Undergraduate Research in Imaging Science.*  
 ► (172) Preliminary report.  
**Larry A Gratton**, Berea College (1035-T1-2003)
- 8:20AM *The Benefit of Locally Hosted Undergraduate Conferences and Speaker Series.*  
 (173) **Jacqueline A Jensen**, Sam Houston State University (1035-T1-1206)
- 8:40AM *Change begins with a WISH: the Women in Science House at St. Mary’s College of Maryland.*  
 (174) **Katherine Socha\*** and **Julia Burton**, St. Mary’s College of Maryland (1035-T1-1246)
- 9:00AM *A Professional Skills Preparation for the Senior Research Experience.* Preliminary report.  
 ► (175) **Theresa L. Friedman**, Mesa State College (1035-T1-1951)
- 9:20AM *Industrial Student Research at SJSU.*  
 ► (176) **B. Cayco**, San Jose State University (1035-T1-1900)
- 9:40AM *Promoting Professional Development by Integrating the Mathematics Curriculum with Co- and Extra-Curricular Activities.*  
 ► (177) **G. Daniel Callon**, Franklin College (1035-T1-1586)
- 10:00AM *Spirographs, Encryption, and other fun student research projects!*  
 ► (178) **Kevin Lee Anderson**, Missouri Western State University (1035-T1-1419)
- 10:20AM *My Experiences Researching With Undergraduate Mathematicians: The Collaboration Model.*  
 ► (179) **Joshua D Laison**, Willamette University (1035-T1-1380)
- 10:40AM *Statistical consulting for a local high school.*  
 ► (180) Preliminary report.  
**Wiebke S. Diestelkamp\*** and **Karen A. Eckberg**, University of Dayton (1035-T1-1353)

**MAA General Contributed Paper Session, I**

8:00 AM – 10:55 AM

- Organizer: **Sarah L. Mabrouk**, Framingham State College
- Moderators: **Melvin A. Nyman**, Alma College  
**J.Marshall Ash**, DePaul University  
**Jesse W. Byrne**, University of Central Oklahoma  
**Charlotte K. Simmons**, University of Central Oklahoma
- 8:00AM *Mathematical Modeling, MCM, and HiMCM.*  
 ► (181) **William P Fox**, Naval Postgraduate School (1035-Z1-579)
- 8:15AM *You Too Can Be a Mathematician a Magician.*  
 ► (182) **John P Bonomo**, Westminster College (1035-Z1-438)
- 8:30AM *Hybrids: They’re Not Just Cars or Roses.*  
 ► (183) **Kristi D. Jarman**, Eastern New Mexico University (1035-Z1-339)
- 8:45AM *Preparatory mathematics: working with challenged students to get them ready for college level math courses.* Preliminary report.  
 ► (184) **Susan J Diesel**, Norwich University (1035-Z1-1222)
- 9:00AM *Using the Symposium to Support the Teaching and Learning of Modeling.* Preliminary report.  
 ► (185) **Michael Huber**, Muhlenberg College (1035-Z1-534)
- 9:15AM *Math Masters: An Innovative Inservice Program for Middle School Teachers.*  
 ► (186) **Robert L. Wilson\***, University of Wisconsin - Madison, and **Brian Sniff**, Madison Metropolitan School District (1035-Z1-1298)
- 9:30AM *Loaded Dice and Dredels.* Preliminary report.  
 ► (187) **Allan Alexander Struthers**, Michigan Technological University (1035-Z1-185)
- 9:45AM *Chebyshev’s Inequality for Fuzzy Random Variables.*  
 ► (188) **Larry Wayne Lewis**, Spalding University (1035-Z1-1829)
- 10:00AM *Existence and Uniqueness of Solutions to the Backward 2D Stochastic Navier-Stokes Equations.*  
 (189) **Padmanabhan Sundar**, Louisiana State University, and **Hong Yin\***, Michigan Tech University (1035-Z1-1103)
- 10:15AM *The Introductory Session of College Algebra.*  
 (190) **Hongbiao Zeng**, Fort Hays State University (1035-Z1-1771)
- 10:30AM *Approximating a Function.*  
 ► (191) **Yajun Yang\*** and **Sheldon P. Gordon**, Farmingdale State College, State University of New York (1035-Z1-1511)
- 10:45AM *Creative Homework in Effective Teaching.*  
 ► (192) Preliminary report.  
**Edward L Mason**, **Natali Hritonenko\*** and **Jason Rouse**, Prairie View A&M University (1035-Z1-1375)
- SIAM Minisymposium on Education and Applied Mathematics**
- 8:00 AM – 10:55 AM
- Organizer: **William L. Briggs**, University of Colorado at Denver
- 8:00AM *Modeling and Simulation in the Mathematics Program at the United States Military Academy.*  
 (193) **Frank Wattenberg**, United States Military Academy (1035-97-663)
- 8:30AM *Modeling as Motivation in an Online Calculus Text.*  
 ► (194) **David A. Smith**, Duke University (1035-97-1053)



- 9:00AM (195) *Project Based Calculus: Stretching and Retaining Students.*  
**Carl V Lutzer**, Rochester Institute of Technology (1035-97-1627)
- 9:30AM (196) *Modeling, Simulation, and Analysis at Olin College of Engineering.*  
**John B. Geddes\*** and **Mark H. Somerville**, F. W. Olin College of Engineering (1035-00-1101)
- 10:00AM (197) *Integrated Calculus and Physics Projects Based on Roller Coaster Design.*  
**K R Fowler\***, **J Skufca**, **A Alhakim** and **T Nishikawa**, Clarkson University (1035-97-657)
- 10:30AM (198) *Controlling Epidemics: Modeling the Spread of SARS.*  
**Deborah Hughes Hallett**, University of Arizona/Harvard University (1035-92-703)

### AMS Workshop: Part I

8:00 AM – 10:55 AM

*Grant writing in the mathematical sciences.*

Organizers: **Michelle Wagner**, National Security Agency  
**Deborah F. Lockhart**, National Science Foundation

### AMS Special Session on The Mathematics of Information and Knowledge, I

9:00 AM – 10:45 AM

Organizers: **Peter W. Jones**, Yale University  
**James G. Glimm**, SUNY at Stony Brook  
**Steve Smale**, Toyota Institute of Technology at Chicago

- 9:00AM (199) *Coordinate Systems, Eigenfunctions, and Local Riemann Mapping Theorems.*  
**Peter W. Jones**, Yale University (1035-51-990)
- 10:00AM (200) *Fast Randomized Algorithms of Numerical Linear Algebra.*  
**Vladimir Rokhlin**, Yale University (1035-65-2028)

### MAA Minicourse #12: Part A

9:00 AM – 11:00 AM

*Developing department self-studies.*

Organizers: **Donna L. Beers**, Simmons College  
**Richard Alan Gillman**, Valparaiso University

### MAA Minicourse #1: Part A

9:00 AM – 11:00 AM

*Teaching a Galois theory course for undergraduates.*

Organizer: **John R. Swallow**, Davidson College

### MAA Minicourse #7: Part A

9:00 AM – 11:00 AM

*Directing undergraduate research.*

Organizer: **Aparna W. Higgins**, University of Dayton

### MAA-Project NExT and Young Mathematicians Network Joint Panel Discussion

9:00 AM – 10:20 AM

*Tenure (and promotion)—You know you want it.*

Organizers: **James E. Hamblin**, Shippensburg University  
**Kimberly A. Roth**, Juniata College

### MAA Special Presentation

9:00 AM – 10:20 AM

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

Organizers: **Lloyd E. Douglas**, National Science Foundation  
**Daniel P. Maki**, National Science Foundation  
**Elizabeth J. Teles**, National Science Foundation  
**Lee L. Zia**, National Science Foundation

### SIGMA on Research in Undergraduate Mathematics Education Panel Discussion

9:00 AM – 10:20 AM

*Making the connection between research and teaching in undergraduate mathematics education.*

Organizers: **Chris Rasmussen**, San Diego State University  
**Marilyn P. Carlson**, Arizona State University  
**David E. Meel**, Bowling Green State University

### Student Hospitality Center

9:00 AM – 5:00 PM

### MAA Department Liaisons Meeting

9:30 AM – 10:50 AM

### MAA Session on Using Ideas from Asian Mathematics in the Classroom, I

9:40 AM – 10:55 AM

Organizers: **Victor J. Katz**, University of the District of Columbia  
**Kim L. Plofker**, Brown University  
**Frank Swetz**, Pennsylvania State University, Harrisburg

- 9:40AM (201) *Examples on Integrating History of Mathematics into the Elementary Education Mathematics Curriculum.* Preliminary report.  
**A. S. Elkhader**, Northern State University (1035-X1-687)

- 10:00AM (202) *Thabit Teaches How to Read a Text: Amicable Numbers for Prospective Elementary Teachers.* Preliminary report.  
**Edith Prentice Mendez**, Sonoma State University (1035-X1-493)

- 10:20AM (203) *Al-Samaw'al and Division of Polynomials.*  
**Benjamin V.C. Collins**, University of Wisconsin - Platteville (1035-X1-301)

## Program of the Sessions – Sunday, January 6 (cont'd.)

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- 10:40AM *Abū'l Wafā and a Rusty Compass.*  
▶ (204) **Shahriar Shahriari**, Pomona College  
(1035-X1-1694)

### AMS Invited Address

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10:05 AM – 10:55 AM

- (205) *Combinatorics and Number Theory.*  
**Wen-Ching Winnie Li**, Pennsylvania State University  
(1035-11-05)

### AMS-MAA Invited Address

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11:10 AM – NOON

- (206) *Structure and randomness in the prime numbers.*  
**Terence Tao**, University of California Los Angeles  
(1035-11-08)

### Exhibits and Book Sales

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12:15 PM – 5:30 PM

*Come to the Grand Opening at 12:15!*

### AMS Colloquium Lecture: Lecture I

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1:00 PM – 2:00 PM

- (207) *Random conformally invariant pictures (Part I).*  
**Wendelin Werner**, University of Paris-Sud  
(1035-00-09)

### MAA Invited Address

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2:15 PM – 3:05 PM

- (208) *Three-dimensional crystallographic groups: The thirty-five prime space groups.*  
**John H. Conway**, Princeton University (1035-A0-15)

### AMS-MAA Special Session on the Scholarship of Teaching and Learning in Mathematics, II

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2:15 PM – 6:05 PM

Organizers: **Curtis D. Bennett**, Loyola Marymount University  
**Jacqueline M. Dewar**, Loyola Marymount University

- 2:15PM *Do students learn more from quizzes or homework?*  
▶ (209) Preliminary report.  
**Edwin P Herman**, University of Wisconsin, Stevens Point (1035-97-1102)
- 2:45PM *Integrative Learning in a Mathematics Classroom.*  
▶ (210) **Michael C. Burke**, College of San Mateo (1035-97-271)
- 3:15PM *Declarative and Procedural Knowledge in Quantitative Reasoning: Knowing "What" and Knowing "How".*  
▶ (211) **Lloyd Bond**, Carnegie Foundation for the Advancement of Teaching (1035-97-1402)
- 3:45PM *A Definition of Mathematics and Its Pedagogical Consequences.*  
(212) **Guershon Harel**, University of California at San Diego (1035-97-157)
- 4:15PM *Pride and Prejudice - Resistance to the Scholarship of Teaching and Learning in a Research Oriented Mathematics Department.* Preliminary report.  
▶ (213) **Jack Bookman**, Duke University (1035-97-965)

- 4:45PM *Guided Discovery in Linear Algebra.*  
▶ (214) **David E Meel**, Bowling Green State University (1035-97-907)

- 5:15PM *Communicating Mathematically by Presenting and Validating Proofs.*  
▶ (215) **Hortensia Soto-Johnson**, University of Northern Colorado (1035-97-326)

- 5:45PM *A Model Teacher-Scholar Program in Mathematics.* Preliminary report.  
▶ (216) **Saad I. El-Zanati\***, **Cynthia Langrall**, Illinois State University, and **Wendy A. Ohanlon**, Illinois Central College (1035-97-1833)

### AMS-SIAM Special Session on Asymptotic Methods in Analysis with Applications, II

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2:15 PM – 6:10 PM

Organizers: **Diego Dominici**, SUNY New Paltz  
**Peter A. McCoy**, U.S. Naval Academy

- 2:15PM *Asymptotics in the NIST Digital Library of Mathematical Functions.*  
(217) **Daniel W. Lozier**, National Institute of Standards and Technology (1035-33-1221)
- 2:45PM *Sampling Expansions for a Class of Analytic Functions and Their Asymptotics.* Preliminary report.  
(218) **Ahmed I Zayed**, DePaul University (1035-41-779)
- 3:15PM *Effective Computation of Bessel Functions.*  
(219) **Jonathan M. Borwein**, Dalhousie University (1035-41-2020)
- 3:45PM *Asymptotics and Connection Formulae for the Painlevé Equations.*  
(220) **Peter A Clarkson**, University of Kent, Canterbury, UK (1035-33-190)
- 4:15PM *A Turning-Point Theory for Second-Order Difference Equations.*  
(221) **Roderick Wong**, City University of Hong Kong (1035-41-407)
- 4:45PM *Liouville-Green (WKB) asymptotics for second-order systems of difference equations.*  
(222) **Renato Spigler**, University "Roma Tre" (1035-41-178)
- 5:15PM *Nonlinear integral-equation formulation of orthogonal polynomials.*  
▶ (223) **Eli Ben-Naim**, Los Alamos National Laboratory (1035-12-926)
- 5:45PM *Imaginary Axis Coverage of the Stability Domains of Adams Multistep Methods.*  
▶ (224) **Michelle L Christ\***, U.S. Air Force Academy, and **Jonah A Reeger**, Rice University (1035-65-1820)

### AMS-SIAM Special Session on Environmental Mathematics: Some Mathematical Problems on Climate Change and Geophysical Fluid Dynamics, II

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2:15 PM – 6:05 PM

Organizers: **Samuel S. Shen**, San Diego State University  
**Gerald R. North**, Texas A&M University

- 2:15PM *Stochastic treatments of cloud-radiation interactions in climate models.*  
(225) **Richard C. J. Somerville**, Scripps Institution of Oceanography, University of California (1035-86-732)

- 2:45PM *Combining climate models and weather observations using dynamical systems and statistics.*  
 ▶ (226) **Douglas W Nychka\*** and **Jeffrey L Anderson**, National Center for Atmospheric Research (1035-62-1998)
- 3:15PM *Robust climate projections and stochastic structural stability of dynamical systems.* Preliminary report.  
 ▶ (227) **Michael Ghil\***, Ecole Normale Supérieure, Paris, and UCLA, **Mickael Chekroun**, Ecole Normale Supérieure, Paris, and IPSA, France, **Eric Simonnet**, Institut Non-Lineaire de Nice, France, and **Ilya Zaliapin**, University of Nevada, Reno (1035-37-1713)
- 3:45PM *Mathematics and Climate Change: Two Examples.*  
 (228) **Dale R Durran**, Atmospheric Sciences, Univ. of Washington, Seattle, WA (1035-86-1422)
- 4:15PM *Stochastic Climate Models.*  
 ▶ (229) **Timothy M DelSole**, George Mason University (1035-60-1583)
- 4:45PM *Stochastic PDEs in GFD and Climate Prediction.*  
 (230) **Joseph Tribbia**, National Center for Atmospheric Research (1035-76-1738)
- 5:15PM *Analysis of Biases in a Tropical Channel Climate Simulation and Implications to Climate Prediction.*  
 ▶ (231) **L. Ruby Leung**, Pacific Northwest National Laboratory (1035-86-1587)
- 5:45PM *New Algorithms and Applications of the Fluctuation-Dissipation Theorem for Climate Response.*  
 (232) **Rafail V. Abramov\***, University of Illinois at Chicago, and **Andrew J. Majda**, Courant Institute of Mathematical Sciences, New York University (1035-82-1299)

**AMS-ASL Special Session on Set Theory and Banach Spaces, II**

2:15 PM – 5:55 PM

Organizers: **Christian Rosendal**, University of Illinois at Urbana-Champaign  
**Stevo B. Todorcevic**, University of Toronto and CNRS, Université Paris 7

- 2:15PM *Global aspects of ergodic group actions and equivalence relations.* Preliminary report.  
 (233) **Alexander S. Kechris**, California Institute of Technology (1035-37-683)
- 3:15PM *On the complexity of uniform homeomorphism of Banach spaces.* Preliminary report.  
 (234) **Su Gao**, **Steve Jackson** and **Bunyamin Sari\***, University of North Texas (1035-46-1223)
- 4:15PM *Oscillation stability from a metric point of view.*  
 (235) **Jordi Lopez-Abad**, Université Paris 7, **Lionel Nguyen Van Thé\*** and **Norbert Sauer**, University of Calgary (1035-51-1078)
- 5:15PM *Banach spaces of bounded Szlenk index.*  
 (236) **Edward W Odell**, University of Texas at Austin, **Thomas B Schlumprecht\***, Texas A&M University, and **Andras Zsak**, University of Leeds, UK (1035-46-873)

**AMS-AWM Special Session on Zeta Functions of Graphs, Ramanujan Graphs, and Related Topics, II**

2:15 PM – 6:05 PM

Organizers: **Audrey A. Terras**, University of California San Diego  
**Matthew Horton**, Wellesley College

- 2:15PM *Zeta functions of complexes.*  
 (237) **Ming-Hsuan Kang** and **Wen-Ching Winnie Li\***, Penn State University (1035-11-324)
- 2:45PM  *$L^2$  zeta functions and infinite cyclic covers of graphs.*  
 (238) **Bryan Clair**, Saint Louis University (1035-05-404)
- 3:15PM *Two-variable Riemann-Roch zeta-functions of graphs.*  
 (239) **Dino Lorenzini**, University of Georgia (1035-05-1120)
- 3:45PM *A Synopsis of Old and New Results about Gassmann Triples.* Preliminary report.  
 ▶ (240) **Robert Perlis**, Louisiana State University (1035-20-155)
- 4:15PM *An application of the edge zeta function to coding theory.*  
 (241) **Judy L Walker**, University of Nebraska (1035-94-1334)
- 4:45PM *Ihara Zeta Functions for Self-Similar Fractal Graphs.*  
 (242) **Daniele Guido**, **Tommaso Isola**, Università di Roma "Tor Vergata", and **Michel L. Lapidus\***, University of California, Riverside (1035-46-472)
- 5:15PM *Poles of Zeta Functions of Graphs and Coverings.* Preliminary report.  
 (243) **H. M. Stark**, UCSD (1035-05-1133)
- 5:45PM *Nonbacktracking spectrum and surprises in non-regular graphs.* Preliminary report.  
 ▶ (244) **Joel Friedman**, University of British Columbia (1035-05-1097)

**AMS Special Session on Automorphic Forms and Related Topics, II**

2:15 PM – 6:05 PM

Organizers: **Olav K. Richter**, University of North Texas  
**Kathrin Bringmann**, University of Minnesota  
**Harold M. Stark**, University of California San Diego

- 2:15PM *On 2nd order Poincare series.*  
 (245) **Ozlem Imamoglu\***, ETH Zurich, and **Cormac O'Sullivan**, Bronx Community College (1035-11-1361)
- 2:45PM *Metaplectic Eisenstein series and Gelfand-Tsetlin patterns.* Preliminary report.  
 (246) **Daniel Bump**, Stanford University, **Ben Brubaker**, Massachusetts Institute of Technology, and **Solomon Friedberg\***, Boston College (1035-11-379)
- 3:15PM *Modified Atkinson's Formulas for the Mean Square of the Riemann Zeta Function.*  
 (247) **Jennifer Beineke\***, Western New England College, and **Daniel Bump**, Stanford University (1035-11-224)
- 3:45PM *On  $U(p)$ -congruences.*  
 (248) **Pavel Guerzhoy**, University of Hawaii at Manoa (1035-11-805)
- 4:15PM *On symmetry in  $q$ -series transformations.*  
 (249) **George E. Andrews**, The Pennsylvania State University (1035-11-148)
- 4:45PM *Odd coefficients of weakly holomorphic modular forms.*  
 (250) **Scott Ahlgren**, University of Illinois at Urbana-Champaign, and **Matthew Boylan\***, University of South Carolina (1035-11-1199)

## Program of the Sessions – Sunday, January 6 (cont'd.)

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- 5:15PM *Rank generating functions as weakly holomorphic modular forms.* (251)  
**Scott Ahlgren**, University of Illinois at Urbana-Champaign, and **Stephanie Treneer\***, Dartmouth College (1035-11-1742)
- 5:45PM *An investigation of  $k$ -component multipartitions.* Preliminary report. (252)  
▶ **Holly Swisher\***, Oregon State University, **Joanna Furno**, Wisconsin Lutheran College, and **Patrick Waters**, Oregon State University (1035-11-1376)

- 2:15PM *Equation-free and variable-free computation for complex/multiscale systems.* (261)  
**Yannis Kevrekidis**, Princeton University (1035-37-1148)
- 3:15PM *A Simple and Efficient Method for Compressed Sensing and Related Optimization Problems.* (262)  
**Stanley Osher\***, UCLA, **Wotao Yin**, Rice U., **Donald Goldfarb**, IEOR, Columbia U., and **Jerome Darbon**, UCLA (1035-49-903)
- 4:15PM Panel Discussion.

### AMS Special Session on Recent Advances in Mathematical Biology, Ecology, and Epidemiology, II

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2:15 PM – 6:10 PM

Organizers: **Linda J. S. Allen**, Texas Tech University  
**Sophia R. Jang**, University of Louisiana at Lafayette  
**Lih-Ing W. Roeger**, Texas Tech University

- 2:15PM *Evolution of conditional dispersal: A reaction-diffusion-advection model.* Preliminary report. (253)  
**Yuan Lou\***, Ohio State University, **Xinfu Chen**, University of Pittsburgh, and **Richard Hambrock**, Ohio State University (1035-35-776)
- 2:45PM *Derivation of Stochastic Partial Differential Equations for Size-Structured and Age-Structured Populations.* Preliminary report. (254)  
**Edward Allen**, Texas Tech University (1035-92-204)
- 3:15PM *A Fetal Energy Balance Equation Based on Maternal Exercise and Diet.* (255)  
▶ **Diana M Thomas\***, Montclair State University, **James F Clapp**, MetroHealth Medical Campus of Case Western Reserve University, and **Susan Shernce**, Montclair State University (1035-92-263)
- 3:45PM *A Selection-Mutation Model.* (256)  
**Azmy S Ackleh\***, **John Cleveland**, University of Louisiana at Lafayette, and **Shuhua Hu**, North Carolina State University (1035-92-897)
- 4:15PM *Population Models with Allee Effect: A New Model.* (257)  
**Saber Elaydi**, Trinity University, San Antonio, and **Robert J Sacker\***, University of Southern California (1035-92-1621)
- 4:45PM *Dynamics of Some Nonlinear Discontinuous Difference Equations.* (258)  
**V. L. Kocic**, Xavier University of Louisiana (1035-39-823)
- 5:15PM *Asymptotic behavior for a cellular replication and maturation model.* (259)  
**Keng Deng**, University of Louisiana at Lafayette (1035-35-936)
- 5:45PM *Competition of Two Species for Two Limited Resources with One Species Mediated by Parasites.* Preliminary report. (260)  
**Sze-Bi Hsu**, National Tsing-Hua University, and **Lih-Ing W. Roeger\***, Texas Tech University (1035-92-445)

### AMS Special Session on The Mathematics of Information and Knowledge, II

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2:15 PM – 6:00 PM

Organizers: **Peter W. Jones**, Yale University  
**James G. Glimm**, SUNY at Stony Brook  
**Steve Smale**, Toyota Institute of Technology at Chicago

### AMS Special Session on Hyperbolic Dynamical Systems, II

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2:15 PM – 5:55 PM

- Organizers: **Todd L. Fisher**, Brigham Young University  
**Boris Hasselblatt**, Tufts University
- 2:15PM *Hyperbolic attractors in foliations.* Preliminary report. (263)  
**Steven Hurder**, University of Illinois at Chicago (1035-37-1500)
- 2:45PM *Iterated Holomorphic Function Systems.* (264)  
**Kourosh Tavakoli**, Fordham University (1035-37-769)
- 3:15PM *Anosov rigidity: Pointwise nonuniform hyperbolicity implies uniform hyperbolicity.* (265)  
**Boris Hasselblatt\***, Tufts University, **Yakov B Pesin**, The Pennsylvania State University, and **Jorg Schmeling**, Lunds Institute of Technology (1035-37-1672)
- 3:45PM *Moduli of smooth conjugacy for Anosov systems.* Preliminary report. (266)  
**Andrey Gogolev**, Penn State (1035-37-1279)
- 4:15PM *Rigidity of abelian cocycles with values in diffeomorphisms groups.* (267)  
**Viorel Nitica\***, West Chester University of Pennsylvania, and **Anatole Katok**, Pennsylvania State University (1035-37-550)
- 4:45PM *Rigidity of partially hyperbolic higher-rank actions obtained as restrictions of the Weyl chamber flow.* (268)  
**Danijela Damjanovic**, Harvard University (1035-37-533)
- 5:15PM *On smooth conjugacy of dynamical systems.* (269)  
**Anatole Katok**, Pennsylvania State University (1035-37-1641)

### AMS Special Session on Interactions Between Noncommutative Algebra and Algebraic Geometry, II

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2:15 PM – 6:05 PM

- Organizers: **Daniel S. Rogalski**, University of California San Diego  
**Lance W. Small**, University of California San Diego  
**James J. Zhang**, University of Washington
- 2:15PM *The homology and geometry of truncated path algebras.* (270)  
▶ **A S Dugas**, **B Huisgen-Zimmermann\*** and **J Learned**, University of California at Santa Barbara (1035-16-796)
- 2:45PM *Spaces of Linear Modules on Regular Graded Clifford algebras.* Preliminary report. (271)  
**Colin J Ingalls**, University of New Brunswick (1035-16-1639)

- 3:15PM *Elliptically fibred orders on surfaces*. Preliminary report. (272)  
**Daniel Chan**, University of New South Wales, Sydney, Australia, and **Rajesh S Kulkarni\***, Michigan State University, East Lansing, Michigan (1035-16-1791)
- 3:45PM *Representations of some Hopf algebras associated to the symmetric groups*. (273)  
**Andrea Jedwab** and **Susan Montgomery\***, University of Southern California (1035-16-1339)
- 4:15PM *Generalizing the notion of Koszul Algebras*. (274)  
**Brad Shelton\***, University of Oregon, and **Thomas Cassidy**, Bucknell University (1035-16-1664)
- 4:45PM *Equidimensionality of characteristic varieties over Cherednik algebras*. (275)  
**I Gordon**, Edinburgh University, and **J T Stafford\***, Manchester University (1035-16-1010)
- 5:15PM *Generalized Graded Clifford Algebras*. Preliminary report. (276)  
**Thomas Cassidy**, Bucknell University, and **Michaela Vancliff\***, University of Texas at Arlington (1035-16-787)
- 5:45PM *Algebras of infinite differential operators with pathological properties*. (277)  
**E. Zelmanov**, UCSD (1035-16-1824)
- 3:15PM *Division algebras over surfaces*. Preliminary report. (284)  
**David J Saltman**, CCR-Princeton/University of Texas (1035-12-1775)
- 3:45PM *Computing characters of groups with a solvable normal subgroup*. (285)  
**Vahid Dabbaghian\***, The IRMACS Centre, Simon Fraser University, and **John D. Dixon**, Carleton University (1035-20-538)
- 4:15PM *On recognition property of the projective special linear group over  $GF(3)$* . (286)  
**M. R. Darafsheh**, University of Tehran (1035-20-156)
- 4:45PM *Bases for the Center of the Symmetric Group Algebra Using Jucys–Murphy Elements*. Preliminary report. (287)  
**Lenny Jones\***, Shippensburg University, and **Andrew Francis**, University of Western Sydney (1035-20-128)
- 5:15PM *Finding Proper Supplements in Finite Groups*. Preliminary report. (288)  
**Joseph Kirtland**, Marist College (1035-20-113)
- 5:45PM *Trace Forms of Abelian Extensions of Number Fields*. Preliminary report. (289)  
**Karli A. Morris**, Louisiana State University (1035-11-1707)

### AMS Special Session on Algebraic Topology, II

2:15 PM – 5:55 PM

Organizers: **Nitu Kitchloo**, University of California San Diego  
**Ralph L. Cohen**, Stanford University  
**James P. Lin**, University of California San Diego  
**Justin Roberts**, University of California San Diego  
**Peter Teichner**, University of California Berkeley

- 2:15PM *Congruences amongst modular forms and the divided beta family*. Preliminary report. (278)  
**Mark Behrens**, MIT (1035-55-1308)
- 3:15PM *Spaces of trees, spaces of graphs, and spaces of embeddings*. (279)  
**Gregory Arone**, University of Virginia (1035-55-1466)
- 4:15PM *Chain rules for Goodwillie calculus and algebraic K-theory*. Preliminary report. (280)  
**Michael Ching**, Johns Hopkins University (1035-55-1285)
- 5:15PM *The Lie cooperad and Hopf invariants*. (281)  
**Dev Prakash Sinha**, University of Oregon (1035-55-754)

### AMS Special Session on Groups, Representations, and Character Theory, II

2:15 PM – 6:05 PM

Organizers: **Manouchehr Misaghian**, Johnson C. Smith University  
**Mohammad Reza Darafsheh**, University of Tehran, Iran

- 2:15PM *Clifford-Fischer theory applied to split and non-split group extensions*. (282)  
**Jamshid Moori**, University of KwaZulu-Natal (1035-20-708)
- 2:45PM *Recent Progress in Block Theory of Finite Groups*. (283)  
**Jiping Zhang**, Peking University (1035-20-761)

### MAA Minicourse #13: Part A

2:15 PM – 4:15 PM

*Teaching and the philosophy of mathematics*.  
Organizer: **Martin E. Flashman**, Humboldt State University

### MAA Minicourse #2: Part A

2:15 PM – 4:15 PM

*Some deterministic models in mathematical biology and their simulations*.  
Organizers: **Cammy Cole Manning**, Meredith College  
**Huseyin Kocak**, University of Miami  
**James F. Selgrade**, North Carolina State University

### MAA Minicourse #9: Part A

2:15 PM – 4:15 PM

*Classroom response systems: Teaching with clickers*.  
Organizers: **Derek Bruff**, Vanderbilt University  
**Matthew Leingang**, Harvard University  
**Kelly Cline**, Carroll College  
**Mark R. Parker**, Carroll College  
**Holly S. Zullo**, Carroll College

### AMS Session on Combinatorics, I

2:15 PM – 6:10 PM

- 2:15PM *On the Representation of Certain Type of Real Numbers Using Combinatorial Identities*. (290)  
**Aklilu Zeleke**, Michigan State University (1035-05-800)
- 2:30PM *A New Proof of the Ballot Theorem*. (291)  
**Marc S. Renault**, Shippensburg University (1035-05-730)

- 2:45PM *A family of non-orientable matroids of rank three in a projective plane.*  
(292) **Rigoberto Florez\***, University of South Carolina Sumter, and **David Forge**, Laboratoire de Recherche en Informatique Université Paris-Sud. (1035-05-1788)
- 3:00PM *Eavesdropping on Graphs.*  
▶ (293) **Jeffrey Stuart**, Pacific Lutheran University (1035-05-1983)
- 3:15PM *Matchwebs and their enumeration.* Preliminary report.  
(294) **Tim Hsu** and **Katherine Shelley\***, San Jose State University (1035-05-88)
- 3:30PM *On  $\gamma$ -labeling almost-bipartite graphs.*  
(295) **Desiree L. Bowman\***, **Saad I. El-Zanati** and **Keri A. Sebesta**, Illinois State University (1035-05-1821)
- 3:45PM *Forbidding and Enforcing Graphs.*  
(296) **Daniela Genova\***, University of North Florida, and **Natasha Jonoska**, University of South Florida (1035-05-1760)
- 4:00PM *Dynamic Domination in Graphs.*  
▶ (297) **Raluca Michelle Gera\***, Naval Postgraduate School, **Jean Blair** and **Horton Steve**, United States Military Academy West Point, NY (1035-05-66)
- 4:15PM *Finite groups of derangements on the  $n$ -cube.*  
(298) **Larry W Cusick**, California State University, Fresno (1035-05-75)
- 4:30PM *The Necklace Poset as a Symmetric Chain Order.* Preliminary report.  
(299) **Kelly Kross Jordan\*** and **J. Griggs**, University of South Carolina (1035-05-95)
- 4:45PM *On the Tightness of the 5/14 Independence Ratio.*  
(300) **Christopher Carl Heckman**, Arizona State University (1035-05-169)
- 5:00PM *Adjacent vertex distinguishing edge-colorings of planar graphs with girth at least six.*  
(301) **Yuehua Bu**, Zhejiang Normal University, **Ko-Wei Lih\***, Academia Sinica, and **Weifan Wang**, Zhejiang Normal University (1035-05-232)
- 5:15PM *On Shephard's Conjecture for Special Classes of Polyhedra.*  
▶ (302) **Pinciu Val**, Southern Connecticut State University (1035-05-284)
- 5:30PM *The solution to the partition reconstruction problem.*  
(303) **Maria J Monks**, MIT (1035-05-286)
- 5:45PM *Fixing numbers of hypercubes and hypercube variants.*  
(304) **Hannah L Breckbill**, Carleton College (1035-05-303)
- 6:00PM *On the feasible number of monochromatic triangles.* Preliminary report.  
▶ (305) **Brett Frankel\***, Johns Hopkins University, and **Rebecca Payne**, Pomona College (1035-05-1381)

### AMS Session on Algebra and Group Theory, II

2:15 PM – 6:10 PM

- 2:15PM *Completions of quantum coordinate rings.*  
(306) Preliminary report.  
**Linhong Wang**, Temple University (1035-16-432)
- 2:30PM *Action of the symmetric group on the universal algebra related to factorization of noncommutative polynomials.*  
(307) **Colleen Duffy**, Rutgers, the State University of New Jersey (1035-16-758)
- 2:45PM *Characterization of Square-Free Rings.*  
(308) **Martin W Montgomery**, Piedmont College (1035-16-1304)

- 3:00PM *Classifications of Pseudo-Local Rings.*  
(309) **Jason P Huffman**, Georgia College & State University (1035-16-1728)
- 3:15PM *Centralizers in R. Thompson's group V.*  
(310) **Jenya Sapir\***, University of Chicago, and **Alison Gordon**, University of Delaware (1035-20-594)
- 3:30PM *More results on the capability of finite groups of class two and prime exponent.*  
(311) **Arturo Magidin**, University of Louisiana at Lafayette (1035-20-84)
- 3:45PM *Cohomology Groups in Algebra and in Geometry.*  
(312) **Jorge Maciel**, The City University of New York-BMCC (1035-20-237)
- 4:00PM *Low-dimensional complex representations of odd characteristic symplectic groups.*  
(313) **Hung Ngoc Nguyen**, University of Florida (1035-20-291)
- 4:15PM *Continuous Control in Exact Non-Split Categories.*  
(314) **Timothy K Lance**, Francis Marion University (1035-19-413)
- 4:30PM *A brief introduction to cubulating groups.*  
(315) **Tim Hsu**, San Jose State University (1035-20-175)
- 4:45PM *On Some Subnormality Conditions in Metabelian Groups.*  
(316) **Luise-Charlotte Kappe\***, SUNY at Binghamton, and **David Garrison**, Lockheed Martin Systems Integration - Owego (1035-20-547)
- 5:00PM *Null Decomposition of Conformal Algebras.*  
(317) **Daniela Mihai**, Carnegie Mellon University (1035-20-257)
- 5:15PM *Fast Fourier Transforms for Inverse Semigroups.* Preliminary report.  
(318) **Martin Malandro**, Dartmouth College (1035-20-401)
- 5:30PM *Decomposing  $p$ -groups via Jordan algebras.*  
(319) **James B. Wilson**, University of Oregon (1035-20-960)
- 5:45PM *Frobenius complements of exponent dividing  $2^m \cdot 9$ .*  
(320) **Enrico Jabara**, Dipartimento di Matematica Applicata, Università di Ca' Foscari, Venezia, Italy, and **Peter Mayr\***, Institut für Algebra, Johannes Kepler Universität Linz, Austria (1035-20-970)
- 6:00PM  *$S_n$ -normal Semigroups of Partial Transformations.*  
(321) **Roberto Palomba\***, **Sean Droms** and **Janusz Konieczny**, University of Mary Washington (1035-20-976)

### AMS Session on Partial Differential Equations, II

2:15 PM – 4:55 PM

- 2:15PM *Population Models with Diffusion, Strong Allee Effect and Constant Yield Harvesting.*  
(322) **Jaffar Ali\***, **Ratnasingham Shivaji**, Mississippi State University, and **Kellan Wampler**, Rose Hulman Institute of Technology (1035-35-81)
- 2:30PM *Computation of the wave forces on a floating cylinder due to scattering and radiation due to surge, heave and pitch.*  
(323) **Dambaru Bhatta**, University of Texas-Pan American (1035-35-283)
- 2:45PM *On the Gevrey wave-front set of traces of CR functions on maximally real submanifolds.*  
(324) **Ziad Adwan**, Texas University at Brownsville, and **Gustavo Hoepfner\***, Temple University (1035-35-447)
- 3:00PM *Lower bounds for blow-up time in some porous medium problems.*  
(325) **Philip W Schaefer**, University of Tennessee (1035-35-474)

- 3:15PM *A constructive method for finding critical points of a Ginzburg-Landau type functional.*  
▶ (326) **Parimah T Kazemi**, University of North Texas (1035-35-258)
- 3:30PM *Adjoint-Based Optimization Applied to a System of Nonlinear Partial Differential Equations.*  
▶ (327) **David C. Szurley**, Francis Marion University (1035-35-690)
- 3:45PM *Wave Scattering in In-homogeneous Strings.*  
(328) Preliminary report.  
**Nezam Iraniparast**, Western Kentucky University (1035-35-807)
- 4:00PM *Infinitely Many Radially Symmetric Solutions to a Superlinear Dirichlet Problem in a Ball.*  
(329) **Sridevi Pudipeddi**, University of North Texas (1035-35-821)
- 4:15PM *Travelling Solution of a Variational Wave Equation on Two Space Dimension.*  
(330) **Tae-Wan Park**, Grand Valley State University (1035-35-912)
- 4:30PM *Coefficient recovery in parabolic initial boundary value problems.*  
(331) **Paul D DuChateau**, Colorado State University, and **Trent C Kull\***, Winthrop University (1035-35-1057)
- 4:45PM *Variational Approach for Free Boundary Problems: A Seepage Problem With Singularity.*  
▶ (332) **Sadia M. Makky\***, Owens College, and **Fadhel S. Fadhel**, University of Baghdad (1035-76-270)

**AMS Session on Algebra and Number Theory, II**

2:15 PM – 5:55 PM

- 2:15PM *New estimates for multidimensional Weyl sums.*  
(333) Preliminary report.  
**Scott T. Parsell**, Butler University (1035-11-1726)
- 2:30PM *Sign Ambiguities.*  
(334) **Heon Kim**, Louisiana State University (1035-11-1823)
- 2:45PM *On the equation  $X^{2p} + Y^{2p} = Z^{2p}$ .* Preliminary report.  
▶ (335) **Adeniran Adeboye**, Howard University (1035-11-1871)
- 3:00PM *Class Numbers and Lengths of Hilbert Class Tower Fields.*  
(336) **Michael W Daub**, Williams College (1035-11-1872)
- 3:15PM *Approximating the  $U_{11}$  operator on overconvergent modular forms.* Preliminary report.  
(337) **Lloyd J Kilford**, University of Bristol (1035-11-79)
- 3:30PM *Sum of powers of integers and binomial coefficients.*  
▶ (338) **George W Grossman\*** and **Zinyun Zhu**, Central Michigan University (1035-11-309)
- 3:45PM *On Solving the Diophantine Equation  $x^3 + y^3 + z^3 = n$ .*  
▶ (339) **Susil Kumar Jena**, KIIT University, Bhubaneswar, Orissa, India (1035-11-378)
- 4:00PM *Asymptotic valuations of sequences satisfying first order recurrences.*  
(340) **Luis A. Medina\***, **Tewodros Amdeberhan** and **Victor H. Moll**, Tulane University (1035-11-728)
- 4:15PM *Waring's number in a finite field.* Preliminary report.  
(341) **James Arthur Cipra**, Kansas State University (1035-11-794)
- 4:30PM *Poincaré Series of Weil and Igusa Type for Elliptic Curves.*  
▶ (342) **Samuel Paul Ruth**, Northwestern University (1035-11-127)

- 4:45PM *A special case of rational thetas for terminating  $\theta$ -expansions.*  
▶ (343) **Santanu Chakraborty**, University of Texas - Pan American (1035-11-844)
- 5:00PM *Singular Moduli of Shimura Curves.*  
(344) **Eric Errthum**, Winona State University (1035-11-872)
- 5:15PM *Error Zeta Function.*  
(345) **Abdul Hassen\*** and **Hieu D Nguyen**, Rowan University (1035-11-905)
- 5:30PM *A simple prime-generating recurrence.*  
▶ (346) **Eric S. Rowland**, Rutgers University (1035-11-986)
- 5:45PM *Upper bounds for Discrete Moments of the Riemann Zeta-Function.* Preliminary report.  
(347) **Micah B. Milinovich**, University of Rochester (1035-11-1040)

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

2:15 PM – 3:40 PM

Organizers: **Florence S. Gordon**, New York Institute of Technology  
**Laurette Foster**, Prairie A&M University  
**Mary R. Robinson**, University of New Mexico, Valencia Campus  
**Yajun Yang**, Farmingdale State University of New York

- 2:15PM *Application of Dutch Curriculum Design Principles in College Algebra: Meaningful Contexts that Promote Mathematical Insight.*  
▶ (348) **David C. Webb\***, University of Colorado at Boulder, **Henk van der Kooij**, Freudenthal Institute, University of Utrecht, and **Monica Geist**, Front Range Community College (1035-D1-1931)
- 2:30PM *The Impact of Curriculum Change on Teacher Practice: The Case of College Algebra.* Preliminary report.  
▶ (349) **Monica R. Geist\***, Front Range Community College, **David C. Webb**, University of Colorado at Boulder, and **Henk van der Kooij**, Freudenthal Institute (1035-D1-832)
- 2:45PM *Beat the Pumps with Algebra.* Preliminary report.  
▶ (350) **Kimberly J. Burch**, Indiana University of Pennsylvania (1035-D1-195)
- 3:00PM *Integrating College Algebra Modularity and Technology.*  
▶ (351) **Dale Magoun\***, **Steve Richters**, **Serpil Saydam**, **Charlotte Owens**, University of Louisiana at Monroe, and **Beth Smith**, University of Louisiana at Monroe (1035-D1-1845)
- 3:15PM *Algebra, Guided Discovery and a Handheld Computer Algebra System: The Perfect Trio.* Preliminary report.  
▶ (352) **Thomas Fox**, University of Houston-Clear Lake (1035-D1-1680)
- 3:30PM *Why Teach Transformations of Graphs?* Preliminary report.  
▶ (353) **Heidi Burgiel\*** and **Ward Heilman**, Bridgewater State College (1035-D1-591)

**MAA Session on Curriculum Materials for Preservice Middle School Mathematics Teachers, I**

2:15 PM – 4:50 PM

Organizers: **Laurie J. Burton**, Western Oregon University

- Maria G. Fung**, Western Oregon University  
**Klay T. Kruczek**, Western Oregon University
- 2:15PM ▶ (354) *A Discrete Mathematics Course for Preservice Middle School Mathematics Teachers.* Preliminary report.  
**Bonnie Gold**, Monmouth University (1035-H1-815)
- 2:35PM ▶ (355) *Using Precalculus and Calculus to Develop Mathematical Connections Surrounding Middle School Mathematics.*  
**Theresa A. Jorgensen**, University of Texas at Arlington (1035-H1-1091)
- 2:55PM ▶ (356) *Visual College Algebra for Middle School Teachers.*  
**Laurie J. Burton**, Western Oregon University (1035-H1-620)
- 3:15PM ▶ (357) *Promoting understanding of middle school mathematics.*  
**Elizabeth George Bremigan**, **Ralph Bremigan\*** and **John Lorch**, Ball State University (1035-H1-1074)
- 3:35PM ▶ (358) *Going 'Round in Circles.*  
**Jeff McLean**, University of St. Thomas (1035-H1-1087)
- 3:55PM ▶ (359) *Algebra for Elementary and Middle School Teachers: An Inquiry Approach.*  
**Sheryl Stump\*** and **Kay Roebuck**, Ball State University (1035-H1-1030)
- 4:15PM ▶ (360) *Supplemental Materials from Number Systems for Middle School Teachers.* Preliminary report.  
**Maura A. Murray**, Salem State College (1035-H1-1271)
- 4:35PM ▶ (361) *Exploring Concepts of Euclidean Geometry Through Comparison with Spherical and Taxicab Geometries.*  
**Maria G. Fung\***, Western Oregon University, **Tevian Dray**, Oregon State University, **David Damcke**, University of Portland, **Lyn Riverstone** and **Dianne Hart**, Oregon State University (1035-H1-877)

### MAA Session on the Power of Inductive and Recursive Thinking

2:15 PM – 5:10 PM

- Organizer: **William A. Marion**, Valparaiso University
- 2:15PM ▶ (362) *Two inquiry based learning tasks to help students think inductively and recursively.*  
**Morton Brown**, University of Michigan (1035-R1-1745)
- 2:30PM ▶ (363) *Using Integer Rods to Visualize Induction.*  
**Elizabeth A. Burroughs**, Montana State University (1035-R1-123)
- 2:45PM ▶ (364) *Induction: It's Only Natural.*  
**J. Winston Crawley\*** and **Douglas E Ensley**, Shippensburg University of PA (1035-R1-1333)
- 3:00PM ▶ (365) *Examples of Inductive Reasoning and Recursive Thinking in Undergraduate Mathematics.* Preliminary report.  
**Jialing Dai**, The University of the Pacific (1035-R1-1808)
- 3:15PM ▶ (366) *Teaching Induction Using Fractals.*  
**David J Hunter**, Westmont College (1035-R1-1817)
- 3:30PM (367) *Strong Induction.*  
**Brian P. Kelly**, Bryant University (1035-R1-1619)
- 3:45PM ▶ (368) *The Blarney's Party: An Exercise in Mathematical Induction.*  
**Linda McGuire\*** and **Elyn Rykken**, Muhlenberg College (1035-R1-1258)

- 4:00PM ▶ (369) *Self-discovery Techniques for Bridging the Gap between Precalculus and Calculus.* Preliminary report.  
**Susan Schmoyer\*** and **Heather A Jackson**, United States Military Academy (1035-R1-1901)
- 4:15PM ▶ (370) *Checkerboard Tiling and Mathematical Induction.* Preliminary report.  
**Melinda Schulteis**, Concordia University, Irvine (1035-R1-985)
- 4:30PM ▶ (371) *Some Examples of Induction in Combinatorial Geometry.*  
**Norton Starr**, Amherst College (1035-R1-55)
- 4:45PM ▶ (372) *Patterns in Biology.* Preliminary report.  
**Anthony Tongen**, James Madison University (1035-R1-1935)
- 5:00PM ▶ (373) *Using Spreadsheets to Help Students Think Recursively.*  
**Robert P. Webber**, Longwood University (1035-R1-317)

### MAA Session on Serving Students Who Have Taken Calculus in High School

2:15 PM – 6:30 PM

- Organizers: **Ann E. Watkins**, California State University, Northridge  
**Daniel J. Teague**, North Carolina School of Science and Mathematics
- 2:15PM ▶ (374) *Calculus in High School—The Numbers.* Preliminary report.  
**David Bressoud**, Macalester College (1035-V1-860)
- 2:35PM ▶ (375) *A National Survey About the Choices Made by Students Who Take Calculus before 12th Grade.*  
**Ann E. Watkins**, California State University, Northridge (1035-V1-1130)
- 2:55PM ▶ (376) *A Creative Way for High Schools to Serve Post AP Mathematics Students.*  
**Harrison W. Straley**, Wheaton College, Norton, MA (1035-V1-753)
- 3:15PM ▶ (377) *Thematic Calculus: Approximations and Primes.*  
**Shahriar Shahriari**, Pomona College (1035-V1-1710)
- 3:35PM (378) *Graph Theory as an Introduction to Proofs Course for Post Calculus High School Students.*  
**Daniel J Teague**, NC School of Science and Mathematics (1035-V1-1716)
- 3:55PM (379) *Using Integrated First-Year College Mathematics Courses to Challenge and Motivate Students Who Have Had Calculus and to Level the Playing Field for Those Who Haven't.*  
**John L. Scharf**, Carroll College (1035-V1-1464)
- 4:15PM (380) *Foundations of Abstract Mathematics.*  
**Suzanne Hamon**, John Burroughs School (1035-V1-151)
- 4:35PM ▶ (381) *An Applied Calculus Course for Everyone.*  
**Rachel M Dunwell\*** and **Christopher W Seaton**, Rhodes College (1035-V1-1630)
- 4:55PM (382) *Linear Algebra in High School.*  
**Al Cuoco**, Center for Mathematics Education, EDC (1035-V1-406)
- 5:15PM ▶ (383) *College "Calculus" for Students Who Have Already Had Some Calculus.*  
**Sarah-Marie Belcastro**, Smith College and Hampshire College Summer Studies in Mathematics (1035-V1-971)



- 5:35PM *Linear Algebra at Strath Haven H.S.*  
(384) **Catherine Stambaugh\***, Strath Haven H.S., Wallingford, PA, and **Stephen B Maurer**, Swarthmore College (1035-V1-922)
- 5:55PM *Redesigning the Advanced Mathematics Program at the United States Military Academy.*  
▶ (385) **Donald A. Outing\***, **Todd P. Retchless** and **Randy Boucher**, United States Military Academy (1035-V1-810)
- 6:15PM *Selecting Students for the Advanced Mathematics Program at the United States Military Academy.*  
(386) **Todd P Retchless\***, **Randy Boucher** and **Donald A Outing**, United States Military Academy (1035-V1-191)

### MAA Session on Topics and Techniques for Real Analysis, I

2:15 PM – 5:00 PM

Organizers: **Erik O. Talvila**, University College of the Fraser Valley

**Robert W. Vallin**, Slippery Rock University

**James E. Peterson**, Benedictine College

- 2:15PM *Keep it real!* Preliminary report.  
▶ (387) **Richard J. Bagby**, New Mexico State University (1035-W1-645)
- 2:35PM *Motivating Concepts Through the Use of Metaphor.*  
▶ (388) **Paul M Musial**, Chicago State University (1035-W1-1578)
- 2:55PM *A Physical Motivator for Some Topics in Intermediate Analysis.*  
▶ (389) **Charles W. Groetsch**, The Citadel (1035-W1-65)
- 3:15PM Break.
- 3:45PM *Questions My Calculus Teacher Couldn't Answer.*  
▶ (390) **Louis A Talman**, Metropolitan State College of Denver (1035-W1-1110)
- 4:05PM *Feather boas, yarn, and post-it notes: A dynamic way to teach real analysis definitions.* Preliminary report.  
▶ (391) **Julia A Barnes**, Western Carolina University (1035-W1-1312)
- 4:25PM *Group Activities for Real Analysis.*  
(392) **Lynette J Boos**, Trinity College (1035-W1-701)
- 4:45PM *Real Analysis for Education majors: Achieving the Right Balance.*  
▶ (393) **Srilal N Krishnan**, Iona College (1035-W1-325)

### MAA Session on Using Ideas from Asian Mathematics in the Classroom, II

2:15 PM – 5:50 PM

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

**Kim L. Plofker**, Brown University

**Frank Swetz**, Pennsylvania State University, Harrisburg

- 2:15PM *A beginning college class reviews basic algebra by way of ancient and medieval Mesopotamia, Egypt, India, China, and Islam.* Preliminary report.  
▶ (394) **Rachelle M Ankney**, North Park University (1035-X1-367)
- 2:35PM *Origins of Trigonometric Functions.*  
▶ (395) **Julie Belock**, Salem State College, and **Kate McGivney\***, Shippensburg University (1035-X1-892)

- 2:55PM *Use of Original Asian Sources in a Liberal Arts Class on the History of Mathematics.*  
▶ (396) **Homer S White**, Georgetown College, Kentucky (1035-X1-340)
- 3:15PM *The Geometric Series: Visually.*  
▶ (397) **Chiru Bhattacharya**, Randolph-Macon College (1035-X1-546)
- 3:35PM *"The Net of Numbers": Combinatorics in Ancient India Engaging Early Examples for Contemporary Classrooms.*  
▶ (398) **Clemency J. Montelle**, University of Canterbury, New Zealand (1035-X1-1378)
- 3:55PM *Kuttaka and Ta-Yen: A Comparison of Indian and Chinese Methods of Solving Linear Indeterminate Equations.* Preliminary report.  
▶ (399) **James F Kiernan**, Brooklyn College of the City University of New York (CUNY) (1035-X1-482)
- 4:15PM *Heavenly Mathematics: The Mathematics of the Chinese, Indian, and Islamic calendars.* Preliminary report.  
▶ (400) **Helmer Aslaksen**, National University of Singapore (1035-X1-1444)
- 4:35PM *A Sangaku problem with a western proof.*  
▶ (401) **Michael Woltermann\***, **Katelin Ennis**, and **Roman Wong**, Washington and Jefferson College (1035-X1-233)
- 4:55PM *An Ancient View on Proportionality in Similar Triangles.* Preliminary report.  
▶ (402) **Jerry Lodder**, New Mexico State University (1035-X1-557)
- 5:15PM *Illustrating the use of The Nine Chapters in the classroom.*  
▶ (403) **Joel Haack**, University of Northern Iowa (1035-X1-928)
- 5:35PM *The Gougu Theorem, etc. in a Euclidean Geometry class.*  
(404) **David Gove**, California State University, Bakersfield (1035-X1-1405)

### MAA General Contributed Paper Session, II

2:15 PM – 5:55 PM

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

Moderators: **Cynthia J. Woodburn**, Pittsburg State University

**Peter Staab**, Fitchburg State College

**Albert W. Schueller**, Whitman College

**Leon Hardy**, Valencia Community College

- 2:15PM *Improving Student Performance in a Problem Solving Curriculum by Emphasizing Fundamental Mathematical Skills, a Follow-Up Discussion.*  
▶ (405) **Heather A Jackson\*** and **Gerald Kobylski**, United States Military Academy (1035-Z1-1897)
- 2:30PM *Normal distribution as the limit of the binomial distribution—a graphical argument.*  
▶ (406) **Aldo R Maldonado**, Park University (1035-Z1-1491)
- 2:45PM *Sharing The Students' Classroom: Joint Teaching Tales.* Preliminary report.  
(407) **Amy H Lin Erickson\*** and **Leigh L Noble**, United States Military Academy (1035-Z1-1272)
- 3:00PM *Simplicity of Endomorphism Centralizer Nearrings.* Preliminary report.  
(408) **G. Alan Cannon\***, Southeastern Louisiana University, and **Gary Walls**, West Texas A&M University (1035-Z1-2011)

- 3:15PM *Efficacy of Peer-led Team Learning in Calculus I at Morehouse College.*  
▶ (409) **John C. Merkel**, Morehouse College (1035-Z1-1811)
- 3:30PM *Differentiated Problem Solving for Prospective K-8 Teachers.* Preliminary report.  
▶ (410) **Trisha A Bergthold\***, San Jose State University, and **David Foster**, Robert Noyce Foundation (1035-Z1-1152)
- 3:45PM *Translating Euler's works: How to get your students' feet wet in undergraduate research.* Preliminary report.  
▶ (411) **Hieu D Nguyen\*** and **Thomas Osler**, Rowan University (1035-Z1-806)
- 4:00PM *Higher Math: An Introduction.*  
▶ (412) **Jean Bee Chan**, Sonoma State University (1035-Z1-963)
- 4:15PM *Exploring Loci with Dynamic Geometry Software.*  
▶ (413) **Owen D Byer** and **Deirdre Longacher Smeltzer\***, Eastern Mennonite University (1035-Z1-1762)
- 4:30PM *Augustus De Morgan: The Man Behind the Scenes.* Preliminary report.  
▶ (414) **Jesse W Byrne\*** and **Charlotte K Simmons**, University of Central Oklahoma (1035-Z1-210)
- 4:45PM *Psychology, pedagogy and epistemology in context of secondary mathematics: A content course for secondary mathematics teachers.*  
(415) **Debasree Raychaudhuri**, California State University, Los Angeles (1035-Z1-1982)
- 5:00PM *Oreos and Experimental Design.*  
▶ (416) **Michelle Everson**, University of Minnesota (1035-Z1-321)
- 5:15PM *From Chinese Mathematics to Calculus and Beyond.*  
▶ (417) **Youyu Phillips**, Keystone College (1035-Z1-1000)
- 5:30PM *On the Distribution of the Number of Simplex Iterations to Optimality.*  
▶ (418) **Susan Kim**, Claremont Graduate University (1035-Z1-58)
- 5:45PM *The potential of Cognitively Guided Instruction facets in the preparation of under-prepared and anxious students in 7th to 12th grades.* Preliminary report.  
▶ (419) **Stephen Max Lancaster**, California State University, Fullerton (1035-Z1-889)

**SIAM Minisymposium on Analysis and Computation of Stochastic Equations**

2:15 PM – 6:40 PM

Organizer: **Jack Xin**, University of California Irvine

- 2:15PM *From Stochastic Variational Integrators to super-diffusive transport at uniform temperature with fluctuation-driven magnetic motors.*  
(420) **Houman Owhadi\***, California Institute of Technology, and **Nawaf Bou-Rabee**, Caltech (1035-60-457)
- 2:45PM *Inertial particles and explosive diffusions.*  
(421) **Leonid Piterbarg**, University of Southern California (1035-60-762)
- 3:15PM *Almost sure stability for a stochastic beam equation.*  
(422) **Peter Baxendale**, University of Southern California (1035-60-676)
- 3:45PM *Reaction-diffusion fronts in random flows.* Preliminary report.  
▶ (423) **Jack Xin**, UC Irvine (1035-35-792)

- 4:15PM *Phase Transitions and Limit Results for Homopolymers.*  
(424) **Michael C. Cranston\***, University of California, Irvine, and **Stanislav Molchanov**, UNiversity of North Carolina, Charlotte (1035-60-1667)
- 4:45PM *Nested Stochastic Simulation Algorithms for Chemical Kinetic Systems with Multiple Time Scales.*  
(425) **Di Liu**, Michigan State University (1035-60-908)
- 5:15PM *Time reversal and super-resolution in random medium.*  
(426) **Hongkai Zhao**, University of California, Irvine (1035-65-830)
- 5:45PM *Simulation and Measurement of Time-Reversal in an Indoor Environment using Wide-angle Antennas.*  
(427) **Peter Blomgren**, San Diego State University (1035-35-1662)
- 6:15PM *Monte Carlo simulations for 2-dimensional Maxwell equations in random media.*  
▶ (428) **Chang-Yeol Jung**, The Institute for Scientific Computing and Applied Mathematics (1035-35-509)

**Math on the Web, I**

2:15 PM – 4:30 PM

- 2:15PM *Communicating mathematics on the Web in practice.*  
(429) **Patrick Ion**, American Mathematical Society
- 3:00PM *Managing math in Moodle.*  
(430) **Bob Mathews**, Design Science, Inc.
- 4:00PM *Student answers to math homework on the Web using proper mathematical notation: A scalable, universal approach.*  
(431) **John Risley**, WebAssign

**MAA-Project NExT and Young Mathematicians Network Joint Poster Session**

2:15 PM – 4:15 PM

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

**AMS Workshop: Part II**

2:15 PM – 5:30 PM

- Grant writing in the mathematical sciences.*  
Organizers: **Michelle Wagner**, National Security Agency  
**Deborah F. Lockhart**, National Science Foundation

**MAA SIGMAA on Mathematics and the Arts Panel Discussion**

2:15 PM – 3:35 PM

- Mathematics and Hollywood: A conversation with mathematical Hollywood writers and mathematics faculty.*  
Organizers: **Christopher Goff**, University of the Pacific  
**Sarah J. Greenwald**, Appalachian State University
- Panelists: **David M. Bressoud**, Macalester College  
**Ken Keeler**, Futurama, 20th Century Fox

Alice Silverberg, University of California Irvine  
 Eric Weisstein, Wolfram Research, Inc.  
 Jeff Westbrook, The Simpsons, 20th Century Fox

**MAA Committee on Graduate Students-Young Mathematicians Network Joint Panel Discussion**

2:15 PM – 3:35 PM

*How to interview for a job in the mathematical sciences.*

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

Panelists: **Allen Butler**, Daniel H. Wagner Associates, Inc.

**Sharon M. Clarke**, Pepperdine University

**James H. Freeman**, Cornell College

**Sarah Ann Stewart**, Belmont University

**David C. Manderscheid**

**MAA Session for Chairs**

2:15 PM – 3:35 PM

*What every chair should know about NSF funding.*

Organizers: **Catherine M. Murphy**, Purdue University Calumet

**Daniel P. Maki**, Indiana University

**AWM Panel Discussion**

2:15 PM – 3:40 PM

*The unseen AWM opportunities*

Moderator: **Cathy Kessel**, Berkeley, CA

Panelists: **Victoria E. Howle**, Sandia National Laboratories

**Elizabeth G. Yanik**, Emporia State University

**Rachel A. Kuske**, University of British Columbia

**Suzanne Lenhart**, University of Tennessee, Knoxville

**Cathy Kessel**

**MAA Section Officers**

2:30 PM – 5:00 PM

**Session for Math Club Advisors**

3:00 PM – 3:50 PM

**MAA Invited Address**

3:20 PM – 4:10 PM

(432) *Mathematics and the law: The apportionment of the House of Representatives.*

**Paul H. Edelman**, Vanderbilt University (1035-A0-18)

**AWM Business Meeting**

3:45 PM – 4:15 PM

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

3:50 PM – 5:50 PM

*Tracking our students from college algebra to calculus: Where they come from, where they go, and where they don't.*

Organizer: **Sheldon P. Gordon**, Farmingdale State College

Panelists: **Barbara E. Edwards**, Oregon State University

**Steven R. Dunbar**, University of Nebraska

**Aimee Ellington**, Virginia Commonwealth University

**Scott Herriott**, Maharishi International University

**Mercedes McGowen**, William Rainey Harper College

**William A. Wallter**, University of Houston-Downtown

**MAA Panel Discussion**

3:50 PM – 5:10 PM

*Engaging students in college mathematics courses.*

Organizer: **Juli D'Ann Ratheal**, West Texas A&M University

Panelists: **James A. Epperson**, University of Texas-Arlington

**Winifred A. Mallam**, Texas Woman's University

**Kimberly M. Childs**, Stephen F. Austin State University

**Bowen Brawner**, Tarleton State University

**Rebecca Walls**, West Texas A&M University

**Juli D'Ann Ratheal**

**MAA Session on Research on the Teaching and Learning of Undergraduate Mathematics, I**

4:00 PM – 5:20 PM

Organizers: **David E. Meel**, Bowling Green State University

**Michelle J. Zandieh**, Arizona State University

**Chris Rasmussen**, San Diego State University

4:00PM *Mathematical Reasoning: Insights from Cognitive Psychology.*

► (433) **Michelle J Zandieh**, Arizona State University (1035-U1-628)

4:35PM *College students' understandings of conditional statements.*

(434) **Kyeong Hah Roh**, Arizona State University (1035-U1-1979)

5:00PM *Students' Conceptions of Vectors, Span, and Linear Dependence and Independence.*

► (435) **Christine Joy Larson\***, Indiana University and San Diego State University, and **Michael Smith**, San Diego State University (1035-U1-1917)

**Reception for Undergraduate Students and Math Club Advisors**

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4:00 PM – 5:00 PM

**SIGMAA on Environmental Mathematics Guest Lecture and Business Meeting**

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4:30 PM – 6:00 PM

**AMS Special Presentation on Congressional Fellowships**

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4:30 PM – 6:00 PM

Organizer: **Samuel M. Rankin, III**, AMS

**MAA Minicourse #14: Part A**

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4:45 PM – 6:45 PM

*Beyond formulas and algorithms: Teaching a conceptual/thematics single variable calculus course.*

Organizer: **Shahriar Shahriari**, Pomona College

**MAA Minicourse #3: Part A**

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4:45 PM – 6:45 PM

*Introduction to the mathematics of modern cryptography.*

Organizers: **Jeffrey Ehme**, Spelman College  
**Colm K. Mulcahy**, Spelman College

**MAA Minicourse #8: Part A**

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4:45 PM – 6:45 PM

*Mathematics and geometry of voting.*

Organizer: **Donald G. Saari**, University of California Irvine

**MAA Special Film Presentation**

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5:00 PM – 6:00 PM

*Flatland: The Movie.*

Organizer: **Thomas F. Banchoff**, Brown University

**MAA Special Presentation**

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5:00 PM – 6:30 PM

*Help for undergraduates: Negotiating the Joint Meetings.*

Organizer: **Elizabeth Mayfield**, Hood College  
Panelists: **Dan Kalman**, American University  
**Jacqueline A. Jensen**, Sam Houston State University

**Reception for Graduate Students and First-Time Participants**

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5:30 PM – 6:30 PM

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

**SIGMAA on the History of Mathematics Guest Lecture, Business Meeting, and Reception**

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6:00 PM – 8:00 PM

**MAA Special Presentation**

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7:00 PM – 8:00 PM

*Dancing mathematics and the mathematics of dance.*

Organizers: **Sarah-Marie Belcastro**, Smith College  
**Karl Schaffer**, DeAnza College

**AMS Josiah Willard Gibbs Lecture**

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8:30 PM – 9:30 PM

(436) *Randomness—A computational complexity view.*  
**Avi Wigderson**, Institute for Advanced Study  
(1035-68-01)

## Monday, January 7

**Joint Meetings Registration**

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7:30 AM – 4:00 PM

**AMS Session on Geometry and Topology, I**

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7:45 AM – 11:55 AM

- 7:45AM *The Bundle Theorem in Laguerre Geometry—A Synthetic Approach.*  
▶ (437) **Robert D Knight**, Ohio University, Chillicothe (1035-51-1178)
- 8:00AM *On  $m$ -accretive Schrödinger operators with singular potentials on Riemannian manifolds.*  
(438) **Ognjen Milatovic**, University of North Florida (1035-58-1306)
- 8:15AM *Liouville properties, stochastic completeness, and self-adjointness.*  
(439) **Jun Masamune**, Worcester Polytechnic Institute (1035-58-1611)
- 8:30AM *Small Time Heat Kernel Behavior for Riemannian Polytopal Complexes.* Preliminary report.  
(440) **Melanie Anne Pivarski**, Texas A&M University (1035-58-1852)
- 8:45AM *Fixed hypersurfaces of holomorphic  $\mathbb{C}^*$  actions on exotic complex projective spaces.*  
(441) **Ryan Brown**, Georgia College & State University (1035-53-1598)
- 9:00AM *Hypersurfaces of low type in real space forms via the immersions by projectors.*  
(442) **Ivko M Dimitric**, Penn State University Fayette (1035-53-1666)
- 9:15AM *The Geometry of Landmark-based Shape Manifolds.*  
(443) **Mario Micheli**, Division of Applied Mathematics, Brown University (1035-53-1172)
- 9:30AM *Gromov-Lawson concordance implies isotopy.*  
(444) **Mark G Walsh**, University of Oregon (1035-53-1831)
- 9:45AM *On the classification of low-dimensional fixed point homogeneous Riemannian manifolds with nonnegative sectional curvature.* Preliminary report.  
(445) **Fernando Galaz-Garcia**, University of Maryland, College Park (1035-53-1180)

- 10:00AM (446) *On the moduli space of triply periodic minimal surfaces.*  
**Adam G. Weyhaupt**, Southern Illinois University Edwardsville (1035-53-2006)
- 10:15AM (447) *Nonorientable Contact Structures on 3-manifolds.*  
**David H Crombecque**, Bryn Mawr College (1035-57-428)
- 10:30AM (448) *Menasco Normal Form and Recognizing Unknot Diagrams.*  
**Chan-Ho Suh**, University of California, Davis (1035-57-1441)
- 10:45AM (449) *Torus leveling for (1, 1) knots.* Preliminary report.  
**Arim Seo**, University of Oklahoma (1035-57-1601)
- 11:00AM (450) *The self-linking of algebraic knots.* Preliminary report.  
**Alan Durfee**, Mount Holyoke College (1035-57-1743)
- 11:15AM (451) *An invariant for flat virtual knots.*  
**Neil R. Nicholson**, William Jewell College (1035-57-161)
- 11:30AM (452) *Isoperimetric Inequalities on Manifolds with Density.*  
**Max D. Engelstein**, Yale University (1035-51-1879)
- 11:45AM (453) *Nonarchimedean Cantor Set and String.*  
**Hung Lu\***, Hawaii Pacific University, and **Michel L. Lapidus**, University of California, Riverside (1035-51-71)

**AMS-ASL Special Session on Set Theory and Banach Spaces, III**

8:00 AM – 11:40 AM

Organizers: **Christian Rosendal**, University of Illinois at Urbana-Champaign  
**Stevo B. Todorcevic**, University of Toronto and CNRS, Université Paris 7

- 8:00AM (454) *On  $w^*$ -null sequences.* Preliminary report.  
**Jordi Lopez-Abad**, Equipe de Logique Mathématique, Université Paris 7 (1035-46-2022)
- 9:00AM (455) *Banach spaces universal for all separable strictly convex spaces.*  
**Nigel J Kalton**, University of Missouri (1035-46-893)
- 10:00AM (456) *Definable Davies' Theorem.* Preliminary report.  
**Asger D Tornquist**, University of Toronto (1035-03-1588)
- 11:00AM (457) *Partial Unconditionality.*  
**Stephen J Dilworth\***, University of South Carolina, **E Odell**, University of Texas at Austin, **Thomas Schlumprecht**, Texas A&M University, and **Andras Zsak**, University of Leeds (1035-46-1197)

**AMS Special Session on Structure, Geometry, and Symbolic Computation of Algebraic Groups and Symmetric Spaces, I**

8:00 AM – 11:50 AM

Organizers: **Jennifer R. Daniel**, Lamar University  
**Aloysius G. Helminck**, North Carolina State University

- 8:00AM (458) *Making the Lie correspondence effective for algebraic groups in characteristic 0.*  
**Willem A. de Graaf**, University of Trento (1035-20-288)
- 8:30AM (459) *A new approach to computing generators for the centralizer of  $K$  in the universal enveloping algebra of  $\mathfrak{g}$ .* Preliminary report.  
**Steven Glenn Jackson** and **Alfred G. Noël\***, University of Massachusetts Boston (1035-22-193)

- 9:00AM (460) *Computational Problems Concerning Kac-Moody Algebras and Groups.*  
**William Casselman**, University of British Columbia (1035-20-1035)
- 9:30AM (461) *Some invariant theoretic computations related to quantum computing.* Preliminary report.  
**Nolan R Wallach**, University of California, San Diego (1035-22-1409)
- 10:00AM (462) *Spin Flips and KAK Decompositions.*  
**Stephen S. Bullock**, IDA Center for Computing Sciences (1035-81-624)
- 10:30AM (463) *Compact symmetric spaces, triangular factorization, and Cayley coordinates.*  
**Derek Habermas**, SUNY Potsdam (1035-22-1374)
- 11:00AM (464) *Combinatorics of Blattner's formula.* Preliminary report.  
**Jeb F. Willenbring\***, University of Wisconsin - Milwaukee, and **Gregg J. Zuckerman**, Yale University (1035-22-240)
- 11:30AM (465) *Tau signatures, cells and nilpotent orbits.* Preliminary report.  
**B. Binengar**, Oklahoma State University (1035-22-1764)

**AMS Special Session on Stochastic, Large-Scale, and Hybrid Systems with Applications, I**

8:00 AM – 11:50 AM

Organizers: **Aghalaya S. Vatsala**, University of Louisiana at Lafayette  
**G. S. Ladde**, University of Texas at Arlington

- 8:00AM (466) *Stochastic Systems: A Class of Hybrid Systems.* Preliminary report.  
**G. S. Ladde**, University of South Florida at Tampa (1035-60-1084)
- 8:30AM (467) *Interacting Markovian systems.* Preliminary report.  
**Andrzej Korzeniowski**, UT Arlington (1035-60-1489)
- 9:00AM (468) *Stochastic Modeling of Global Warming Entities.* Preliminary report.  
**Chris P. Tsokos**, University of South Florida at Tampa (1035-60-1226)
- 9:30AM (469) *Restoration the Coefficient in Euler-Bernoulli Equation from Over-posed Data.* Preliminary report.  
**Tchavdar T. Marinov\***, University of Louisiana at Lafayette, and **Aghalaya S. Vatsala**, University of Louisiana at Lafayette, (1035-34-418)
- 10:00AM (470) *The Semilinear Evolution Equation for American Contingent Claims: Successive Approximations and Bounds.*  
**Valery A. Kholodnyi**, Platts Analytics (1035-91-392)
- 10:30AM (471) *A Numerical Comparison of Three State Estimation Schemes Applied to a Nonlinear Stochastic System.*  
**Elaine T. Hale**, Rice University (1035-93-1135)
- 11:00AM (472) *Uniqueness of weak solutions of semilinear wave equations with interior-boundary supercritical sources and damping.*  
**Lorena Bociu**, University of Virginia (1035-35-361)
- 11:30AM (473) *Improved Generalized Quasilinearization Method and Rapid Convergence for Nonlinear Volterra Integral Equations.*  
**Tanya G. Melton\***, LSU at Alexandria, and **Aghalaya S. Vatsala**, University of Louisiana at Lafayette (1035-45-338)

**AMS Special Session on Time-Frequency Analysis: Hilbert Huang Transform and Wavelet Analysis, I**

8:00 AM – 11:50 AM

Organizers: **Yuesheng Xu**, Syracuse University  
**Sherman D. Riemenschneider**, West Virginia University  
**Samuel S. Shen**, San Diego State University

- 8:00AM *Basic Elements of Empirical Mode Decomposition and Hilbert Spectral Analysis.*  
 ▶ (474) **Norden E Huang**, National Central University (1035-41-2014)
- 9:00AM *A characterization of wavelet frames by the multiplicative Zak transform.* Preliminary report.  
 (475) **John J. Benedetto\***, Norbert Wiener Center, University of Maryland, College Park, **Wojciech Czaja** and **Justin C. Flake**, University of Maryland, College Park (1035-42-656)
- 9:30AM *Quantization for Finite Frame Expansions and the White Noise Hypothesis.*  
 (476) **Yang Wang**, Michigan State University (1035-94-1807)
- 10:00AM *Image analysis using two-dimensional empirical mode decomposition.*  
 ▶ (477) **Lixin Shen**, Syracuse University (1035-94-2009)
- 10:30AM *Decomposition into Intrinsic Mode Functions.*  
 (478) **Vesselin I Vatchev**, The University of Texas at Brownsville (1035-41-1767)
- 11:00AM *Hilbert-Huang Transform and signals with positive instantaneous frequency.*  
 ▶ (479) **Daniel R Van Vliet**, West Virginia University (1035-41-1673)
- 11:30AM *Orthonormal Bases with Nonlinear Phase.*  
 (480) **Tao Qian**, FST, University of Macau, **Rui Wang**, Chinese Academy of Sciences, **Yuesheng Xu** and **Haizhang Zhang\***, Syracuse University (1035-41-422)

**AMS Special Session on Recent Advances in Mathematical Biology, Ecology, and Epidemiology, III**

8:00 AM – 11:55 AM

Organizers: **Linda J. S. Allen**, Texas Tech University  
**Sophia R. Jang**, University of Louisiana at Lafayette  
**Lih-Ing W. Roeger**, Texas Tech University

- 8:00AM *Species disappearance: A combination of infectious disease and Allee effect?*  
 ▶ (481) **Horst R Thieme**, Arizona State University (1035-92-430)
- 8:30AM *Mathematical Analysis of the Interaction of Cytotoxic T Lymphocytes and Epithelial Cells in the Influenza Infection.*  
 (482) **Abdessamad Tridane\***, Arizona State university, **Karl P Hadeler** and **Yang Kuang**, Arizona State University (1035-92-63)
- 9:00AM *Heterogeneous mixing in epidemic models.*  
 ▶ (483) **Fred Brauer**, University of British Columbia (1035-92-452)
- 9:30AM *Spatial patterns in a discrete-time epidemic patch model.*  
 (484) **Linda J. S. Allen**, Texas Tech University, **Yuan Lou**, The Ohio State University, and **Andrew L Nevai\***, Mathematical Biosciences Institute, The Ohio State University (1035-92-955)

- 10:00AM *SIR Models with Square-Root Dynamics.*  
 (485) **Ronald E Mickens**, Clark Atlanta University (1035-39-234)
- 10:30AM *The 1918-19 Influenza Pandemic in England and Wales: Spatial Patterns in Transmissibility and Mortality Impact.*  
 (486) **Gerardo Chowell\***, Arizona State University, **Luis MA Bettencourt**, Los Alamos National Laboratory, **Niall Johnson**, Sidney Sussex College, **Wladimir Alonso** and **Cecile Viboud**, Fogarty International Center (1035-92-403)
- 11:00AM *Malaria Model In Seasonal Environments.* Preliminary report.  
 ▶ (487) **Bassidy Dembele\***, Howard University, **Avner Friedman**, Ohio State University, and **Abdul-Aziz Yakubu**, Howard University (1035-34-619)
- 11:30AM *Continuous-time predator-prey models with parasites.* Preliminary report.  
 (488) **Sophia Jang\***, University of Louisiana at Lafayette, and **James Baglama**, University of Rhode Island (1035-92-1596)

**AMS Special Session on Progress in Commutative Algebra, II**

8:00 AM – 11:50 AM

Organizers: **Janet Striuli**, University of Nebraska, Lincoln  
**Sean M. Sather-Wagstaff**, North Dakota State University  
**Lars Winther Christensen**, Texas Tech University

- 8:00AM *Ascent of module structures, vanishing of Ext, and extended modules.*  
 (489) **Anders J. Frankild**, University of Copenhagen, **Sean Sather-Wagstaff**, North Dakota State University, and **Roger Wiegand\***, University of Nebraska (1035-13-715)
- 8:30AM *Hilbert Functions for Ext-Modules.* Preliminary report.  
 (490) **Andrew Crabbe\*** and **Janet Striuli**, University of Nebraska - Lincoln (1035-13-1136)
- 9:00AM *On the projective dimension of four quadrics.* Preliminary report.  
 (491) **Bahman Engheta**, University of California (1035-13-1880)
- 9:30AM *Vanishing conditions which force regularity in local rings of prime characteristic.*  
 (492) **Ian Aberbach**, University of Missouri, and **Jinjia Li\***, Syracuse University (1035-13-1068)
- 10:00AM *On the nonrigidity of Frobenius.*  
 (493) **Jinjia Li** and **Claudia Miller\***, Syracuse University (1035-13-1392)
- 10:30AM *Cohomology of connected sums of artinian Gorenstein rings.* Preliminary report.  
 (494) **Luchezar L Avramov** and **W. Frank Moore\***, University of Nebraska - Lincoln (1035-13-1512)
- 11:00AM *Contracting Endomorphisms and Gorenstein Modules.* Preliminary report.  
 (495) **Hamid Rahmati**, University of Nebraska-Lincoln (1035-13-1141)
- 11:30AM *On homological properties of Gorenstein rings.*  
 (496) **David A Jorgensen**, University of Texas at Arlington (1035-13-1332)

**AMS Special Session on Monotone Discrete Dynamical Systems with Applications, I**

8:00 AM – 11:50 AM

Organizers: **M. R. S. Kulenovic**, University of Rhode Island  
**Orlando Merino**, University of Rhode Island  
**Hal L. Smith**, Arizona State University

- 8:00AM *Global Bifurcation for Competitive Systems in the Plane.* (497)  
**Orlando Merino\*** and **Mustafa Kulenovic**, University of Rhode Island (1035-39-1027)
- 8:30AM *Positive Difference Equations with Several Equilibrium Points: Attractivity and Basins of Attraction.* Preliminary report.  
**Ann Brett\*** and **M. R. S. Kulenovic**, University of Rhode Island (1035-37-899)
- 9:00AM *On the Global Behavior of Nonnegative Solutions to*  
 $x_{n+1} = \frac{\alpha + \beta x_n + \gamma x_{n-1}}{A + Bx_n + Cx_{n-1}}$  *with positive parameters.* (499)  
**Sukanya Basu\*** and **Orlando Merino**, University of Rhode Island (1035-39-1242)
- 9:30AM *Non-hyperbolic Dynamics for Competitive Systems in the Plane.* Preliminary report.  
**M. R. S. Kulenovic\***, University of Rhode Island, **Dz. Burgic**, University of Tuzla, and **Senada Kalabusic**, University of Sarajevo (1035-37-859)
- 10:00AM *A nonautonomous model with Allee effect.* Preliminary report.  
**Saber N Elaydi**, Trinity University (1035-39-1996)
- 10:30AM *Existence, uniqueness and asymptotic phase in the carrying simplex for certain competitive maps.* (502)  
**Morris W Hirsch**, University of California, Berkeley and University of Wisconsin, Madison (1035-37-209)
- 11:00AM *Global Stability for Mixed Monotone Systems.* (503)  
**Hal L Smith**, Arizona State University (1035-37-942)
- 11:30AM *Two Applications of Monotone Systems to Quasilinear Elliptic Problems.* (504)  
**Peter Takac**, University of Rostock, Germany (1035-35-1073)

**AMS Special Session on The Mathematics of Information and Knowledge, III**

8:00 AM – 11:45 AM

Organizers: **Peter W. Jones**, Yale University  
**James G. Glimm**, SUNY at Stony Brook  
**Steve Smale**, Toyota Institute of Technology at Chicago

- 8:00AM *New Mathematical Challenges Arising from Studying Internet-like Systems.* (505)  
**Walter Willinger**, AT&T Labs-Research (1035-94-1326)
- 9:00AM *Learning from examples; What is "learning theory"?* (506)  
**Stephen Smale**, Toyota Technological Institute in Chicago (1035-94-1037)
- 10:00AM *Inferential diffusions as a tool for geometrization of digital data sets.* Preliminary report. (507)  
**Ronald R. Coifman**, Yale University (1035-43-2027)
- 11:00AM *Learning Behavior as a Function of Brain Dynamics.* (508)  
**Francois G Meyer**, University of Colorado at Boulder (1035-92-835)

**AMS Special Session on Mathematics for Teaching: Educating Elementary and Middle School Teachers for Success, I**

8:00 AM – 11:55 AM

Organizers: **Babette M. Benken**, California State University, Long Beach  
**Lynn C. McGrath**, University of San Diego  
**Perla L. Myers**, University of San Diego

- 8:00AM *Evaluating Mathematics Courses for Elementary Teachers: Mathematical Knowledge and Dispositions for Teaching.* (509)  
**Jim Gleason**, The University of Alabama (1035-97-73)
- 8:30AM *Mathematics classes for elementary and middle school teacher certification.* (510)  
**Raven S. McCrory**, Michigan State University (1035-97-549)
- 9:00AM *The Mathematics Semester: Educating Future Elementary Teachers at the University of Nebraska-Lincoln.* Preliminary report. (511)  
**W. James Lewis\*** and **Ruth Heaton**, University of Nebraska-Lincoln (1035-97-1813)
- 9:30AM *Using Technology to Build Understanding in Teaching and Learning Mathematics.* (512)  
**Laurie J. Riggs**, California State Polytechnic University, Pomona (1035-97-412)
- 10:00AM *Non-traditional Content Courses for Prospective and Practicing Mathematics Teachers: A Unique Program.* (513)  
**Babette M. Benken\*** and **Lindsay Tartre**, California State University, Long Beach (1035-97-1418)
- 10:30AM *Focusing on Justification in the Context of Computation: A First Course for Prospective Teachers.* (514)  
**Kate Kline\***, **Theresa J Grant**, Western Michigan University, and **Judy Flowers**, University of Michigan-Dearborn (1035-97-582)
- 11:30AM *Oakland/East Bay Middle School Math Circle.* Preliminary report. (515)  
**Brandy S. Wieggers**, University of California, Davis (1035-97-134)

**AMS Special Session on Conformally Flat Lorentzian Manifolds, I**

8:00 AM – 11:50 AM

Organizers: **Virginie Charette**, Université de Sherbrooke  
**William M. Goldman**, University of Maryland  
**Karin H. Melnick**, Yale University  
**Kevin Scannel**, Saint Louis University

- 8:00AM *Conformal actions of nilpotent Lie groups on compact Lorentz manifolds.* Preliminary report. (516)  
**Karin Melnick\***, Yale University, and **Charles Frances**, Université Paris-Sud XI (1035-53-1414)
- 8:30AM *Admissible Decomposition of Complex Projective Structures.* (517)  
**Shinpei Baba**, UC Davis (1035-53-1171)
- 9:00AM *Earthquakes on hyperbolic surfaces with geodesic boundary and multi black holes.* (518)  
**Francesco Bonsante**, Università degli Studi di Pavia (1035-53-726)
- 10:00AM *Actions on Hermitian symmetric spaces.* (519)  
**Alessandra Iozzi**, ETH Zurich (1035-22-1193)

- 10:30AM *Fundamental domains of properly convex real projective structures.* Preliminary report.  
(520) **Jaejeong Lee**, University of California, Davis (1035-53-1399)
- 11:00AM *Holomorphic Riemannian metrics on compact complex 3-manifolds.*  
(521) **Abdelghani Zeghib**, CNRS, UMPA, Ecole Normale Supérieure de Lyon (1035-51-992)
- 11:30AM *Rigidity of boundaries in conformal Lorentz geometry.*  
(522) **Charles Frances**, Université Paris-Sud (1035-51-853)

**AMS Special Session on Voting Theory, I**

8:00 AM – 11:40 AM

Organizers: **Michael A. Jones**, Montclair State University  
**Eric I. Gottlieb**, Rhodes College  
**Brian P. Hopkins**, Saint Peter's College

- 8:00AM *Symmetry of Nonparametric Statistical Tests on Three Samples.*  
▶ (523) **Anna E Bargagliotti\***, University of Memphis, and **Donald G Saari**, University of California Irvine (1035-62-280)
- 8:30AM *A geometric approach to judgement aggregation.*  
▶ (524) Preliminary report.  
**Christian Klamler\*** and **Daniel Eckert**, University of Graz (1035-91-608)
- 9:00AM *A voting rule based on the spatial median.*  
▶ (525) Preliminary report.  
**William S. Zwicker**, Union College (1035-91-716)
- 9:30AM *Applications of Topology to Decisions.*  
(526) **Jason Kronewetter\*** and **Donald G Saari**, University of California, Irvine (1035-91-1177)
- 10:00AM *How to Elect a Representative Committee Using Approval Balloting.*  
▶ (527) **D. Marc Kilgour\***, Wilfrid Laurier University, **Steven J. Brams**, New York University, and **M. Remzi Sanver**, Istanbul Bilgi University (1035-91-596)
- 10:30AM *Are Societies Agreeable?*  
▶ (528) **Francis Edward Su\***, **Kristen Huff**, Harvey Mudd College, and **Alex Izsak**, University of British Columbia (1035-91-1857)
- 11:00AM *Voting Systems That Combine Approval and Preference.*  
(529) **Steven J. Brams\***, New York University, and **M. Remzi Sanver**, Istanbul Bilgi University (1035-91-316)

**AMS Special Session on Graph Theory, I**

8:00 AM – 11:50 AM

Organizers: **Andre Kundgen**, California State University, San Marcos  
**K. Brooks Reid**, California State University, San Marcos

- 8:00AM *Cost parameterization in dynamic location problems.* Preliminary report.  
(530) **D. Jacob Wildstrom**, University of Louisville (1035-05-351)
- 8:30AM *Graphs with Champions.* Preliminary report.  
(531) **W. D. Wallis**, Southern Illinois University Carbondale (1035-05-83)
- 9:00AM *Bootstrap percolation in regular graphs.*  
(532) **Jacques A Verstraete**, University of California San Diego (1035-05-1443)

- 9:30AM *Spectra of (3,6)-Fullerenes.*  
(533) **Matt DeVos**, **Luis Goddyn\***, **Robert Šámal**, Simon Fraser University, and **Bojan Mohar**, Simon Fraser University (1035-05-174)
- 10:00AM *The search for cages of girth 5 and 7.*  
(534) **Allen J Schwenk**, Western Michigan University (1035-05-756)
- 10:30AM *How Useful is the Mathematics Subject Classification? Share Your Ideas on Improving It!*  
(535) **Jerrold W. Grossman**, Oakland University and *Mathematical Reviews* (1035-05-354)
- 11:00AM *The Distinguishing Chromatic Number.*  
(536) **Karen L. Collins**, **Mark Hovey**, Wesleyan University, and **Ann N. Trenk\***, Wellesley College (1035-05-858)
- 11:30AM *Distance graph—p-adic approach.*  
(537) **Jeong-Hyun Kang\***, University of West Georgia, and **Hiren Maharaj**, Clemson University (1035-05-1163)

**AMS Special Session on Modular Forms and Modularity, I**

8:00 AM – 11:50 AM

Organizers: **Ling Long**, Iowa State University  
**Wen-Ching Winnie Li**, Pennsylvania State University  
**Tong Liu**, University of Pennsylvania

- 8:00AM *Modularity of certain K3-fibered Calabi-Yau threefolds.*  
(538) **Noriko Yui**, Queen's University (1035-14-572)
- 8:30AM *Zeta-functions and L-series of certain Calabi-Yau threefolds.*  
(539) **Yasuhiro Goto**, Hokkaido Univ. of Education (1035-11-995)
- 9:00AM *Cuspidal divisor class groups of the modular curves  $X_1(N)$ .*  
(540) **Yifan Yang**, National Chiao Tung University, Taiwan (1035-11-529)
- 9:30AM *Heights of higher weight Heegner cycles.*  
(541) Preliminary report.  
**Hui Xue**, Clemson University (1035-11-882)
- 10:00AM *Dyson's challenge for the future: The mock theta functions.*  
▶ (542) **Ken Ono**, University of Wisconsin at Madison (1035-11-515)
- 10:30AM *Odd coefficients of weakly holomorphic modular forms.*  
(543) **Scott Ahlgren\***, University of Illinois, and **Matthew Boylan**, University of South Carolina (1035-11-1682)
- 11:00AM *Half-integral weight Maass form correspondences and vector valued forms.*  
(544) **Amanda Folsom**, University of Wisconsin, Madison (1035-11-1275)
- 11:30AM *Traces of singular values of Maass forms.*  
(545) **William Duke** and **Paul Jenkins\***, UCLA (1035-11-1286)

**AMS Special Session on Algebraic Topology, III**

8:00 AM – 11:40 AM

Organizers: **Nitu Kitchloo**, University of California San Diego  
**Ralph L. Cohen**, Stanford University  
**James P. Lin**, University of California San Diego  
**Justin Roberts**, University of California San Diego



**Peter Teichner**, University of California Berkeley

- 8:00AM *K*-theory and supersymmetric QFTs. (546) **Henning Hohnhold**, University of California, San Diego (1035-55-1388)
- 9:00AM *Stable homology of automorphism groups of free groups.* (547) **Soren Galatius**, Stanford (1035-55-1786)
- 10:00AM *Higher loop group genera and the fibered WZW models of Distler and Sharpe.* (548) **Matthew Ando**, University of Illinois at Urbana-Champaign (1035-55-1329)
- 11:00AM *Morita-Invertible Conformal Nets.* Preliminary report. (549) **Christopher L. Douglas\***, University of California, Berkeley, **Arthur Bartels**, University of Muenster, and **Andre Henriques**, University of Utrecht (1035-55-469)

**MAA Minicourse #4: Part A**

8:00 AM – 10:00 AM

*Wavelets and applications: A multidisciplinary undergraduate course with an emphasis on scientific computing.*

Organizers: **Patrick J. Van Fleet**, University of St. Thomas  
**David K. Ruch**, Metropolitan State College of Denver

**AMS Session on Analysis and Ordinary Differential Equations, I**

8:00 AM – 11:55 AM

- 8:00AM *A g*-function and Hermite expansion. Preliminary report. (550) **Javad Namazi**, Fairleigh Dickinson University (1035-28-1218)
- 8:15AM *"Lifting" Bailey pairs to WP-Bailey pairs.* (551) **James McLaughlin**, West Chester University of PA, **Andrew V Sills**, Georgia Southern University, and **Peter J Zimmer\***, West Chester University of PA (1035-33-1612)
- 8:30AM *Harmonic functions via restricted mean-value theorems.* (552) **Mohammad Javaheri**, University of Oregon (1035-31-1818)
- 8:45AM *Oscillation of second-order forced functional dynamic equations with oscillatory potentials.* (553) **Douglas R Anderson**, Concordia College-Moorhead (1035-34-40)
- 9:00AM *Positive solutions of second-order nonlinear differential equations.* (554) **Zhivko S. Athanassov**, Bulgarian Academy of Sciences (1035-34-389)
- 9:15AM *Zeta Functions of Multifractals.* Preliminary report. (555) **John A. Rock**, California State University, Stanislaus (1035-00-1476)
- 9:30AM *Dynamics and stability of impulsive hybrid set valued delay integro-differential equations.* (556) **Seenith Sivasundaram**, Embry Riddle Aeronautical University (1035-34-385)
- 9:45AM *Preliminary Results on Two New Oscillatory Functions:  $L_{cn}(t)$  and  $L_{sn}(t)$ .* Preliminary report. (557) **Ronald E Mickens**, Clark Atlanta University (1035-34-387)
- 10:00AM Break

- 10:15AM *Optimal Selling Rules in a Regime-Switching Exponential Gaussian Diffusion Model.* (558) **Paul Eloe\*** and **Ruihua Liu**, University of Dayton (1035-34-937)
- 10:30AM *Uniqueness Implies Existence for Nonlinear Conjugate-Like Boundary Value Problems.* (559) **Jeffrey A. Ehme\***, Spelman College, and **Aprillya Lanz**, Virginia Military Institute (1035-34-1081)
- 10:45AM *Stepanov-like Almost Automorphic Solutions of Semilinear Evolution Equations with Deviated Argument.* (560) **Haewon Lee**, **Hadi Alkahby\***, Dillard University, and **Gaston N'Guérékata**, Morgan State University (1035-34-1112)
- 11:00AM *Blow-up Behavior of Solutions for Riccati Initial-Value Problems.* (561) **Nadejda Dyakevich\***, **Sarah Bahk** and **Stefan Johnson**, California State University at San Bernardino (1035-34-1809)
- 11:15AM  $\Gamma$ -Convergence Approximation to Piecewise Smooth Medical Image Segmentation. (562) **Jung-Ha An\***, California State University, Stanislaus, **Mikael Rousson** and **Chenyang Xu**, Siemens Corporate Research, Imaging and Visualization Dept. (1035-49-1492)
- 11:30AM *Sufficient Conditions for the Existence of (Bi)Simulation Relations for Nonlinear Control Systems.* Preliminary report. (563) **Munteanu Laura**, University of Oklahoma (1035-49-1860)
- 11:45AM *An  $L^p$  Inequality for Polynomials.* (564) **Mohammed A. Qazi**, Tuskegee University (1035-41-843)

**AMS Session on Applications of Mathematics, I**

8:00 AM – 10:55 AM

- 8:00AM *Dynamical Behavior of a Two-Inhibin Model for Hormonal Control of the Menstrual Cycle.* Preliminary report. (565) **R. Drew Pasteur\*** and **James F. Selgrade**, North Carolina State University (1035-92-449)
- 8:15AM *Numerical Methods for an Immunology Model Using Reaction-Diffusion Equations with Stochastic Source Terms.* (566) **Timothy A Lucas**, Duke University (1035-92-1080)
- 8:30AM *Modeling aspects of neural-glia networks.* (567) **Anne J. Catlla**, Duke University (1035-92-1373)
- 8:45AM *Three-Dimensional Internal Source Primary Root Growth Model.* (568) **Brandy S. Wieggers\***, **Angela Y. Cheer** and **Wendy K. Silk**, University of California, Davis (1035-92-69)
- 9:00AM *Nonlinear dynamics of a double bilipid membrane.* (569) **Christine Sample\*** and **Alexander Golovin**, Northwestern University (1035-92-254)
- 9:15AM *Harvesting in biological populations: Models and analysis.* (570) **Natalia Hritonenko\***, Prairie View A&M University, **Renan Ulrich Goetz**, Universitat de Girona, **Yuri Yatsenko**, Houston Baptist University, and **Angels Xabadia**, Universitat de Girona (1035-92-322)

- 9:30AM *A model of the acute inflammatory response with immune mediators in both the blood and tissue and the effects of linking multiple tissue units to the same blood compartment.*  
 ▶ (571) **Angela Reynolds\***, University of Pittsburgh, **Gilles Clermont**, Department of Critical Care Medicine, University of Pittsburgh, **Jonathan Rubin** and **G. Bard Ermentrout**, University of Pittsburgh (1035-92-1169)
- 9:45AM *Conditions under which Vectors Develop Resistance to Spray.*  
 ▶ (572) **Jemal S. Mohammed-Awel\***, Valdosta State University, and **Blayneh W. Kebelesh**, Florida A&M University (1035-92-285)
- 10:00AM *A New Mathematical Model of Schistosomiasis.*  
 ▶ (573) **Ruijun Zhao\*** and **Fabio A. Milner**, Purdue University (1035-92-337)
- 10:15AM *Stability analysis of a model of atherogenesis: An energy estimate approach.*  
 (574) **L R Ritter\***, Southern Polytechnic State University, **A I Ibragimov**, Texas Tech University, **J R Walton**, Texas A&M University, and **C J McNeal**, Department of Internal Medicine, Scott & White Hospital (1035-92-359)
- 10:30AM *The Role of Time Dependence in the Exchange of Oxygen and Substrates in a Multi-Capillary System of the Skeletal Muscle.*  
 ▶ (575) **Akongnwi C Mformbele**, Georgia Gwinnett College (1035-92-788)
- 10:45AM *The interplay of abstinence and infertility with the existence of sub-threshold endemic states in epidemic models of persistent sexually transmitted diseases.* Preliminary report.  
 ▶ (576) **Daniel Maxin**, Valparaiso University (1035-92-1164)

**AMS Session on Abstract Harmonic Analysis and Operator Theory, I**

8:00 AM – 9:10 AM

- 8:00AM *On  $C^*$ -extreme Maps and Homomorphisms of  $C(X)$ .*  
 (577) Preliminary report.  
**Martha C. Gregg**, University of Nebraska-Lincoln (1035-47-1548)
- 8:15AM *An Invariant Subspace for Some Composition Operators on  $H^2(D)$ .* Preliminary report.  
 (578) **Rebecca G. Wahl**, Butler University (1035-47-1719)
- 8:30AM *The Berezin Transform and  $m$ th Order Bergman Metric.*  
 (579) **Bo Li**, State University of New York at Buffalo (1035-47-1804)
- 8:45AM *The multidimensional moment problem and reproducing kernels.*  
 (580) **Roger A. Roybal**, California State University Channel Islands (1035-47-1865)
- 9:00AM *Asymptotic behavior of nonexpansive maps in finite dimensional normed spaces.*  
 ▶ (581) **Brian C. Lins**, Dickinson College (1035-47-1154)

**MAA Session on College Algebra: Concepts, Data, and Models, II**

8:00 AM – 11:55 AM

- Organizers: **Florence S. Gordon**, New York Institute of Technology  
**Laurette Foster**, Prairie A&M University  
**Mary R. Robinson**, University of New Mexico, Valencia Campus

**Yajun Yang**, Farmingdale State University of New York

- 8:00AM *Factors that Shape Community College Mathematics Faculty Members' Reasoning About College Algebra Reform: A Multiple Case Study.*  
 ▶ (582) **Helen E Burn**, Highline Community College (1035-D1-398)
- 8:20AM *Phase Two In Developing Effective Teaching Techniques For Undergraduate College Algebra Courses.*  
 (583) **Jonathan P Lambright**, Savannah State University (1035-D1-1255)
- 8:40AM *A Modeling Alternative to College Algebra—Lessons Learned.*  
 ▶ (584) **Mary Ellen Davis**, Georgia Perimeter College (1035-D1-723)
- 9:00AM *Redesigning College Algebra: Combining Educational Theory, Forward-Thinking Pedagogy and Web-Based Learning to Improve Student Performance.*  
 ▶ (585) **Gary W. Hagerty\***, **Stan S. Smith**, Black Hills State University, and **Danielle Marie Goodwin**, Penn State Erie (1035-D1-1411)
- 9:20AM *Time to Change the Name.*  
 ▶ (586) **Sol Garfunkel**, COMAP (1035-D1-1262)
- 9:40AM *A Taxonomy of Mathematical Modeling in High School.* Preliminary report.  
 (587) **Eric Robinson\*** and **John C Maceli**, Ithaca College (1035-D1-1248)
- 10:00AM *Environmental Mathematics Modeling in Connections: College Algebra and English Composition.*  
 (588) **Ken Smith**, Indiana University South Bend, and **Morteza Shafii-Mousavi\***, Indiana University South Bend (1035-D1-201)
- 10:20AM *An inconvenient truth: College algebra courses study applications from climate change in a campus-wide teach-in at Framingham State College.* Preliminary report.  
 ▶ (589) **Victoria A Sapko**, Framingham State College (1035-D1-1029)
- 10:40AM *Honey, I Shrunk the Dollar.*  
 ▶ (590) **Ronald J Harshbarger\***, University of South Carolina - Beaufort, and **Lisa S. Yocco**, Georgia Southern University (1035-D1-1393)
- 11:00AM *Shocking Applications of Mathematical Modeling in the Undergraduate Classroom.* Preliminary report.  
 ▶ (591) **Christopher M. Smith\*** and **Jon Roginski**, United States Military Academy at West Point (1035-D1-1761)
- 11:20AM *Mathematics in Industry.* Preliminary report.  
 ▶ (592) **Caroline Maher Boulis**, Lee University (1035-D1-350)
- 11:40AM *Developing Algebraic Understanding With Excel.*  
 (593) **Eileen Fernandez**, Montclair State University (1035-D1-1494)

**MAA Session on Crossing the “Bridge to Higher Mathematics”: What Works and Why, II**

8:00 AM – 10:55 AM

- Organizer: **George J. Davis**, Georgia State University
- 8:00AM *Logic and Axiomatics at King's College: A Bridge Course for First Semester Freshmen.*  
 ▶ (594) **Joseph Evan\*** and **Anthony D Berard**, King's College (1035-F1-1219)

- 8:20AM *A Sophomore-Level Transition Course: From Conception to Maturity.*  
 (595) **Michael A Jones** and **Aruo Mukherjee\***, Montclair State University, Montclair, NJ (1035-F1-1243)
- 8:40AM *Student Generated Examples of Proof Techniques.*  
 ▶ (596) Preliminary report.  
**Morteza Seddighin**, Indiana University East (1035-F1-1257)
- 9:00AM *Learning To Be a Mathematician.*  
 ▶ (597) **David C Haines**, Bates College (1035-F1-1331)
- 9:20AM *Repercussions of Eliminating a Bridge Course.*  
 ▶ (598) Preliminary report.  
**Jeremy Case**, Taylor University (1035-F1-1338)
- 9:40AM *Active Learning in a Bridge Course.*  
 ▶ (599) **Magnhild Lien\*** and **Katherine Stevenson**, California State University Northridge (1035-F1-1362)
- 10:00AM *Teachers, majors, data structures takers: Learning proofs in a very mixed class.* Preliminary report.  
 ▶ (600) **Terry A Loring**, University of New Mexico (1035-F1-1425)
- 10:20AM *A Discrete Transition to Advanced Mathematics.*  
 ▶ (601) Preliminary report.  
**Tom Richmond**, Western Kentucky University (1035-F1-1495)
- 10:40AM *Inquiry-based learning in a proofs course.*  
 (602) Preliminary report.  
**Feryal Alayont**, Grand Valley State University (1035-F1-1847)

**MAA Session on Demos and Strategies with Technology that Enhance Teaching and Learning Mathematics, I**

8:00 AM – 11:55 AM

Organizers: **David R. Hill**, Temple University  
**Scott Greenleaf**, University of New England  
**Mary L. Platt**, Salem State College  
**Lila F. Roberts**, Georgia College & State University

- 8:00AM *Mathematical Opportunities in Robotics.* Preliminary report.  
 ▶ (603) **Jong H Chung**, United States Military Academy (1035-I1-1359)
- 8:20AM *Ramanujan and Fourier with GeoGebra.* Preliminary report.  
 ▶ (604) **David Fowler**, University of Nebraska-Lincoln (1035-I1-884)
- 8:40AM *Visualizing Lagrange multipliers: A discovery approach to constrained optimization.*  
 ▶ (605) **Elisha Peterson**, United States Military Academy (1035-I1-1195)
- 9:00AM *Demos and Strategies That Work in a Mathematical Modeling Course.*  
 ▶ (606) **William P Fox**, Naval Postgraduate School (1035-I1-580)
- 9:20AM *Sliding Into Calculus Lab.* Preliminary report.  
 ▶ (607) **Roland B Minton**, Roanoke College (1035-I1-1690)
- 9:40AM *A Java Simulator for Voting Methods.* Preliminary report.  
 ▶ (608) **Richard E Klima**, Appalachian State University (1035-I1-62)
- 10:00AM *Spreadsheet-based Modeling and Applications.*  
 ▶ (609) **Morteza Shafii-Mousavi**, Indiana University South Bend (1035-I1-106)

- 10:20AM *Analyzing the Solutions, Approximations, and Stability of Time-Varying Difference and Differential Equations with Excel and Flash.*  
 ▶ (610) **Paul R Bouthellier**, University of Pittsburgh-Titusville (1035-I1-1001)
- 10:40AM *Calculus from the Mouths of Babes: Improving Students' Math Communication Skills Using Formal Problem Briefs.* Preliminary report.  
 ▶ (611) **Kimberly R. Swetz\*** and **Jadonna Brewton**, United States Air Force Academy (1035-I1-1774)
- 11:00AM *Cool Tools for the Tablet PC.* Preliminary report.  
 ▶ (612) **Denise LeGrand**, University of Arkansas at Little Rock (1035-I1-165)
- 11:20AM *Interactive Modules (Produce with Flash) to Facilitate the Construction of Knowledge in Finite Mathematics for Liberal Arts Students.*  
 (613) **J. Alfredo Jimenez**, Penn State Hazleton (1035-I1-1470)
- 11:40AM *Presenting Fully-Interactive Mathematics Within Web Browsers.*  
 (614) **Kunio Mitsuma**, Kutztown University of Pennsylvania (1035-I1-857)

**MAA Session on Topics and Techniques for Real Analysis, II**

8:00 AM – 11:35 AM

Organizers: **Erik O. Talvila**, University College of the Fraser Valley  
**Robert W. Vallin**, Slippery Rock University  
**James E. Peterson**, Benedictine College

- 8:00AM *The Euler-Stirling Correspondence.*  
 ▶ (615) **Robert L. Brabenec**, Wheaton College (IL) (1035-W1-54)
- 8:20AM *Introducing Computation and Numerical Examples in Real Analysis Courses.*  
 ▶ (616) **Paul S Rossi**, College of Saint Elizabeth (1035-W1-1165)
- 8:40AM *A Project on Baire Class One Functions.* Preliminary report.  
 ▶ (617) **Robert A Fontenot**, Whitman College (1035-W1-829)
- 9:00AM *Applications of Elementary Analysis.*  
 ▶ (618) **Richard B Darst**, Colorado State University (1035-W1-1751)
- 9:20AM *From Classical Analysis to Neoclassical Analysis: Extending the Scope of Analysis.* Preliminary report.  
 ▶ (619) **Mark Burgin**, UCLA (1035-W1-188)
- 9:35AM Break.
- 10:00AM *Using regulated functions to teach integration.*  
 ▶ (620) **Franklin Mendivil**, Acadia University (1035-W1-536)
- 10:20AM *A Local Maximal Function Simplifying Measure Differentiation.*  
 ▶ (621) **Peter A. Loeb**, University of Illinois, Urbana-Champaign (1035-W1-565)
- 10:40AM *Distributional integrals.*  
 ▶ (622) **Erik Talvila**, University College of the Fraser Valley (1035-W1-1886)
- 11:00AM *Henstock-Kurzweil integration for linear operators.*  
 (623) **Woodford W. Zachary**, Howard University (1035-W1-693)
- 11:20AM *Ergodic theory examples to illustrate concepts from real analysis.*  
 (624) **Cesar E. Silva**, Williams College (1035-W1-837)

**MAA General Contributed Paper Session, III**

8:00 AM – 11:55 AM

Organizer: **Sarah L. Mabrouk**, Framingham State College  
 Moderators: **Mike Huber**, Muhlenberg College  
**Jihwa Noh**, University of Northern Iowa  
**Salar Alsardary**, University of the Sciences  
**Heather A. Jackson**, United States Military Academy

- 8:00AM *Investigating Graphs Using Handheld Technology.*  
▶ (625) **C. C. Edwards**, Western Kentucky University (1035-Z1-1945)
- 8:15AM *Classroom Response Systems in Calculus: Facilitating Student Discussion and Preparation for Class.* Preliminary report.  
(626) **David G. Taylor\***, **Chris R. Lee**, **Jeff L. Spielman**, **Roland B. Minton** and **Jan G. Minton**, Roanoke College (1035-Z1-410)
- 8:30AM *On the relationship between the Hausdorff dimension and the integration order.*  
▶ (627) **Leon C Hardy**, Valencia Community College (1035-Z1-314)
- 8:45AM *A Talk Without Words: Visualizing Group Theory.*  
▶ (628) **Nathan C Carter**, Bentley College (1035-Z1-1062)
- 9:00AM *Student Generated Demonstrations.*  
▶ (629) **Albert W Schueller**, Whitman College (1035-Z1-1261)
- 9:15AM *Teaching Linear Algebra in a Finite Mathematics Course using WebCAS.*  
▶ (630) **Peter L Staab**, Fitchburg State College (1035-Z1-1207)
- 9:30AM *Using a Smartboard in Abstract Algebra.* Preliminary report.  
▶ (631) **Cynthia J Woodburn**, Pittsburg State University (1035-Z1-411)
- 9:45AM *"In America", the combinatorics are not "as simple as pie".* Preliminary report.  
▶ (632) **Michael David Smith**, Morningside College, Sioux City, Iowa (1035-Z1-789)
- 10:00AM *Cardinality and Measure.*  
▶ (633) **H. Vic Dannon**, San Diego, California (1035-Z1-477)
- 10:15AM *A transition course using improvisation guided by metacognition, experience, and mathematical knowledge and culture.* Preliminary report.  
▶ (634) **Ward Heilman\*** and **Heidi Burgiel**, Bridgewater State College (1035-Z1-1070)
- 10:30AM *A Hybrid (Half On-Line) Model for a Large Enrollment Mathematical Ideas Course.*  
(635) **Alexander Alekseenko**, **Elena Anne Marchisotto**, **Mark F Schilling\*** and **Michael Cole**, California State University Northridge (1035-Z1-1336)
- 10:45AM *Using writing to help mathematics education students connect to the curriculum.*  
(636) **Kelleen H. Bonomo**, Grove City College (1035-Z1-1551)
- 11:00AM *A Team-Taught Biometry Course With Lectures and Labs.* Preliminary report.  
(637) **Dexter C. Whittinghill**, Rowan University (1035-Z1-1606)
- 11:15AM *Connect your preservice teachers to real, live middle school students using a free (grant supported) MathNerds Mentoring Network.* Preliminary report.  
▶ (638) **W. Ted Mahavier**, Lamar University (1035-Z1-1212)

- 11:30AM *Sudoku Calculus.* Preliminary report.  
▶ (639) **Q. W. Harris**, Georgia Perimeter College (1035-Z1-1994)
- 11:45AM *Preparing to Teach an Online Sophomore Differential Equations Course.* Preliminary report.  
▶ (640) **William M. Kinney**, Bethel University (1035-Z1-290)

**SIAM Minisymposium on From Global Predictions to Local Action, I: Dynamical Systems Challenges in Climate Change**

8:00 AM – 11:00 AM

Organizers: **Inez Fung**, Berkeley Institute of the Environment, University of California Berkeley  
**Christopher K. Jones**, University of North Carolina  
**Mary Lou Zeeman**, Bowdoin College

- 8:00AM Welcome remarks and symposium goals.
- 8:10AM *Addressing the key climate questions of the next few decades to inform adaptation strategies and policy.*  
▶ (641) **Emily F Shuckburgh**, British Antarctic Survey (1035-37-1423)
- 8:40AM *Coupling between the carbon cycle and physical processes on multiple scales in the past and present.*  
(642) **Amala Mahadevan**, Boston University (1035-00-2015)
- 9:10AM *Dynamics of grounded meridional abyssal flow.*  
▶ (643) **Gordon E Swaters**, University of Alberta (1035-86-727)
- 9:40AM *Scaling laws, scale invariance, and climate prediction.* Preliminary report.  
(644) **William D Collins**, UC Berkeley and Lawrence Berkeley Laboratory (1035-60-1976)
- 10:10AM *A dynamical systems approach to weather forecasting and climate prediction.*  
▶ (645) **Eric J Kostelich**, Arizona State University (1035-37-746)
- 10:40AM Roundtable discussion on outstanding problems in the field.

**MAA Session on Philosophy of Mathematics**

8:30 AM – 11:55 AM

- Organizers: **Kevin M. Iga**, Pepperdine University  
**Bonnie Gold**, Monmouth University
- 8:30AM *Mathematical Rigor in the Classroom.* Preliminary report.  
▶ (646) **Laura Mann Schueller**, Whitman College (1035-Q1-1936)
  - 9:00AM *Mathematics is a Meme(plex).*  
▶ (647) **Andrew G. Borden**, Palo Alto College, San Antonio, TX (1035-Q1-25)
  - 9:30AM *Are Euclid's Postulates Really Essences?*  
▶ (648) **Carl E. Behrens**, Alexandria, VA (1035-Q1-1360)
  - 10:00AM *The De Continuo of Thomas Bradwardine.* Preliminary report.  
▶ (649) **Daniel C. Sloughter**, Furman University (1035-Q1-181)
  - 10:30AM *Ignoring the Obvious in Philosophical Applications of the Goedel Incompleteness theorems.*  
▶ (650) **Jeff Buechner**, Rutgers University and the Kripke Center, CUNY Graduate Center (1035-Q1-1461)

- 11:00AM *What Does It Mean for One Problem to Reduce to Another?* Preliminary report.  
 ▶ (651) **James R Henderson**, Edinboro University of Pennsylvania (1035-Q1-94)
- 11:30AM *Remarks about the notion of EXISTENCE in mathematics.*  
 (652) **Ruggero Ferro**, University of Verona, Italy (1035-Q1-1722)

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

8:40 AM – 11:55 AM

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

- 8:40AM *A Java Applet and Tutorial for the Jacobi, Gauss-Seidel and SOR Methods.*  
 ▶ (653) **David Strong**, Pepperdine University (1035-M1-1567)
- 9:00AM *The Effects of Perturbations on Matrix Multiplication-Interactive Flash Simulation.*  
 ▶ (654) **Paul R Bouthellier**, University of Pittsburgh-Titusville (1035-M1-408)
- 9:20AM *Making Transition to Linear Independence through Set Theory and a Web Module.* Preliminary report.  
 ▶ (655) **Hamide Dogan-Dunlap**, University of Texas at El Paso (UTEP) (1035-M1-1060)
- 9:40AM *A Double-Minded Fractal.*  
 ▶ (656) **Andrew J Simoson**, King College (1035-M1-167)
- 10:00AM *Computational Linear Algebra and Social Networks.*  
 ▶ (657) **Mason Alexander Porter**, University of Oxford (1035-M1-51)
- 10:20AM *The Problem with the “Junk Food Problem”.*  
 ▶ (658) **Stephen Szydluk**, University of Wisconsin-Oshkosh (1035-M1-1147)
- 10:40AM *Matrices and Their Adjoints.* Preliminary report.  
 ▶ (659) **Jack W. Rogers Jr.**, Auburn University (1035-M1-1159)
- 11:00AM *Homogeneous Coordinates: They work, but where do they come from?*  
 ▶ (660) **Jonathan R Senning**, Gordon College (1035-M1-1553)
- 11:20AM *Getting Down with Determinants: Defining  $\det(A)$  via the  $PA = LU$  Decomposition.*  
 ▶ (661) **Henry J. Ricardo**, Medgar Evers College (CUNY) (1035-M1-1702)
- 11:40AM *Computing the Moore-Penrose Inverse of a Matrix with a Computer Algebra System.*  
 ▶ (662) **Karsten K. Schmidt**, Schmalkalden University of Applied Sciences, Germany (1035-M1-41)

**MAA Invited Address**

9:00 AM – 9:50 AM

- (663) *4000 years of algebra: An historic tour from BM 13901 to Moderne Algebra.*  
**Karen H. Parshall**, University of Virginia (1035-A0-17)

**MAA Minicourse #10: Part A**

9:00 AM – 11:00 AM

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

**MAA Minicourse #15: Part A**

9:00 AM – 11:00 AM

*Evaluating student presentations in mathematics.*  
 Organizers: **Suzanne Dorée**, Augsburg College  
**Richard Jardine**, Keene State College  
**Thomas Linton**, Central College

**MAA Invited Paper Session on Using the New Technologies in Teaching Mathematics**

9:00 AM – NOON

Organizers: **Lawrence C. Moore**, Duke University  
**Bruce W. Yoshiwara**, Los Angeles Pierce College

- 9:00AM *Taking a bite of (the) Apple: Innovations for mathematics teaching and learning.*  
 (664) **Lila F. Roberts**, Georgia College & State University (1035-A2-631)
- 9:30AM *iPod Math - How to use screencasting technology to help students relate activities and homework.* Preliminary report.  
 ▶ (665) **Andrew G Bennett**, Kansas State University (1035-A2-1069)
- 10:00AM *Mobile Learning Environments and Virtual Mathematics Workspaces.*  
 (666) **Russell L. Herman\*** and **Gabriel Lugo**, University of North Carolina, Wilmington (1035-A2-1256)
- 10:30AM *Poll the Audience: How Clickers Can Enhance Learning in a Math Class.*  
 (667) **Patti Frazer Lock**, St. Lawrence University (1035-A2-1220)
- 11:00AM *21st century technologies for 21st century mathematics and science.*  
 (668) **Frank Wattenberg**, U. S. Military Academy (1035-A2-510)
- 11:30AM Discussion.

**MAA Poster Session on Outreach Programs for Underrepresented Populations in Mathematics**

9:00 AM – 11:00 AM

Organizers: **Elizabeth Yanik**, Emporia State University  
**Jennifer Hontz**, Meredith College  
**Kathleen Sullivan**, Seattle University

**MAA Special Presentation**

9:00 AM – 10:20 AM

*Proposal writing workshop for grant applications to the NSF Division of Undergraduate Education.*  
 Panelists: **Daniel P. Maki**, National Science Foundation  
**Elizabeth J. Teles**, National Science Foundation  
**Lee L. Zia**, National Science Foundation

**MAA Panel Discussion**

9:00 AM – 10:20 AM

*Exciting, surprising, and satisfying: Why and how to teach proof.*  
 Organizers: **Carol S. Schumacher**, Kenyon College  
**Diane L. Herrmann**, University of Chicago

Panelists: **T. Christine Stevens**, Saint Louis University  
**Susanna S. Epps**, DePaul University  
**Lisa A. Mantini**, Oklahoma State University  
**Diane Hermann**

11:30AM (678) *Bowen's Formula in Graph Directed Markov Systems*. Preliminary report.  
**Eugen Andrei Ghenciu**, University of Alaska Fairbanks (1035-37-696)

11:45AM (679) *An  $n$ -cell in  $R^{n+1}$  that is not the attractor of any IFS on  $R^{n+1}$* .  
**Manuel J Sanders**, University of South Carolina Beaufort (1035-37-574)

NOON (680) *Example of a mean ergodic  $L^1$  operator with the linear rate of growth*.  
**Wojciech K Kosek**, Colorado College (1035-37-1613)

### MAA Panel Discussion

9:00 AM – 10:20 AM

*Research and outreach focusing on the mathematics education of K-8 Latino/a students.*

Organizers: **Taliesin Sutton**, University of Arizona  
**Laura Kondek McLeman**, University of Arizona

Panelists: **Richard Kitchen**, University of New Mexico  
**Virginia Horak**, University of Arizona  
**Laura Kondek McLeman**  
**José Maria Menéndez**, University of Arizona  
**Taliesin Sutton**

### Student Hospitality Center

9:00 AM – 5:00 PM

### AMS Session on Dynamical Systems

9:15 AM – 12:10 PM

- 9:15AM (669) *A General Criterion for Control of Chaos with Feedback*.  
**Dmitry A Altshuller**, Crane Aerospace and Electronics (1035-37-943)
- 9:30AM (670) *Angular-Asymmetric Binary Branching Trees*.  
**Parousia Rockstroh\***, Harvey Mudd College, and **David Brown**, Ithaca College (1035-37-1988)
- 9:45AM (671) *Sequences and Cycles of Schwarzian Derivatives*.  
**Stephen M. Zemyan**, Penn State Mont Alto (1035-37-1729)
- 10:00AM (672) *One Dimensional Stochastic Cellular Automata*.  
**Donna Molinek\***, Davidson College, and **Jane Hawkins**, University of North Carolina, Chapel Hill (1035-37-1574)
- 10:15AM (673) *Particle-Tracking Simulations: Evolving Curves and Surfaces in Time-Dependent Velocity Fields*.  
**Paul von Dohlen\***, William Paterson University, and **Patrick D. Miller**, Stevens Institute of Technology (1035-37-1157)
- 10:30AM (674) *Superlattice patterns in oscillatory systems with multi-frequency forcing*.  
**Jessica M Conway\*** and **Hermann Riecke**, Department of Engineering Sciences and Applied Mathematics, Northwestern University (1035-37-1236)
- 10:45AM (675) *Fixed Point Sets of Finite Order Automorphisms on Mixing Shifts of Finite Type*.  
**Nicholas Long**, University of Maryland (1035-37-1432)
- 11:00AM (676) *Chain recurrence rates and topological entropy*.  
**David Richeson**, Dickinson College, and **Jim Wiseman\***, Agnes Scott College (1035-37-1009)
- 11:15AM (677) *Smoothness of density functions for random maps*.  
**Md. Shafiqul Islam\***, University of Prince Edward Island, and **Pawel Gora**, Concordia University (1035-37-748)

### Exhibits and Book Sales

9:30 AM – 5:30 PM

### Math on the Web, II

10:00 AM – 3:30 PM

- 10:00AM (681) *Managing math in Moodle*.  
**Bob Mathews**, Design Science, Inc.
- 11:00AM (682) *The use of MathML and interactive online oracles through Maplesoft's new student help center*.  
**Tom Lee**, Maplesoft
- 12:15PM (683) *Writing questions with randomized parameters in proper mathematical notation for online homework assignments*.  
**John Risley**, WebAssign
- 1:00PM (684) *WebALT calculus*.  
**Mika Seppälä**, WebALT
- 2:00PM (685) *Creating mathematical documents for the Web with Scientific WorkPlace*.  
**Barry MacKichan**, MacKichan Software, Inc.
- 3:00PM (686) *Speaking of math: Spoken math and accessibility*.  
**Bob Mathews**, Design Science, Inc.

### AWM Emmy Noether Lecture

10:05 AM – 10:55 AM

- (687) *Fun with zeta functions of graphs*.  
**Audrey A. Terras**, University of California San Diego (1035-05-99)

### MAA Minicourse #5: Part A

10:30 AM – 12:30 PM

*Visualizing abstract mathematics with cellular automata.*  
Organizers: **Michael J. Bardzell**, Salisbury University  
**Donald E. Spickler**, Salisbury University

### SIGMAA Officers Meeting

10:30 AM – NOON

Chair: **Amy Shell-Gellasch**, Pacific Lutheran University

### MAA Special Presentation

10:45 AM – 12:05 PM

*Undergraduate career paths in math: What can you do with a math degree?*  
Organizers: **Vanessa Garcia**, Texas State University-San Marcos

Dov N. Chelst, DeVry University

**MAA Committee on the Teaching of Undergraduate Mathematics Panel Discussion**

10:45 AM – 12:05 PM

*Classroom voting comes to the mathematics classroom.*

Organizers: **Mark R. Parker**, Carroll College  
**Cheryl L. Olsen**, Nebraska Wesleyan University

Panelists: **Kelly Cline**, Carroll College  
**David O. Lomen**, University of Arizona  
**Maria S. Terrell**, Cornell University

**SIAM Invited Address**

11:10 AM – NOON

(688) *From global predictions to local action: Mathematical challenges in global warming.*  
**Inez Fung**, University of California Berkeley

**AMS Colloquium Lecture: Lecture II**

1:00 PM – 2:00 PM

(689) *Random conformally invariant pictures (Part II).*  
**Wendelin Werner**, University of Paris-Sud (1035-00-10)

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

1:00 PM – 3:50 PM

Organizers: **Darren A. Narayan**, Rochester Institute of Technology  
**Bernard Brooks**, Rochester Institute of Technology  
**Jacqueline A. Jensen**, Sam Houston State University  
**Vadim Ponomarenko**, San Diego State University  
**Tamas Wiandt**, Rochester Institute of Technology

1:00PM ▶ (690) *On Ramsey Numbers for Quadrilaterals in 3 and 4 Colors.*

**Evan Heidtmann\***, The College of Wooster, **Timothy Hopper**, Grove City College, and **Stanislaw Radziszowski**, Rochester Institute of Technology (1035-05-1189)

1:30PM ▶ (691) *Minimal k-rankings and the rank number of  $P_n^2$ .*  
**Sarah Novotny\***, Sacred Heart University, **Juan Ortiz**, California Lutheran University, and **Darren A Narayan**, University of South Carolina (1035-05-236)

2:00PM ▶ (692) *Non-negative expressions of certain matrix minors.* Preliminary report.

**Kristen DiGiacomo**, Providence College, **Gary Gordon**, Lafayette College, **Garth Isaak**, Lehigh University, **Chor Ham Lam**, Dartmouth College, **Joe Tenini**, Furman University, and **Olga Turanova\***, Bard College (1035-05-460)

2:30PM ▶ (693) *Characterization of the Vertex-Reinforced Random Walk and Trapping Subgraphs.*  
**Aaron M Yeager\***, Missouri State University, and **Thomas A Gassert**, Bowdoin College (1035-60-282)

3:00PM ▶ (694) *External Cavity Mode Solutions to the Lang-Kobayashi Equations.*

**Sara Reynolds\***, Nazareth College, **Stanley Snelson**, Columbia University, and **Tamas Wiandt**, Rochester Institute of Technology (1035-37-614)

3:30PM ▶ (695) *Topological Anomaly Detection in Hyperspectral Satellite Images.*

**Jennifer Mahle\***, Florida Atlantic University, **Paul Prue**, University of California - Davis, and **William F Basener**, National Geospatial-Intelligence Agency and RIT (1035-62-616)

**AMS Special Session on Structure, Geometry, and Symbolic Computation of Algebraic Groups and Symmetric Spaces, II**

1:00 PM – 3:50 PM

Organizers: **Jennifer R. Daniel**, Lamar University  
**Aloysius G. Helminck**, North Carolina State University

1:00PM (696) *A Step Towards the Determination of the Unitary Dual.*

**Alessandra Pantano**, University of California, Irvine (1035-20-1276)

1:30PM (697) *On the omega-regular unitary dual of the metaplectic group.* Preliminary report.

**A. Pantano**, University of California, Irvine, **A. Paul**, Western Michigan University, and **S. A. Salamanca-Riba\***, New Mexico State University (1035-22-1437)

2:00PM (698) *Signed Kazhdan-Lusztig Polynomials and the Unitary Dual Problem.*

**Wai Ling Yee**, University of Windsor (1035-22-894)

2:30PM (699) *The Combinatorics of Involutions and Twisted Involutions in Weyl groups.*

**Ruth Haas**, Smith College (1035-05-1311)

3:00PM (700) *On the classification of orbits of minimal parabolic k-subgroups acting on symmetric k-varieties of  $SL(n, k)$ .*

**Stacy L. Beun\*** and **Aloysius G. Helminck**, North Carolina State University (1035-22-435)

3:30PM (701) *Representations associated with p-adic symmetric spaces.*

**Gerardus Franciscus Helminck\***, University of Twente, and **Aloysius Gerardus Helminck**, North Carolina State University (1035-43-1427)

**AMS Special Session on Stochastic, Large-Scale, and Hybrid Systems with Applications, II**

1:00 PM – 3:50 PM

Organizers: **Aghalaya S. Vatsala**, University of Louisiana at Lafayette  
**G. S. Ladde**, University of Texas at Arlington

1:00PM (702) *Perturbation of a Gradient Temperature Field Due to the Presence of Two Spheres.*

**Abhinandan Chowdhury\*** and **Christo I. Christov**, University of Louisiana at Lafayette (1035-65-734)

1:30PM (703) *Variation of Constants Method for Stochastic Discrete Systems.* Preliminary report.

**G. S. Ladde**, University of South Florida, and **M. Sambandham\***, Morehouse College (1035-34-812)

2:00PM (704) *Dynamic Models For Social Networks.*

**Chung-Chien Hong\***, Albany State University, and **N G Medhin**, North Carolina State University (1035-60-633)

- 2:30PM *Analysis of Gene Expression Data using Johnson's System of Distributions.*  
(705) **Florence George\***, Florida International University, and **Ramachandran M. Kandethody**, University of South Florida (1035-62-1107)
- 3:00PM *Generalized Monotone Method for Functional Differential Equations with Retardation and Anticipation.*  
(706) **Aghalaya S Vatsala**, University of Louisiana at Lafayette (1035-34-751)
- 3:30PM *McKean-Vlasov equations driven by fractional Brownian motion.* Preliminary report.  
(707) **Mark A McKibben\***, Goucher College, and **David N Keck**, Ohio University (1035-60-77)

- 2:30PM *Structure on the set of closure operations of a commutative ring.*  
▶ (717) **Janet C. Vassilev**, University of California, Riverside (1035-13-742)
- 3:00PM *Joint Hilbert-Kunz multiplicities and a-tight closure.*  
(718) **Adela Vraciu**, University of South Carolina (1035-13-890)
- 3:30PM *Liaison addition and the structure of a Gorenstein liaison class.*  
(719) **Robin Hartshorne**, University of California, Berkeley, **Juan Migliore**, University of Notre Dame, and **Uwe Nagel\***, University of Kentucky (1035-14-1842)

**AMS Special Session on Time-Frequency Analysis: Hilbert Huang Transform and Wavelet Analysis, II**

1:00 PM – 3:50 PM

- Organizers: **Yuesheng Xu**, Syracuse University  
**Sherman D. Riemenschneider**, West Virginia University  
**Samuel S. Shen**, San Diego State University
- 1:00PM *Time-frequency surrogates.*  
(708) **Patrick Flandrin**, CNRS - ENS Lyon (1035-94-64)
- 1:30PM *Identifying Super-Annual Oscillations of an Infectious Disease in a Space-Time Pattern with the Use of the Hilbert-Huang Transform.*  
(709) **Arthur Getis**, San Diego State University (1035-44-639)
- 2:00PM *Some Applications of EMD Analysis in Climate Change Studies, and Some Challenges.*  
▶ (710) **K. K. Tung**, University of Washington (1035-86-602)
- 2:30PM *A Non-Linear Filtering Process for Empirical Mode Decomposition.*  
▶ (711) **Reginald N Meeson**, Institute for Defense Analyses (1035-00-556)
- 3:00PM *Ensemble Empirical Mode Decomposition: A Noise Assisted Data Analysis Method.*  
(712) **Zhaohua Wu\***, Center for Ocean-Land-Atmosphere Studies, and **Norden E Huang**, National Central University (1035-42-1048)
- 3:30PM *HHT Applications to Signal Detection on Mechanical Vibration Problems in Underwater Vessels.*  
(713) **Liming W Salvino**, Naval Surface Warfare Center (1035-00-2017)

**AMS Special Session on Progress in Commutative Algebra, III**

1:00 PM – 3:50 PM

- Organizers: **Janet Striuli**, University of Nebraska, Lincoln  
**Sean M. Sather-Wagstaff**, North Dakota State University  
**Lars Winther Christensen**, Texas Tech University
- 1:00PM *Universal Gröbner bases of varieties of minimal degree.*  
(714) **Sonja Petrovic**, University of Kentucky (1035-13-1150)
- 1:30PM *Modules with prescribed intersection properties.*  
(715) **Erin E Chamberlain**, University of Utah (1035-13-555)
- 2:00PM *Commutativity of Intersection with Divisors.*  
(716) **Paul Roberts**, University of Utah, and **Sandra Spiroff\***, Seattle University (1035-13-1408)

**AMS Special Session on Monotone Discrete Dynamical Systems with Applications, II**

1:00 PM – 3:50 PM

- Organizers: **M.R.S. Kulenovic**, University of Rhode Island  
**Orlando Merino**, University of Rhode Island  
**Hal L. Smith**, Arizona State University
- 1:00PM *An application of planar monotone maps to synchronized cohort oscillations in population dynamics.*  
▶ (720) **J. M. Cushing**, University of Arizona (1035-92-760)
- 1:30PM *Globally Attracting Attenuant versus Resonant Cycles in Periodic Compensatory Leslie Models.*  
▶ (721) **Abdul-Aziz Yakubu**, Howard University, and **John E Franke\***, North Carolina State University (1035-39-777)
- 2:00PM *A monotone difference equation for pulse circulation in a loop of cardiac tissue.*  
(722) **Hassan Sedaghat**, Virginia Commonwealth University (1035-39-902)
- 2:30PM *Dynamics of cooperative discrete systems.* Preliminary report.  
▶ (723) **Winfried Just\***, Ohio University, and **German A Enciso**, Harvard Medical School and Mathematical Biosciences Institute (1035-39-1302)
- 3:00PM *Asymptotic Stability for Difference Equations with Decreasing Arguments.*  
(724) **Candace M. Kent\***, **Hassan Sedaghat**, **David M. Chan**, **Eun R. Chang**, Virginia Commonwealth University, **Mehdi Dehghan** and **Reza Mazrooei-Sebdani**, Amirkabir University of Technology, Tehran, Iran (1035-37-1442)
- 3:30PM *Fractional Multivariate Opial Type Inequalities Over Spherical Shells.* Preliminary report.  
(725) **George A Anastassiou**, University of Memphis (1035-26-61)

**AMS Special Session on The Mathematics of Information and Knowledge, IV**

1:00 PM – 4:00 PM

- Organizers: **Peter W. Jones**, Yale University  
**James G. Glimm**, SUNY at Stony Brook  
**Steve Smale**, Toyota Institute of Technology at Chicago
- 1:00PM *Analysis of and on data sets with diffusion processes.*  
(726) **Mauro Maggioni**, Duke University (1035-42-1987)



- 2:00PM *Learning unified low-level and context information for image analysis.* Preliminary report.  
(727) **Zhuowen Tu\*** and **Arthur W. Toga**, Lab of Neuro Imaging, University of California Los Angeles (1035-62-2034)
- 3:00PM Discussion.

**AMS Special Session on Mathematics for Teaching: Educating Elementary and Middle School Teachers for Success, II**

1:00 PM – 3:55 PM

Organizers: **Babette M. Benken**, California State University, Long Beach  
**Lynn C. McGrath**, University of San Diego  
**Perla L. Myers**, University of San Diego

- 1:00PM *Engaging Prospective Elementary School Teachers in Mathematics Through Children's Thinking.*  
(728) **Randolph Philipp\***, **Bonnie Schappelle**, San Diego State University, and **John Zig Siegfried**, San Diego State University & University of California-San Diego (1035-97-711)
- 2:00PM *Mathematics for Teaching Elementary School Mathematics: Incorporating Japanese Curriculum Materials.*  
(729) **Tad Watanabe**, Kennesaw State University (1035-97-553)
- 2:30PM *Place Value for Future Teachers: A Lesson Study,*  
▶ (730) Preliminary report.  
**Edith Prentice Mendez\***, **Brigitte Lahme**, **Rick Marks** and **Ben Ford**, Sonoma State University (1035-97-959)
- 3:00PM *Teacher-Student Parallels in Concepts of Unit.*  
▶ (731) **Christopher M. Kribs Zaleta**, University of Texas at Arlington (1035-97-397)
- 3:30PM *Exposing Pre-service Elementary and Middle School Teachers to Mathematics in Depth.*  
(732) **Jerrold W. Grossman**, Oakland University (1035-97-352)

**AMS Special Session on Low Genus Curves and Applications, I**

1:00 PM – 3:50 PM

Organizers: **Kristin E. Lauter**, Microsoft Research  
**Peter Stevenhagen**, Leiden University

- 1:00PM *The Complexity of the Complex Analytic CM Method for Computing Class Polynomials in Genus 2.*  
(733) **Marco Streng**, Universiteit Leiden (1035-11-1198)
- 1:30PM *Implementing the Genus 2 CM Method.*  
(734) **David Freeman\***, University of California at Berkeley, and **Kristin Lauter**, Microsoft Research (1035-11-1352)
- 2:00PM *Denominators of Igusa class polynomials.*  
(735) **Kristin E Lauter**, Microsoft Research (1035-11-1941)
- 2:30PM Break.
- 3:00PM *CM-constructions in genus 1 and 2.* Preliminary report.  
(736) **Peter Stevenhagen**, Universiteit Leiden (1035-11-1750)
- 3:30PM *Genus 2 point-counting and Kummer surfaces.*  
(737) **Pierrick Gaudry**, CNRS/LORIA, and **Eric Schost\***, The University of Western Ontario (1035-68-1649)

**AMS Special Session on Conformally Flat Lorentzian Manifolds, II**

1:00 PM – 3:50 PM

Organizers: **Virginie Charette**, Université de Sherbrooke  
**William M. Goldman**, University of Maryland  
**Karin H. Melnick**, Yale University  
**Kevin Scannel**, Saint Louis University

- 1:00PM *Causal boundary of flat Lorentzian manifolds and other spacetimes, given as quotient spaces.* Preliminary report.  
(738) **Steven G Harris**, Saint Louis University (1035-53-1383)
- 1:30PM *Asymptotic behavior of flat spacetimes.*  
(739) **Lars Andersson**, University of Miami (1035-53-1503)
- 2:00PM *Quasi-Fuchsian representations into  $SO(2, n)$ .*  
(740) **Thierry Barbot**, CNRS, École Normale Supérieure de Lyon (1035-51-504)
- 3:00PM *Conformal geometry and possible kinematics for 2-dimensional spacetimes.*  
(741) **Alan S McRae**, Washington and Lee University (1035-53-1071)
- 3:30PM *Involutions of the Einstein universe.* Preliminary report.  
(742) **Virginie Charette**, Université de Sherbrooke (1035-53-1777)

**AMS Special Session on Voting Theory, II**

1:00 PM – 3:50 PM

Organizers: **Michael A. Jones**, Montclair State University  
**Eric I. Gottlieb**, Rhodes College  
**Brian P. Hopkins**, Saint Peter's College

- 1:00PM *Voting, the Symmetric Group, and Representation Theory.*  
▶ (743) **Michael E Orrison**, Harvey Mudd College (1035-20-946)
- 1:30PM *Points-based rules respecting a pairwise-change-symmetric ordering.* Preliminary report.  
▶ (744) **Karl-Dieter Crisman**, Gordon College (1035-91-1128)
- 2:00PM *Characterizations of Arrovian Social Welfare Functions.* Preliminary report.  
(745) **Alan D Taylor**, Union College (1035-91-1525)
- 2:30PM *A Characterization of the Maxmin Rule in the Context of Voting.* Preliminary report.  
▶ (746) **R Vincent Merlin\***, CREM, CNRS and University of Caen, and **Ronan Congar**, CARE and University of Rouen (1035-91-525)
- 3:00PM *Multilinear Extensions and Semivalues for Multichoice Games.*  
(747) **Jennifer M. Wilson\***, Eugene Lang College, The New School for Liberal Arts, and **Michael A. Jones**, Montclair State University (1035-91-1469)
- 3:30PM *Anonymous voting games with multiple levels of approval: Classification and counting.*  
▶ (748) **Josep Freixas\***, Department of Applied Mathematics 3 and Engineering School of Manresa, Technical University of Catalonia, and **William S. Zwicker**, Union College (1035-91-1185)

**AMS Special Session on Graph Theory, II**

1:00 PM – 3:50 PM

Organizers: **Andre Kundgen**, California State University, San Marcos  
**K. Brooks Reid**, California State University, San Marcos

- 1:00PM (749) *A Class of Interval Digraphs*. Preliminary report. **Shilpa Das Gupta**, **J. Richard Lundgren\*** and **Elena Ortega**, University of Colorado at Denver (1035-05-699)
- 1:30PM (750) *Characterizing Interval Tournaments*. **David E Brown**, Utah State University, **Arthur H Busch\***, University of Dayton, and **J. Richard Lundgren**, University of Colorado at Denver (1035-05-636)
- 2:00PM (751) *Hypergraph transversals and kernels in digraphs*. Preliminary report. **Hortensia Galeana-Sanchez\***, UNAM, and **Matej Stelík**, Instituto de Matematicas, UNAM (1035-05-179)
- 2:30PM (752) *On the Number of Proper Nodes in Rooted Trees*. Preliminary report. **J. W. Moon\*** and **Laura L.M. Yang**, University of Alberta (1035-05-462)
- 3:00PM (753) *Cycle Lengths Occurring in Hamiltonian Graphs*. **Michael S. Jacobson\***, University of Colorado at Denver, **Michael J. Ferrara**, University of Akron, and **Angela Harris**, University of Colorado at Denver (1035-05-1066)
- 3:30PM (754) *Some recent results on strong connectivity*. **Ronald J. Gould**, Emory University (1035-05-414)

**AMS Special Session on Modular Forms and Modularity, II**

1:00 PM – 3:20 PM

Organizers: **Ling Long**, Iowa State University  
**Wen-Ching Winnie Li**, Pennsylvania State University  
**Tong Liu**, University of Pennsylvania

- 1:00PM (755) *Iwasawa theory, Hida families, and vanishing of L-functions*. Preliminary report. **Trevor S Arnold**, University of Washington (1035-11-662)
- 1:30PM (756) *Congruences among automorphic forms on unitary groups and the Bloch-Kato conjecture*. **Krzysztof Klosin**, University of Utah (1035-11-313)
- 2:00PM (757) *Congruences between modular forms and ranks of new parts of completed Hecke rings*. **Ravi Ramakrishna**, Cornell University (1035-11-878)
- 2:30PM (758) *Hodge, Newton, and tame inertia polygons*. **Xavier Caruso**, Univ. de Rennes 1, and **David Savitt\***, Univ. of Arizona (1035-11-906)
- 3:00PM (759) *On lattices in semi-stable representations*. **Tong Liu**, University of Pennsylvania (1035-11-506)

**MAA Minicourse #11: Part A**

1:00 PM – 3:00 PM

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

**MAA Minicourse #16: Part A**

1:00 PM – 3:00 PM

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

**MAA Minicourse #6: Part A**

1:00 PM – 3:00 PM

*Sonification for mathematics instruction.*  
 Organizers: **Steven M. Hetzler**, Salisbury State University  
**Robert M. Tardiff**, Salisbury State University

**AMS Session on Analysis and Ordinary Differential Equations, II**

1:00 PM – 4:10 PM

- 1:00PM (760) *Jacobi polynomials ( $\alpha=\beta=-1$ ), their Sobolev orthogonality, and self-adjoint operators*. **Andrea S Bruder**, Baylor University (1035-33-1426)
- 1:15PM (761) *Chapter 23 of Abramowitz and Stegun*. **Jonathan M. Borwein**, Dalhousie University, **Neil J. Calkin**, Clemson University, and **Dante Manna\***, Dalhousie University (1035-33-681)
- 1:30PM (762) *A continuous version of the Grothendieck inequality*. **Adam Bowers**, University of Connecticut (1035-28-1347)
- 1:45PM (763) *On entire solutions of nonlinear differential and difference equations*. Preliminary report. **Chung-Chun Yang**, The Hong Kong University of Sci. & Tech. (1035-34-182)
- 2:00PM (764) *The Schwarzian Operator on Fuchsian Connections*. **David J Pinchbeck**, St. Joseph's College (Maine) (1035-30-458)
- 2:15PM (765) *Computation of the Ahlfors map for multiply connected domains with nonsmooth boundaries*. Preliminary report. **Thomas J Tegtmeyer**, Truman State University (1035-30-1330)
- 2:30PM Break
- 2:45PM (766) *Various types of convexity of Banach spaces and solutions to dual extremal problems*. **Irina Peterburgsky**, Suffolk University (1035-30-1456)
- 3:00PM (767) *Distribution of Polynomial Zeros*. Preliminary report. **Andrzej Piotrowski**, California State University, Fresno (1035-30-1389)
- 3:15PM (768) *Local Banach space theory and solutions to the  $\delta$  equation in infinite dimensions*. **Andreas Defant**, University of Oldenburg, and **Aaron Zerhusen\***, Purdue University (1035-32-1530)
- 3:30PM (769) *Accuracy of computer generated pictures of Julia sets for the family  $\lambda \tan(z)$* . **John W Hoggard**, Edinboro University of Pennsylvania (1035-30-1753)
- 3:45PM (770) *Canonical Products Over the Roots of Certain Dirichlet Polynomials*. **Scot Paul Childress**, University of California at Riverside (1035-30-80)

- 4:00PM *Finite rank Toeplitz operators on Bergman space.*  
 (771) **Daniel H. Luecking**, University of Arkansas  
 (1035-30-1805)

**AMS Session on Geometry and Topology, II**

1:00 PM – 4:25 PM

- 1:00PM *On an  $A_\infty$ -structure on  $H^*(C_n \times C_m)$ .*  
 (772) **Mikael Vejdemo-Johansson**,  
 Friedrich-Schiller-Universität Jena, Germany  
 (1035-55-1111)
- 1:15PM *Surgery description of colored knots.*  
 (773) **Richard A. Litherland** and **Steven D Wallace\***,  
 Louisiana State University (1035-55-177)
- 1:30PM *Generalized Quandle Polynomials.*  
 ▶ (774) **V. Sam Nelson**, Pomona College (1035-55-384)
- 1:45PM *RO(G)-Graded Serre Spectral Sequence.*  
 (775) **William C Kronholm**, University of Oregon  
 (1035-55-950)
- 2:00PM *The  $\ell^2$ -homology of even Coxeter groups.*  
 (776) **Timothy A Schroeder**, University of  
 Wisconsin-Milwaukee (1035-55-968)
- 2:15PM *A new invariant of virtual knots.* Preliminary report.  
 ▶ (777) **Allison K Henrich**, Dartmouth College  
 (1035-55-1077)
- 2:30PM *Qd(p) Groups and Free Actions on Products of  
 Spheres.* Preliminary report.  
**Jane Holsapple Long**, University of Maryland  
 (1035-55-1532)
- 2:45PM *Using Unstable Modules over the Steenrod Algebra  
 to Obtain  $H^*(X^{S^1}; R)$  from  $H_{S^1}^*(X; R)$ .* Preliminary  
 report.  
**Courtney K. Taylor**, Purdue University  
 (1035-55-1555)
- 3:00PM *Fibration and Cofibration in Module Theory.*  
 (780) **C. Joanna Su**, Providence College (1035-55-1898)
- 3:15PM *p-adic K-theory and the Bousfield-Kuhn Functor.*  
 Preliminary report.  
**Kristen Joy Schemmerhorn**, Dominican University  
 (1035-55-1943)
- 3:30PM *Volumes of p-adic Analogues of Rational Polyhedra.*  
 (782) **Wesley S. Cross**, Richard Stockton College of New  
 Jersey (1035-52-136)
- 3:45PM *Diameter graphs of polygons and the proof of a  
 conjecture of Graham.*  
**Jim Foster**, Weber State University, and **Tamas  
 Szabo\***, University of Wisconsin - Whitewater  
 (1035-52-682)
- 4:00PM *Describing Conjugacy Classes of Properly  
 Discontinuous Affine Groups of Euclidean Space.*  
 Preliminary report.  
 ▶ (784) **Robert M. Sulman**, Pennsylvania State University  
 (1035-52-1421)
- 4:15PM *Algorithm and pseudo-code for a contour  
 construction of a smooth closed surface when it is  
 given by its approximate triangulation.*  
 ▶ (785) **Avraham Goldstein\*** and **Chokri Cherif**, BMCC /  
 The City University of New York (1035-68-1435)

**AMS Session on Algebra and Number Theory, III**

1:00 PM – 4:25 PM

- 1:00PM *Reflexive Covers and Envelopes.* Preliminary report.  
 (786) **Richard G. Belshoff**, Missouri State University  
 (1035-13-772)
- 1:15PM *On Infinite Syzygies.*  
 ▶ (787) **Meri T Hughes**, University of Texas at Arlington  
 (1035-13-1318)

- 1:30PM *Factorization in Krull Domains with Cyclic Divisor  
 Class Group.* Preliminary report.  
 ▶ (788) **Karl Kattchee\*** and **Mike Fitzpatrick**, University of  
 Wisconsin-La Crosse (1035-13-1493)
- 1:45PM *On Computing a Minimal Generating Set of  
 Covariants for a Binary Form of Degree 10.*  
 Preliminary report.  
 ▶ (789) **Thomas R. Hagedorn**, The College of New Jersey  
 (1035-13-1920)
- 2:00PM *The Dieudonné module of a Hopf algebra  
 generated by two elements.* Preliminary report.  
 (790) **Alan Koch**, Agnes Scott College (1035-13-1253)
- 2:15PM *A new factorization invariant.*  
 (791) **Jack Maney**, University of South Dakota, and  
**Vadim Ponomarenko\***, San Diego State University  
 (1035-13-528)
- 2:30PM *Two Types of Zariski-Samuel Associated Prime  
 Ideals.* Preliminary report.  
 (792) **Tracy Dawn Hamilton\*** and **Howard B. Hamilton**,  
 California State University Sacramento  
 (1035-13-446)
- 2:45PM *The Arithmetic Degree of Squarefree Strongly  
 Stable Ideals.*  
 (793) **Erik Stokes**, University of Kentucky (1035-13-130)
- 3:00PM *A local version of Gotzmann's Persistence.*  
 (794) **Morgan Sherman**, California State University,  
 Channel Islands (1035-13-1885)
- 3:15PM *The Image of the Totalling Functor.*  
 (795) **Kristen A Beck**, The University of Texas at  
 Arlington (1035-13-1660)
- 3:30PM *The character variety's new clothes: How trace  
 diagrams reveal new structure and simplify  
 computations in the coordinate ring.*  
 (796) **Elisha Peterson**, United States Military Academy  
 (1035-14-1203)
- 3:45PM *List Decoding BCH Codes.* Preliminary report.  
 (797) **Philip R Busse**, University of Kentucky (1035-14-96)
- 4:00PM *On a class of reducible determinantal varieties  
 arising in computer vision.* Preliminary report.  
 (798) **GianMario Besana\***, DePaul University, **Marina  
 Bertolini** and **Cristina Turrini**, Università degli  
 Studi di Milano (1035-14-1828)
- 4:15PM *A Basis For Covariants of Degree 3 for a Binary  
 Form.*  
 ▶ (799) **Thomas R. Hagedorn** and **Glen M. Wilson\***, The  
 College of New Jersey (1035-13-1635)

**AMS Session on Applications of Mathematics, II**

1:00 PM – 4:25 PM

- 1:00PM *Finite Element Methods Applied to Computational  
 Neuroscience.* Preliminary report.  
 ▶ (800) **Felix J Apfaltrer**, BMCC/CUNY (1035-92-1230)
- 1:15PM *Deterministic Models of Initiation and Propagation  
 of Unidirectional Excitations (Action Potentials) In  
 Excitable Media.* Preliminary report.  
 ▶ (801) **John Gordon Alford**, Sam Houston State University  
 (1035-92-1340)
- 1:30PM *Process based modeling of soil respiration fluxes in  
 a subalpine forest.*  
 (802) **John M Zobitz\***, Augsburg College, **David Moore**,  
 King's College London, **William Sacks**, University of  
 Wisconsin, **Russell Monson**, University of  
 Colorado, **David Schimel**, NCAR/UCAR, and **David  
 Bowling**, University of Utah (1035-92-1372)
- 1:45PM *Complex Analysis and Dynamics of Polynomial  
 Hele-Shaw Cells.*  
 ▶ (803) **Kim I. Meyer**, University of Louisville  
 (1035-92-1801)

**Program of the Sessions – Monday, January 7 (cont'd.)**

- 2:00PM *Fast and slow traveling wave solutions of the modified FitzHugh model.*  
(804) **Faina Berezovskaya**, Howard University (1035-92-1888)
- 2:15PM *Mathematical predictions for surgical and endovascular aneurysm repair.*  
▶ (805) **Dawn A. Lott\***, Delaware State University, **Charles J. Prestigiacomo**, University of Medicine and Dentistry of New Jersey, **Anwar Atif**, **Sami Atif** and **Darius Wheeler**, Delaware State University (1035-92-1995)
- 2:30PM *An Enzyme Kinetic Model of Blood Island Formation.*  
▶ (806) **Andrew Lewis Matteson**, Texas A&M University (1035-92-1732)
- 2:45PM *Pedestrian Motion in Complex Geometries Using Nonlinear Dynamical Systems Approach.*  
▶ (807) Preliminary report.  
**Rossitza S Marinova**, Edmonton (1035-92-145)
- 3:00PM *Weight Distributions of Hamming codes.*  
(808) **Dae San Kim**, Sogang University (1035-94-972)
- 3:15PM *On the Taylor Series of Asymptotic Weight Enumerators.*  
(809) **Sarah L Sweatlock\***, **Srinivas Aji**, and **Robert J McEliece**, California Institute of Technology (1035-94-1131)
- 3:30PM *Foliating Metric Spaces: A Generalization of Frobenius' Theorem.*  
(810) **Craig Calcaterra**, Metropolitan State University (1035-93-599)
- 3:45PM *Synchronization analysis of a network model in mammalian suprachiasmatic nucleus.*  
▶ (811) **Menaka B Navaratna\***, Florida Gulf Coast University, and **Channa N Navaratna**, Indiana University of Pennsylvania (1035-93-1475)
- 4:00PM *Determination of Stress Tensor by Wavelet Analysis.* Preliminary report.  
(812) **George Roy**, Natural Resources Canada, CANMET/MTL (1035-74-1955)
- 4:15PM *Key Management in Mobile Peer-to-Peer Networks using Cryptography.*  
▶ (813) **Biswajit Panja**, Morehead State University (1035-94-770)
- 1:45PM *What is wrong with this picture? A rich type of assignment.*  
▶ (817) **Greisy Winicki Landman**, Cal Poly Pomona (1035-A5-207)
- 2:00PM *The Validity of Assessing College Algebra Learning Outcomes from a Conceptual Point of View: Implications to Deep and Surface Learning.*  
▶ (818) **Jerry C Obiekwe**, University of Akron-Wayne College (1035-A5-305)
- 2:15PM *Assessment of Student Learning in Quantitative Reasoning.*  
(819) **Joe A. Stickles Jr.**, Millikin University (1035-A5-369)
- 2:30PM *QL Outcomes Assessment within an Integrative Studies Program.*  
▶ (820) **Dick Jardine**, Keene State College (1035-A5-1570)
- 2:45PM *Assessing How a Mathematics Degree Program Contributes to Core Competencies.*  
▶ (821) **Tom McMillan\*** and **Jim Fulmer**, University of Arkansas at Little Rock (1035-A5-1636)
- 3:00PM *Revising a Portfolio Assessment Program to Make It Work.*  
(822) **Susan Hammond Marshall\*** and **Bonnie Gold**, Monmouth University (1035-A5-658)
- 3:15PM *Including Faculty and Tutors in Math Placement.*  
▶ (823) Preliminary report.  
**Nicole A Hoover** and **Cinnamon Hillyard\***, University of Washington Bothell (1035-A5-1252)
- 3:30PM *Quantitative literacy: Methods for developing appropriate assessment instruments.*  
(824) **Susan L. Ganter\***, Clemson University, and **Jack Bookman**, Duke University (1035-A5-757)
- 3:45PM *Assessment of General Education Math Courses.*  
▶ (825) **James E. Hamblin**, Shippensburg University (1035-A5-863)
- 4:00PM *The Impact of the Mathematics Across the Community College (MAC<sup>3</sup>) Project on Students' Learning and Attitudes about Mathematics.*  
▶ (826) Preliminary report.  
**Deann A. Leoni**, Edmonds Community College (1035-A5-1984)

**MAA Session on Curriculum Materials for Preservice Middle School Mathematics Teachers, II**

1:00 PM – 3:55 PM

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

**MAA Session on Assessment of Student Learning in Undergraduate Mathematics, II**

1:00 PM – 4:10 PM

Organizers: **William O. Martin**, North Dakota State University  
**Bernard L. Madison**, University of Arkansas  
**Maura B. Mast**, University of Massachusetts-Boston  
**Kimberly M. Vincent**, Washington State University

- 1:00PM *Bridging the Perceived Gap between Content and Process Standards: Incorporating a Content Portfolio into Math Methods Courses for Pre-service Secondary Mathematics Teachers.* Preliminary report.  
▶ (814) **Janet A. White**, Millersville University of PA (1035-A5-909)
- 1:15PM *Student placement in calculus courses. A case study.* Preliminary report.  
(815) **Radoslav Dimitric**, DBRI, Pittsburgh (1035-A5-87)
- 1:30PM *Blending Individual and Group Assessment: A Model for Measuring Student Performance.*  
▶ (816) **Elana Epstein**, St. Joseph's College (1035-A5-158)

- 1:00PM *A Stimulating Journey on a Road of Discovery: Mathematical Projects Designed to Engage both Student and Teacher During a Dynamic Exploration of Mathematics.* Preliminary report.  
(827) **Gail Kaplan**, Towson University (1035-H1-312)
- 1:20PM *Mathematics Books for Middle School Teachers.*  
(828) **Ira J Papick**, University of Missouri-Columbia (1035-H1-749)
- 1:40PM *A Framework for Integrating Mathematics and Science in Middle School.*  
(829) **George Rublein**, College of William and Mary (1035-H1-1623)
- 2:00PM *An On-Line Course to Encourage Prospective Teachers to Develop Habits for Life-Long Learning.*  
▶ (830) Preliminary report.  
**Elena Anne Marchisotto\*** and **Michael Cole**, California State University, Northridge (1035-H1-583)

- 2:20PM *A Textbook in Geometry for Preservice Middle School Mathematics Teachers.*  
 ▶ (831) **Carol E. Seaman**, University of Wisconsin Oshkosh (1035-H1-1115)
- 2:40PM *Discrete Mathematics Materials for Middle School Mathematics Teachers.* Preliminary report.  
 ▶ (832) **Klay Kruczek**, Western Oregon University (1035-H1-1239)
- 3:00PM *The Mathematics of Change for Middle Grades Teachers, an Alternative to Calculus.* Preliminary report.  
 ▶ (833) **David C. Carothers**, James Madison University (1035-H1-1642)
- 3:20PM *Developing an Online Statistics Class for Middle School Teachers.* Preliminary report.  
 ▶ (834) **Alexander Kevin White**, Texas State University (1035-H1-1815)
- 3:40PM *A Course for Preservice Middle School Mathematics Teachers That Integrates Mathematics and Science.*  
 ▶ (835) **Philip Wagreich**, Learning Sciences Research Inst.; University of Illinois-Chicago (1035-H1-122)

**MAA Session on Demos and Strategies with Technology that Enhance Teaching and Learning Mathematics, II**

1:00 PM – 2:55 PM

Organizers: **David R. Hill**, Temple University  
**Scott Greenleaf**, University of New England  
**Mary L. Platt**, Salem State College  
**Lila F. Roberts**, Georgia College & State University

- 1:00PM *Using Digital Video and Data Collection Software to Make Math Class Fun.*  
 ▶ (836) **Josh W. Helms\*** and **Keith A. Erickson**, United States Military Academy (1035-I1-1712)
- 1:20PM *Using Blue Man Group and Sound Waves to Introduce Fourier Analysis in Calculus.* Preliminary report.  
 ▶ (837) **Phil Gustafson**, Mesa State College (1035-I1-1956)
- 1:40PM *Animated Visual Demonstrations of Historical Mathematics via Excel.*  
 ▶ (838) **Deane E. Arganbright**, Martin, Tennessee (1035-I1-289)
- 2:00PM *Use of Geometer's Sketchpad and Guided Inquiry to Foster Conceptual Understanding of Precalculus Topics.*  
 ▶ (839) **Becky J. Krakowski**, University of Dayton (1035-I1-1544)
- 2:20PM *Interactive Probability Modules for a Calculus-Based Sequence in Probability and Mathematical Statistics.*  
 ▶ (840) **Agnes M Rash\*** and **Deborah Lurie**, Saint Joseph's University (1035-I1-585)
- 2:40PM *JavaScript Simulations for a Probability Course for Middle and High School Teachers.* Preliminary report.  
 ▶ (841) **Kimberly J Presser**, Shippensburg University (1035-I1-500)

**MAA Session on Great Activities for an Introductory Statistics Class, II**

1:00 PM – 4:15 PM

Organizers: **Patricia B. Humphrey**, Georgia Southern University  
**Christopher J. Lacke**, Rowan University

- Ginger Holmes-Rowell**, Middle Tennessee State University
- 1:00PM *Show Me Your Data: Statistics for Millennials.*  
 ▶ (842) **Penelope H Dunham**, Muhlenberg College (1035-K1-1043)
- 1:20PM *Statistics Projects.* Preliminary report.  
 ▶ (843) **Queen W. Harris**, Georgia Perimeter College (1035-K1-1992)
- 1:40PM *The first three days of introductory statistics: Who knew it was going to be fun.*  
 ▶ (844) **Kathryn G. Shafer**, Bethel College (1035-K1-220)
- 2:00PM *Activities to Illustrate Standard Error in Regression Modeling.*  
 ▶ (845) **Jan O. Case**, Jacksonville State University (1035-K1-593)
- 2:20PM *Using Humming to Teach Experimental Design in Elementary Statistics.*  
 ▶ (846) **Cora Neal**, Sonoma State University (1035-K1-816)
- 2:40PM *Threading a Topic Throughout a Statistics Course: Two Examples.*  
 ▶ (847) **William R. Harris\*** and **Homer S. White**, Georgetown College (1035-K1-1594)
- 3:00PM *Service Learning Projects in an Introductory Statistics Class.* Preliminary report.  
 ▶ (848) **Cathy L Whitlock**, UNC - Asheville (1035-K1-1282)
- 3:20PM *Base-ic Statistical Concepts: Using Baseball to Bring Statistics to Life.*  
 ▶ (849) **Stanley Rothman**, Quinnipiac University (1035-K1-231)
- 3:40PM *The Pythagorean won-loss theorem: An introduction to modeling.*  
 ▶ (850) **Steven J Miller**, Brown University (1035-K1-91)
- 4:00PM *Anthrax, Killer Bees and Murder to Motivate Statistics.*  
 ▶ (851) **Rodney X Sturdivant**, United States Military Academy, West Point, NY (1035-K1-1269)

**MAA Session on Mathematics and the Arts, I**

1:00 PM – 3:55 PM

Organizer: **Douglas E. Norton**, Villanova University

- 1:00PM *Algorithmic Art from Streams of Interacting Particles.*  
 ▶ (852) **Gary R Greenfield**, University of Richmond (1035-N1-393)
- 1:20PM *A formula for the intersection angle of backbone arcs with the bounding circle for general Circle Limit III patterns.* Preliminary report.  
 ▶ (853) **Douglas Dunham\***, University of Minnesota Duluth, and **Luns Tee**, University of California Berkeley (1035-N1-1891)
- 1:40PM *Which 17 Planar Crystallographic Groups Are Represented at the Alhambra?*  
 ▶ (854) **B Lynn Bodner**, Monmouth University (1035-N1-56)
- 2:00PM *Some Historical Geometric Constructions and their Arts.*  
 ▶ (855) **Reza Sarhangi**, Towson University (1035-N1-1727)
- 2:20PM *Geometry, Perspective and Proportion in Art: A Traveler's Guide.*  
 ▶ (856) **Elizabeth C Rogers**, Piedmont College (1035-N1-1964)
- 2:40PM *Pattern Analysis of Traditional Thai Designs.*  
 ▶ (857) **Susan A. McBurney**, Western Springs, Illinois (1035-N1-819)
- 3:00PM *Hyperbolic Pillows.* Preliminary report.  
 ▶ (858) **Samuel R Kaplan**, University of North Carolina, Asheville (1035-N1-296)

- 3:20PM *Perspective, Mathematics, and the Renaissance.*  
 ▶ (859) **Andrius Tamulis**, Cardinal Stritch University (1035-N1-1370)
- 3:40PM *The Artist's Eye Was Not Enough.*  
 ▶ (860) **John F. Putz**, Alma College (1035-N1-1781)

**MAA Session on Research and Professional Development Activities for Math Majors, II**

1:00 PM – 4:15 PM

Organizers: **Suzanne M. Lenhart**, University of Tennessee  
**Mike O'Leary**, Towson University  
**Margaret M. Robinson**, Mount Holyoke College

- 1:00PM *CURM and Mini-grants for Undergraduate Research.*  
 ▶ (861) **Michael Dorff**, Brigham Young University (1035-T1-199)
- 1:20PM *LURE-ing students at 4 different institutions: the science apprenticeship model applied to mathematics.* Preliminary report.  
 ▶ (862) **James A Davis\***, University of Richmond, **Sarah Spence-Adams**, Olin College, **Ken Smith**, Sam Houston State University, **Nicholas Eugene**, Coppin State University, and **Sivaram Narayan**, Central Michigan University (1035-T1-919)
- 1:40PM *Undergraduate Research for all Math Majors: Reality or Pipe Dream?* Preliminary report.  
 ▶ (863) **Anant P Godbole**, East Tennessee State University (1035-T1-450)
- 2:00PM *International Research Experience for Undergraduate Mathematics Students: A Collaboration between the U.S. and Hong Kong.*  
 ▶ (864) **Graeme Fairweather\*** and **Barbara M. Moskal**, Colorado School of Mines (1035-T1-1337)
- 2:20PM *Mathematics Teacher Candidates and Model Eliciting Activities: A Journey Towards Research.*  
 ▶ (865) **Paula R Stickle**s, Millikin University (1035-T1-362)
- 2:40PM *Research Motivates Students.*  
 ▶ (866) **Leslie Hogben**, Iowa State University & American Institute of Mathematics (1035-T1-604)
- 3:00PM *Math in the City—A Mathematical Modeling Program for Undergraduates.*  
 ▶ (867) **Petronela Radu**, University of Nebraska-Lincoln (1035-T1-638)
- 3:20PM *Field Trips Motivate Students to Pursue Mathematics.*  
 (868) **Jason E Miller**, Truman State University (1035-T1-775)
- 3:40PM *Research Program for the Academic Year.*  
 ▶ (869) **Zsuzsanna Szaniszlo**, Valparaiso University (1035-T1-1031)
- 4:00PM *Successful Mentoring of Undergraduate Students on Research Projects.*  
 (870) **Michael A. Jones**, Montclair State University (1035-T1-818)

**MAA Session on Research on the Teaching and Learning of Undergraduate Mathematics, II**

1:00 PM – 2:45 PM

Organizers: **David E. Meel**, Bowling Green State University  
**Michelle J. Zandieh**, Arizona State University  
**Chris Rasmussen**, San Diego State University

- 1:00PM *Beyond the mathematics: What else is needed to teach in an inquiry-oriented classroom?* Preliminary report.  
 ▶ (871) **Joseph F. Wagner**, Xavier University (1035-U1-494)
- 1:35PM *Comparison of native-English and Native-Korean speaking university students' discourses on infinity and limit.* Preliminary report.  
 ▶ (872) **Dong Joong Kim**, Michigan State University (1035-U1-1904)
- 2:00PM *Using Computer Simulations to Facilitate Calculus Students' Understanding of Related Rates Problems.* Preliminary report.  
 (873) **Nicole M Engelke**, California State University, Fullerton (1035-U1-1691)
- 2:25PM *Research Results on the Relationship Between Graduate Teaching Assistant Instructor Expertise and Algebra Performance of College Students.*  
 ▶ (874) **Karla Marie Childs**, Pittsburg State University, Pittsburg, KS (1035-U1-1156)

**MAA General Contributed Paper Session, IV**

1:00 PM – 4:10 PM

- Organizer: **Sarah L. Mabrouk**, Framingham State College
- Moderators: **Susan J. Diesel**, Norwich University  
**Michael Smith**, Morningside College  
**Bruce S. Burdick**, Roger Williams University  
**Hongbiao Zeng**, Fort Hays State University
- 1:00PM *Using Visual Cues in Teaching Exponent Rules.* Preliminary report.  
 ▶ (875) **Jim Brandt**, Southern Utah University (1035-Z1-1072)
- 1:15PM *Connecting Pascal's Triangle to Thirteen Number Sets.*  
 ▶ (876) **Jim Fulmer\*** and **Tom McMillan**, University of Arkansas at Little Rock (1035-Z1-1367)
- 1:30PM *Applying interactive, learner-centered methods to teaching Mathematics.*  
 ▶ (877) **Salar Alsardary\*** and **Phyllis Blumberg**, University of the Sciences in Philadelphia (1035-Z1-74)
- 1:45PM *On Generalized Alternating Galileo Sequences.*  
 ▶ (878) **Hari Pulapaka**, Stetson University (1035-Z1-162)
- 2:00PM *Concept Acquisition in Linear Algebra.* Preliminary report.  
 (879) **Melvin A Nyman\***, Alma College, **John Berry**, University of Plymouth, and **Douglas Lapp**, Central Michigan University (1035-Z1-828)
- 2:15PM *How to "create" more class time for active learning.*  
 (880) **Min-Lin Lo**, California State University San Bernardino (1035-Z1-330)
- 2:30PM *A quadrilateral inside another one.*  
 (881) **J. Marshall Ash\***, DePaul University, **Michael A. Ash**, Economic Dept., University of Massachusetts Amherst, and **Peter F. Ash**, Cambridge College (1035-Z1-1467)
- 2:45PM *Limits of zeros of polynomial sequences.*  
 ▶ (882) **Xinyun Zhu\*** and **George Grossman**, Central Michigan University (1035-Z1-304)
- 3:00PM *Chaos and Bifurcations in the Dynamical System of Student Attitudes toward Mathematics in Ten Undergraduate Classes.*  
 ▶ (883) **Zaur Berkaliyev**, Illinois Institute of Technology (1035-Z1-1487)

- 3:15PM *Numbers Simultaneously Polygonal and Centered Polygonal.*  
 ▶ (884) **Steven Schlicker**, Grand Valley State University (1035-Z1-281)
- 3:30PM *Educating about Sustainability while Teaching Calculus.* Preliminary report.  
 ▶ (885) **Thomas J Pfaff**, Ithaca College (1035-Z1-685)
- 3:45PM *Algebraic and Geometric Aspects of Stability of Linear Equations.*  
 ▶ (886) **Avraham Goldstein\*** and **Chokri Cherif**, BMCC / The City University of New York (1035-Z1-1301)
- 4:00PM *Baseball and general education mathematics.*  
 ▶ (887) **Fred Worth**, Henderson State University (1035-Z1-949)

**SIAM Minisymposium on From Global Predictions to Local Action, II: Mathematics of Social and Economic Feedback in Climate Change**

1:00 PM – 4:15 PM

Organizers: **Inez Fung**, Berkeley Institute of the Environment, University of California Berkeley  
**Christopher K. Jones**, University of North Carolina  
**Mary Lou Zeeman**, Bowdoin College

- 1:00PM Welcome remarks and symposium goals.
- 1:05PM *The Challenge of Measuring and Modeling the Economic Impacts of Climate Change.*  
 (888) **Maximilian Auffhammer**, University of California Berkeley (1035-00-1677)
- 1:35PM Questions and discussion.
- 2:00PM *Self-Enforcing Climate-Change Treaties.*  
 ▶ (889) **Roy Radner\***, Stern School, New York University, and **Prajit K. Dutta**, Columbia University (1035-91-1516)
- 2:30PM Questions and discussion.
- 3:00PM *The Mathematics of Climate Change.*  
 (890) **Graciela Chichilnisky**, Columbia University (1035-91-2021)
- 3:30PM Questions and discussion.

**MAA Panel Discussion**

1:00 PM – 2:20 PM

*Creating and implementing a capstone course in mathematics for preservice secondary teachers.*  
 Organizers: **David W. Dempsey**, Jacksonville State University  
**Matthew Winsor**, University of Texas at El Paso

Panelists: **Edward E. Aboufadel**, Grand Valley State University  
**Rebecca Walker**, Grand Valley State University  
**Gail Burrill**, Michigan State University  
**Henry S. Kepner**, University of Wisconsin-Milwaukee  
**David W. Dempsey**  
**Matthew Winsor**

**SIGMAA on the History of Mathematics Panel Discussion**

1:00 PM – 3:00 PM

*The political dimension of ethnomathematics.*  
 Organizers: **Amy Shell-Gellasch**, Pacific Lutheran University  
**Janet L. Beery**, University of Redlands

Presenters: **Ubiratan D'Ambrosio**, Universidade Estadual de Campinas, Brazil  
**Ana Lúcia Bras Dias**, Central Michigan University  
**Arthur B. Powell**, Rutgers University

**MAA-AMS Special Presentation**

1:00 PM – 3:00 PM

*Putting math on the Web the correct way.*  
 Organizers: **Paulo Ney de Souza**, University of California Berkeley and Mathematical Sciences Publishers  
**William F. Hammond**, SUNY at Albany  
**Patrick D. F. Ion**, *Mathematical Reviews* and W3C MathML Working Group

**Summer Program for Women in Mathematics (SPWM) Reunion**

1:00 PM – 4:00 PM

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

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

2:00 PM – 4:00 PM

- Organizer: **Jon W. Scott**, Montgomery Community College
- 2:00PM *Professional Enhancement Program (PREP).*  
 (891) **J. Michael Pearson**, Mathematical Association of America, **William Haver**, Virginia Commonwealth University, **Nancy Baxter Hastings**, Dickinson College, **Nathaniel Dean**, Texas State University-San Marcos, and **Jon Scott\***, Montgomery College
- 2:00PM *Renewal of College Algebra.*  
 (892) **Norma Agrads\***, Miami Dade College, and **J. Michael Pearson**, Mathematical Association of America
- 2:00PM *Collaborative Research: Lessons in Mathematics and Art.*  
 (893) **Annalisa Crannell\***, Franklin and Marshall College, and **Marc Frantz**, Indiana University
- 2:00PM *Adapting and Implementing Innovative Materials in Statistics Courses (AIMS).*  
 (894) **Robert delMas**, **Joan Garfield\*** and **Andrew Zieffler**, University of Minnesota
- 2:00PM *WebWork, a Web-based Interactive Homework System.*  
 (895) **Michael Gage\***, **Arnold Pizer** and **Vicki Roth**, University of Rochester
- 2:00PM *Research-focused Learning Communities in Mathematical Biology.*  
 (896) **Jason Miller\***, **Jon Beck**, **Michael Kelrick** and **Laura Rechav-Fielden**, Truman State University

- 2:00PM *Interdisciplinary Training for Undergraduates in Biological and Mathematical Sciences at ASU.*  
**Yang Kuang\***, **Hal Smith**, **Carlos Castillo-Chavez**, **James Elser** and **John Anderies**, Arizona State University
- 2:00PM *The National Curve Bank Project: A MATH Archive.*  
 (898) **Shirley Gray\***, California State University, Los Angeles, **Bill Austin**, **Chris Caldwell**, University of Tennessee at Martin, **Phillip Johnson**, Appalachian State University, and **Lou Talman**, Metropolitan State College of Denver
- 2:00PM *Technically Speaking.*  
 (899) **Lew Ludwig**, Denison University
- 2:00PM *Paradigms in Physics: Multiple Entry Points.*  
 (900) **Corinne Manogue**, **Tevian Dray\***, **Barbara Edwards**, **David McIntyre** and **Emily van Zee**, Oregon State University
- 2:00PM *Adapting K-8 Mathematics Curricular Materials for Pre-Service Teacher Education.*  
 (901) **William Moss**, Clemson University
- 2:00PM *SOCR Analyses: A Free Internet-based Statistical Analysis Toolkit.*  
 (902) **Annie Che**, **Nicolas Christou**, **Jenny Cui** and **Ivo Dinov\***, University of California at Los Angeles
- 2:00PM *Biocalculus: Text Development, Dialog, and Assessment.*  
 (903) **Timothy Comar\***, **Lisa Townsley** and **Brenda Alberico**, Benedictine University
- 2:00PM *The STEM Real World Applications Modules Project.*  
 (904) **Darren Narayan\***, University of South Carolina, **William Basener**, National Geospatial-Intelligence Agency, and **Moises Sudit**, Rochester Institute of Technology
- 2:00PM *The Next STEP: Integrating STEM Learning Communities.*  
 (905) **Jason Miller\***, **Maria Nagan** and **Jennifer Thompson**, Truman State University
- 2:00PM *Math Questions to Engage Students (Math QUEST).*  
 (906) **Holly Zullo\***, **Kelly Cline** and **Mark Parker**, Carroll College
- 2:00PM *Quantitative Reasoning in the Contemporary World.*  
 (907) **Bernard Madison\***, University of Arkansas, **Stuart Boersma**, Central Washington University, **Caren Diefenderfer**, Hollins University, and **Shannon Dingman**, University of Arkansas
- 2:00PM *CSUMS: Computational Science Training in the Mathematical Sciences at Rensselaer.*  
 (908) **Victor Roytburd\***, **Mark Holmes**, **Isom Herron**, **Gregor Kovacic** and **Peter Kramer**, Rensselaer Polytechnic Institute
- 2:00PM *Enhancing the Teaching of Linear Algebra Using Digital Image Processing.*  
 (909) **Mohamed Allali**, Chapman University
- 2:00PM *The PascGalois Project: Visualizing Abstract Mathematics.*  
 (910) **Michael Bardzell\***, **Kathleen Shannon** and **Donald Spickler**, Salisbury University
- 2:00PM *Training Undergraduate Students in Mathematics and Biology at UL Lafayette.*  
 (911) **Azmy Ackleh\***, University of Louisiana at Lafayette, **Jacoby Carter**, USGS National Wetlands Research Center, and **Susan Mopper**, University of Louisiana at Lafayette
- 2:00PM *Classroom Response Systems in Statistics Courses.*  
 (912) **Teri J. Murphy\***, **Curtis McKnight**, **Michael Richman** and **Robert Terry**, University of Oklahoma
- 2:00PM *Research and Education Program (REP) in BioMath.*  
 (913) **Semen Koksal\***, **Richard Sinden**, **Jewgeni Dshalalow**, **David Carroll** and **Robert van Woesik**, Florida Institute of Technology
- 2:00PM *College Algebra in Context: A Learner-centered Approach Incorporating Data-driven Activities Related to Social Issues.*  
 (914) **Michael Catalano**, Dakota Wesleyan University
- 2:00PM *Synthetic Biology Research for Undergraduates (SyBR-U).*  
 (915) **Laurie Heyer\***, Davidson College, **Jeffrey Poet**, Missouri Western State University, **A. Malcolm Campbell**, Davidson College, and **Todd Eckdahl**, Missouri Western State University
- 2:00PM *Refocusing College Algebra.*  
 (916) **Laurette Foster\***, Prairie View A&M University, and **Don Small**, U.S. Military Academy
- 2:00PM *Developing a Mathematics Curriculum to Serve the Biosciences: The First Step.*  
 (917) **Sheldon Gordon\***, **John Winn**, **Matthew Bahamonde**, Farmingdale State College, **Linda Sabatino** and **James Fulton**, Suffolk County Community College
- 2:00PM *A Comprehensive WeBWork Problem Library.*  
 (918) **Jeff Holt\***, University of Virginia, **John Jones**, Arizona State University, and **William Ziemer**, California State University, Long Beach
- 2:00PM *Long Beach Project in Geometry and Symmetry.*  
 (919) **Scott Crass** and **Temma Leiman\***, California State University-Long Beach
- 2:00PM *From ILAP to iLabAP-Linking Investigative Biology Laboratories to the Mathematics Curriculum.*  
 (920) **Kirk Bartholomew\***, **Hema Gopalakrishnan**, **Rose Kinik** and **Jennifer Mattei**, Sacred Heart University
- 2:00PM *BioGrapher: An Excel Front-End for Computation of Graph Theoretical Properties and Graphical Visualization of Networks.*  
 (921) **Rama Viswanathan\***, **Han Lai**, **Hlaing Lin**, **Khalid Qumsieh** and **John Jungck**, Beloit College
- 2:00PM *A Phase II Expansion of the Development of a Multidisciplinary Course on Wavelets and Applications.*  
 (922) **Patrick Van Fleet\***, University of St. Thomas, **Catherine Beneteau**, University of South Florida, **Caroline Haddad**, SUNY Geneseo, and **David Ruch**, Metropolitan State College of Denver
- 2:00PM *PHASER: A Universal Simulator for Dynamical Systems.*  
 (923) **Huseyin Kocak\***, **Brian Coomes**, and **Burton Rosenberg**, University of Miami
- 2:00PM *Team Research Training Program in Biology and Mathematics.*  
 (924) **Edwin Tecarro**, **Steve London\***, **Youn-Sha Chan**, **Jeong-Mi Yoon** and **Aaron Krochmal**, University of Houston-Downtown
- 2:00PM *Quantitative Literacy Across the Curriculum in a Liberal Arts Setting.*  
 (925) **Semra Kilic-Bahi\***, **Lavonne Batalden** and **Ben Steele**, Colby-Sawyer College
- 2:00PM *Integrating Field Trips into Calculus Courses.*  
 (926) **Despina Prapavessi\*** and **Karen Edwards**, Diablo Valley College
- 2:00PM *Foundation in Mathematical Biology through Interdisciplinary Research, Training, and Curriculum Development.*  
 (927) **Elissa Schwartz\***, **Richard Gomulkiewicz**, **Robert Dillon**, **Judith McDonald**, **Charlotte Omoto** and **Bala Krishnamoorthy**, Washington State University



- 2:00PM *Interdisciplinary Training of Undergraduates in Biological and Mathematical Sciences with Emphasis on Fisheries Stock Assessment.*  
**Tor Kwembe\*** and **Hyung Cho**, Jackson State University
- 2:00PM *A Radical Approach to Teaching Object-Oriented Programming.*  
**Ann Moskol\*** and **Kate Sanders**, Rhode Island College
- 2:00PM *A Model Teacher-Scholar Program in Secondary Mathematics.*  
**Saad El-Zanati\***, **Sharon McCrone** and **Cynthia Langrall**, Illinois State University
- 2:00PM *Preparing Computational Biologists by Encouraging an Academic Minor.*  
**Dmitry Gokhman\***, **David Senseman**, **Kay Robbins**, **James Bower** and **Nandini Kannan**, University of Texas at San Antonio
- 2:00PM *Computer Interfaces for Enhancing Visual Learning for Students with Visual Processing Disabilities.*  
**Karen Luxton Gourgey\***, **Annette Gourgey**, Baruch College, and **Steven Landau**, Touch Graphics Company
- 2:00PM *Transforming Science and Mathematics Teacher Preparation.*  
**James Curry\***, **Richard McCray**, **Carl Wieman**, **Valerie Otero** and **William Wood**, University of Colorado, Boulder
- 2:00PM *History Across the Mathematics Curriculum for Preservice Teachers.*  
**Gabriela R. Sanchis**, Elizabethtown College
- 2:00PM *Mathematics Research Experience for Pre-service and for In-service Teachers.*  
**Wendy O'Hanlon\*** and **Saad El-Zanati**, Illinois State University
- 2:00PM *Interdisciplinary Teaching: Using The Study of Sprouts To Teach Mathematics and Science at a Liberal Arts College.*  
**Cheri Boyd\***, **Beverly Brown** and **William Lammela**, Nazareth College of Rochester
- 2:00PM *Mathematics Across the Community College Curriculum.*  
**Deann Leoni\***, Edmonds Community College, **Caren Diefenderfer**, Hollins University, and **Christie Gilliland**, Green River Community College
- 2:00PM *Appropriately Using WeBWork, WebAssign and Maple in Calculus I and II.* Preliminary report.  
**Bryan Dorner\***, **Daniel Heath**, **Jessica Sklar** and **Jeffrey Stuart**, Pacific Lutheran University

**AMS Invited Address**

- 2:15 PM – 3:05 PM  
 (939) *Quantum field theory and generalized cohomology.*  
**Peter Teichner**, University of California Berkeley (1035-81-07)

**Project NExT Panel Discussion**

- 2:30 PM – 4:00 PM  
*Making the math major work for the under-prepared student.*  
 Organizers: **Linda Braddy**, East Central University  
**Pamela B. Pierce**, The College of Wooster  
 Panelists: **Bonnie Gold**, Monmouth University  
**John Ramsay**, The College of Wooster

**Laura A. Taalman**, James Madison University

**MAA Panel Discussion**

- 2:30 PM – 3:50 PM  
*Dueling platforms: Java vs. Flash.*  
 Organizers: **Mary L. Platt**, Salem State College  
**Lawrence C. Moore**, Duke University  
 Moderator: **Mary L. Platt**  
 Panelists: **Thomas E. Leathrum**, Jacksonville State University  
**Kyle T. Siegrist**, University of Alabama, Huntsville  
**Doug Ensley**, Shippensburg University  
**Barbara Kaskosz**, University of Rhode Island

**SIGMAA on Business, Industry, and Government Guest Lecture**

- 3:00 PM – 3:45 PM  
 ▶ (940) *From Flapping Birds to Space Telescopes: The Modern Science of Origami.* Preliminary report.  
**Robert J. Lang**, www.langorigami.com (1035-A0-1999)

**AMS Retiring Presidential Address**

- 3:20 PM – 4:10 PM  
 (941) *Semisimple groups as universal examples.*  
**James G. Arthur**, University of Toronto (1035-22-03)

**Joint Prize Session**

- 4:25 PM – 5:25 PM

**Joint Prize Session Reception**

- 5:30 PM – 6:30 PM

**SIGMAA on the Philosophy of Mathematics Business Meeting, Guest Lecture, and Reception**

- 5:45 PM – 7:15 PM  
 ▶ (942) *How applied mathematics became pure.*  
**Penelope Maddy**, Department of Logic and Philosophy of Science, University of California Irvine (1035-A0-292)

**MAA Special Presentation**

- 5:45 PM – 7:45 PM  
*Sharing residues from college algebra workshops.*  
 Organizers: **Donald B. Small**, U.S. Military Academy  
**William E. Haver**, Virginia Commonwealth University

**SIGMAA on Quantitative Literacy Business Meeting and Reception**

- 5:45 PM – 6:45 PM

**SIGMAA on Statistics Education Business Meeting**

- 5:45 PM – 7:15 PM

**BIGSIGMAA Reception for Mathematicians in Business, Industry, and Government**

5:45 PM – 6:45 PM

**MAA Two-Year College Reception**

5:45 PM – 7:00 PM

**MAA Special Presentation**

6:00 PM – 7:30 PM

*The proof is in the pudding: Humorous theater of the mathematical variety.*

Presenter: **Colin C. Adams**, Williams College

**MAA Committee on Minority Participation-North American Institutes Informal Gathering**

6:30 PM – 8:00 PM

*Conversations with minority scientists.*

Organizers: **William A. Hawkins, Jr.**, University of the District of Columbia

**Robert E. Megginson**, University of Michigan

**Camille A. McKayle**, University of the Virgin Islands

**Ivelisse M. Rubio**, University of Puerto Rico, Rio Piedras

**MAA Music Presentation**

7:00 PM – 8:00 PM

*Tones are real functions, rhythms are sequences.*

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

**Tuesday, January 8**

**Joint Meetings Registration**

7:30 AM – 4:00 PM

**AMS Special Session on Modular Forms and Modularity, III**

7:30 AM – 10:50 AM

Organizers: **Ling Long**, Iowa State University  
**Wen-Ching Winnie Li**, Pennsylvania State University  
**Tong Liu**, University of Pennsylvania

7:30AM (943) *On modular forms for some noncongruence subgroups.*

**Chris A. Kurth** and **Ling Long\***, Iowa State University (1035-11-978)

8:00AM (944) *L-functions and l-adic representations for noncongruence subgroups.*

**Jerome William Hoffman\*** and **Helena Verrill**, Louisiana State University (1035-11-791)

8:30AM (945) *Farey Symbols and Finite Index Subgroups of  $PSL_2(\mathbb{Z})$ .*

**Chris Kurth**, Iowa State University (1035-11-1604)

9:00AM (946) *Computing with Modular Forms Using SAGE.*

**William A Stein**, University of Washington (1035-11-382)

9:30AM (947) *The module of vector-valued modular forms on  $SL(2, \mathbb{Z})$ .* Preliminary report.

**Geoff Mason**, University of California, Santa Cruz (1035-11-124)

10:00AM (948) *The Local Langlands Correspondence for  $GL_4$ .*

**Wee Teck Gan**, University of California, San Diego (1035-11-239)

10:30AM (949) *Actions of finite groups on modular forms and coherent sheaves.* Preliminary report.

**Ted C Chinburg\***, University of Pennsylvania, and **Amy Ksir**, United States Naval Academy (1035-14-89)

**AMS Session on Combinatorics, II**

7:45 AM – 10:55 AM

7:45AM (950) *Graph energy change due to single edge deletion.* Preliminary report.

**Wasin So**, San Jose State University (1035-05-1307)

8:00AM (951) *Some Results on Antidesigns.* Preliminary report.

**Ian Rogers**, Rose Hulman Institute of Technology (1035-05-508)

8:15AM (952) *Combinatorial enumeration of rectangular kolam designs of the Tamil land.*

**Rethinasamy K Kittappa**, Millersville University (1035-05-543)

8:30AM (953) *Extremal systems for the fair and biased Erdős-Selfridge theorem.*

**Eric Lars Sundberg**, Occidental College (1035-05-544)

8:45AM (954) *A New Lower Bound on the Number of Oblivious Questions Required to Guess Two Secrets.* Preliminary report.

**Kelley Harris**, Harvard University (1035-05-650)

9:00AM (955) *Three-Dimensional Generalized Solitary Waves via a Spatial Dynamical Approach.*

**Shengfu Deng\*** and **Shu-Ming Sun**, Virginia Tech (1035-05-672)

9:15AM (956) *Sequences with small subsum sets.*

**Aaron Pixton**, Princeton University (1035-05-677)

9:30AM (957) *Boundaries of the minimum  $P_k$  total weights.* Preliminary report.

**Ji Young Choi**, Shippensburg University of PA (1035-05-695)

9:45AM (958) *Almost avoiding classes of permutations.*

**Robert Brignall**, University of Bristol, **William Griffiths**, Southern Polytechnic State University, **Rebecca Smith\***, SUNY Brockport, **Vincent Vatter**, DIMACS, **Daniel Warren**, Ohio State, and **Doron Zeilberger**, Rutgers (1035-05-804)

10:00AM (959) *On  $(64, 28, 12)$  Difference Sets.* Preliminary report.

**Omar A. AbuGhneim**, Jordan University (1035-05-871)

10:15AM (960) *New families of non-embeddable quasi-derived designs.*

**Tariq A. Alraqad**, Central Michigan University (1035-05-918)

10:30AM (961) *Some results on  $\lambda_x$ -invertible graphs.*

**John P. Georges**, **David Mauro** and **Yan Wang\***, Trinity College, Hartford, CT (1035-05-939)

10:45AM (962) *A Combinatorial Approach to the Distinguishing Number of a Tournament and Other Digraphs.*

**Michael Babcock**, **Larry J. Langley** and **Sarah K. Merz\***, University of the Pacific (1035-05-1354)

**AMS Session on Geometry and Topology, III**

7:45 AM – 10:55 AM

- 7:45AM *A Characterization of the Interior of a Triangle.*  
▶ (963) **Shing S So\*** and **Alvin R Tinsley**, University of Central Missouri (1035-51-1213)
- 8:00AM *Upper Bound of Edge Number for Links.* Preliminary report.  
▶ (964) **Lucas Bennett**, University of Iowa (1035-54-187)
- 8:15AM *A modified Wallman method for compactifications of certain arbitrary topological spaces and an arbitrary Hausdorff compactification.*  
(965) **Hueyzen J Wu\***, Texas A&M University – Kingsville, and **Wan-Hong Wu**, Institute of Drug Development, Cancer Therapy & Research Center (1035-54-173)
- 8:30AM *The Kauffman-Harary Conjecture.*  
▶ (966) **P R Solis**, Massachusetts Institute of Technology (1035-54-225)
- 8:45AM *New Metrization Theorems in Terms of Semi-open Covers.* Preliminary report.  
(967) **Gangadhar R. Hiremath**, University of North Carolina Pembroke (1035-54-295)
- 9:00AM *Covering Properties Extending Several Special Base Properties.*  
(968) **Brad Bailey**, North Georgia Coll. & State Univ. (1035-54-710)
- 9:15AM *Problems of scalable topology.* Preliminary report.  
▶ (969) **Mark Burgin**, UCLA (1035-54-189)
- 9:30AM *Asphericity of Random Equilateral Knots.*  
▶ (970) **Eric J Rawdon\***, University of St. Thomas, **Andrzej Stasiak**, University of Lausanne, **John C Kern**, Duquesne University, **Patrick Plunkett**, University of California Santa Barbara, **Michael Piatek**, University of Washington, and **Kenneth C Millett**, University of California Santa Barbara (1035-57-342)
- 9:45AM *Quantum invariants can provide sharp bounds on Heegaard genus.*  
(971) **Helen Wong\***, Bowdoin College, and **Andrew Casson**, Yale University (1035-54-1655)
- 10:00AM *Quasi-conformal Homeomorphisms on Compact Ultrametric Spaces.*  
(972) **Mozhgan Mirani**, The University of the South, Sewanee, TN (1035-54-1605)
- 10:15AM *Homological Codimension.* Preliminary report.  
(973) **Kailash C Ghimire**, Georgia Southwestern State University (1035-54-1229)
- 10:30AM *Intrinsically  $n$ -linked spatial graphs.*  
(974) **Danielle O'Donnol**, UCLA (1035-54-1382)
- 10:45AM *The  $q_0$ -topology – An order topology on a space of quasicontinuous functions.*  
(975) **Rodica Cazacu**, Georgia College & State University (1035-54-1457)

**AMS General Session**

7:45 AM – 10:55 AM

- 7:45AM *Shortest paths and optimal solutions for evacuation in emergency situations.* Preliminary report.  
▶ (976) **Mitch A. Phillipson\*** and **Simei Tong**, University of Wisconsin Eau Claire (1035-00-163)
- 8:00AM *A Mathematical Model of the Evolution of the ABO Blood Group System.*  
(977) **Sara Jensen**, Carthage College, and **Anna Sparacino\***, Westminster College, PA (1035-00-1862)

- 8:15AM *Discovery Precalculus projects: Modeling with a graphing calculator TI-84+.*  
▶ (978) **Nataliya I. Latushkina**, Columbia College, Columbia, Missouri (1035-00-48)
- 8:30AM *Reducts of Countably Categorical Graphs.*  
(979) **Yun Lu**, Kutztown University of Pennsylvania (1035-03-1064)
- 8:45AM *On the classification of torsion-free abelian groups up to quasi-isomorphism.*  
(980) **Samuel Gregory Coskey**, Rutgers University (1035-03-1806)
- 9:00AM *Characterizing “Planar” Abstract Simplicial Complexes by Excluded Minors (Generalizing Kuratowski’s Theorem to Higher Dimensions).*  
(981) **Taylor Dupuy**, University of New Mexico (1035-06-72)
- 9:15AM *On the local multiple-valued logic algebras.*  
(982) **Lavinia Corina Ciungu**, State University of New York at Buffalo (1035-06-444)
- 9:30AM *Fractional Weak Discrepancy, Interval Orders, and Forbidden Configurations.*  
(983) **Alan Shuchat\***, **Randy Shull** and **Ann Trenk**, Wellesley College (1035-06-1481)
- 9:45AM *A Priestley Style Duality for Meet Semi Lattices.*  
(984) **Aditya Kumar Nagrath**, University of Denver (1035-06-1906)
- 10:00AM *On the Natural Density of the  $k$ -Zeckendorf Niven Numbers.*  
(985) **Curtis Cooper**, University of Central Missouri (1035-11-1254)
- 10:15AM *Direct Sum Decompositions over Two-dimensional Local Domains.*  
(986) **Nicholas R Baeth**, University of Central Missouri (1035-13-688)
- 10:30AM *On Compact Connected Mobs.* Preliminary report.  
(987) **Phoebe H McLaughlin\***, **Shing So**, University of Central Missouri, and **Haohao Wang**, Southeast Missouri State University (1035-22-1210)
- 10:45AM *Point spectra for generalized Hausdorff matrices.*  
(988) **B. E. Rhoades**, Indiana University (1035-40-276)

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

8:00 AM – 10:50 AM

Organizers: **Darren A. Narayan**, Rochester Institute of Technology  
**Bernard Brooks**, Rochester Institute of Technology  
**Jacqueline A. Jensen**, Sam Houston State University  
**Vadim Ponomarenko**, San Diego State University  
**Tamas Wiandt**, Rochester Institute of Technology

- 8:00AM *Modeling Atomic Force Microscope Deformation of Fibrin Fibers.*  
▶ (989) **Callie A Johnson\*** and **Anthony Tongen**, James Madison University (1035-74-1780)
- 8:30AM *Cardinal Invariants Beyond the Continuum.*  
▶ (990) **E. T. Brown**, **J. L. Bruno** and **C. L. Wingfield\***, James Madison University (1035-03-1752)
- 9:00AM *Existence of Asymptotic Solutions to Semilinear Partial Difference Equations on Graphs.*  
(991) **Jason Dean Lee\***, Duke University, and **John Neuberger**, Northern Arizona University (1035-35-261)

- 9:30AM *Nested Chain Partitions of Normalized-Matching Posets.*  
 ▶ (992) **Elinor Gardner Escamilla, Andreea Cristina Nicolae, Paul Russell Salerno, Shahriar Shahriari,** Pomona College, and **Jordan Olliver Tirrell\***, Lafayette College, (1035-06-132)
- 10:00AM *Minimum Semidefinite Rank of a Graph with Cut Sets of Size 2 and Graphs with  $\text{msr}(G) = \text{vruleheight}1.5\text{ex}G| - 2$ .*  
 ▶ (993) **Jonathan E. Beagley\***, Illinois Institute of Technology, **Eileen L. Radzwion**, Central Michigan University, and **Andrew M. Zimmer**, University of Puget Sound (1035-15-119)
- 10:30AM *Hadamard Difference Sets in Groups of Order 144 and the Spread Construction.*  
 ▶ (994) **Nicole Kroeger**, North Carolina State University, **Marcus Miller\***, Harvard University, **Christopher Mooney**, Transylvania University, and **Kathleen Shepard**, Grinnell College (1035-05-120)

**AMS-MAA Special Session on History of Mathematics, I**

8:00 AM – 10:50 AM

Organizers: **Joseph W. Dauben**, Lehman College, CUNY  
**Patti Hunter**, Westmont College  
**Victor J. Katz**, University of District of Columbia  
**Karen H. Parshall**, University of Virginia

- 8:00AM *Mathematics and Mathematical Astronomy in Ancient India.*  
 ▶ (995) **Toke Lindegaard Knudsen**, Brown University (1035-01-496)
- 8:30AM *A Different Sort of Sacred Geometry: The Medieval Analemma for Finding the Direction of Mecca.*  
 ▶ (996) **Glen R Van Brummelen**, Quest University (1035-01-532)
- 9:00AM *A New Interpretation of Cardano's Liber De Ludo Aleae.* Preliminary report.  
 ▶ (997) **Mary Sol de Mora Charles**, Universidad del País Vascos (1035-01-609)
- 9:30AM *Navigating Between Triangular Numbers and Trigonometric Tables: How Thomas Harriot Developed His Interpolation Formulas.*  
 (998) **Janet L. Beery**, University of Redlands (1035-01-561)
- 10:00AM *Joaquim Gomes de Souza, a controversial 19th century Brazilian mathematician.*  
 ▶ (999) **Ubiratan D'Ambrosio**, Pontificia Universidade Católica de São Paulo (1035-01-269)
- 10:30AM *Introduction of set theory in Mexico.* Preliminary report.  
 ▶ (1000) **Alejandro R. Garciadiego**, Universidad Nacional Autonoma de Mexico (1035-01-491)

**AMS Special Session on Structure, Geometry, and Symbolic Computation of Algebraic Groups and Symmetric Spaces, III**

8:00 AM – 10:50 AM

Organizers: **Jennifer R. Daniel**, Lamar University  
**Aloysius G. Helminck**, North Carolina State University

- 8:00AM *Modules of covariants in modular invariant theory.*  
 (1001) **Abraham Broer**, Université de Montréal, and **Jianjun Chuai\***, Memorial University of Newfoundland (1035-13-483)

- 8:30AM *A Proof of The First Main Theorem for the Two Dimensional Modular Representation of  $C_p$ .*  
 (1002) **H. E. A. Eddy Campbell\***, Memorial University of Newfoundland, **R. James Shank**, University of Kent at Canterbury, and **David L. Wehlau**, Royal Military College and Queen's University (1035-13-562)
- 9:00AM *A Proof of The First Main Theorem for the Two Dimensional Modular Representation of  $C_p$ .* Preliminary report.  
 (1003) **Eddy Campbell**, Memorial University of Newfoundland, **R. J. Shank**, University of Canterbury at Kent, and **David L. Wehlau\***, Royal Military College of Canada (1035-20-498)
- 9:30AM *Separating Invariants.* Preliminary report.  
 (1004) **Emilie Dufresne**, Queen's University (1035-13-588)
- 10:00AM *Computation of gradient flows in flag manifolds.*  
 (1005) **Ralph Bremigan**, Ball State University (1035-22-867)
- 10:30AM *Quotients of finite and affine Weyl groups by maximal parabolic subgroups and applications.* Preliminary report.  
 (1006) **Markus Hunziker\*** and **W. Andrew Pruet**, Baylor University (1035-22-1465)

**AMS Special Session on Financial Mathematics, I**

8:00 AM – 10:55 AM

Organizers: **Jean-Pierre Fouque**, University of California Santa Barbara  
**Kay Giesecke**, Stanford University  
**Ronnie Sircar**, Princeton University  
**Knut Solna**, University of California Irvine

- 8:00AM *Extracting and Using Credit Information in Hybrid Models.*  
 (1007) **Sanjiv R Das**, Santa Clara University (1035-91-466)
- 9:00AM *Two-Dimensional Markovian Model for Dynamics of Aggregate Credit Loss.*  
 (1008) **Andrei Lopatin\***, NumeriX LLC, and **Timur Misirpashaev**, Merrill Lynch (1035-60-566)
- 9:30AM *Multiname and Multiscale Default Modeling.*  
 ▶ (1009) Preliminary report.  
**Knut Solna**, University of California at Irvine (1035-60-1315)
- 10:00AM *Calibration of portfolio credit risk models: Solution of an inverse problem via intensity control.* Preliminary report.  
 (1010) **Rama Cont\***, Columbia University, and **Andreea Minca**, Ecole Polytechnique (1035-60-535)
- 10:30AM *Default Correlation, Cluster Dynamics and Single Names: The GPCL Dynamical Loss Model.*  
 (1011) **Damiano Brigo**, Q-SCI, Derivativefitch, Fitch Ratings QFR, London (1035-60-567)

**AMS Special Session on Secant Varieties and Related Topics, I**

8:00 AM – 10:50 AM

Organizers: **Christopher S. Peterson**, Colorado State University  
**Hirotschi Abo**, University of Idaho  
**Anthony V. Geramita**, Queen's University and University of Genoa

- 8:00AM *Secant varieties of Grassmann and Segre varieties.*  
 (1012) **Giorgio Ottaviani**, Università di Firenze, Italy (1035-14-607)

- 9:00AM *Secant varieties and polynomial interpolation.*  
(1013) **Maria Chiara Brambilla**, University of Florence (Italy) (1035-14-1510)
- 9:30AM *The Fibers of a General Projection.*  
(1014) **David Eisenbud\***, University of California, Berkeley, and **Roya Beheshti-Zavareh**, Washington University, St. Louis (1035-14-1498)
- 10:30AM *Secant varieties and optimal low-rank approximations of tensors.*  
(1015) **Vin de Silva\***, Pomona College, and **Lek-Heng Lim**, University of California, Berkeley (1035-14-1942)

- 10:00AM *A new approach to the discrete log problem on an elliptic curve.*  
(1026) **Samuel Maurycy Kadziela**, University of California at Irvine (1035-11-448)
- 10:30AM *Explicit Formulas for Real Hyperelliptic Curves of Genus 2.*  
(1027) **Stefan Erickson\***, Colorado College, **Michael J. Jacobson, Jr.**, University of Calgary, **Ning Shang**, **Shuo Shen**, Purdue University, and **Andreas Stein**, University of Wyoming (1035-11-669)

**AMS Special Session on Wavelet Sets and Tilings of  $R^n$ , I**

8:00 AM – 10:50 AM

Organizers: **Kathy D. Merrill**, Colorado College  
**Lawrence W. Baggett**, University of Colorado, Boulder  
**Judith A. Packer**, University of Colorado, Boulder

- 8:00AM *A Characterization Of Two and Three Interval Wavelet Sets.*  
▶ (1016) **Kenneth R. Hoover**, California State University, Stanislaus (1035-42-1838)
- 8:30AM *Construction and reconstruction of tight framelets and wavelets via matrix mask functions.*  
(1017) **Marcin Bownik\***, University of Oregon, and **Ziemowit Rzeszotnik**, University of Wroclaw, Poland (1035-42-424)
- 9:00AM *Simple smooth wavelet frames approximating Parseval frames.* Preliminary report.  
(1018) **John J. Benedetto\***, Norbert Wiener Center, University of Maryland, College Park, and **Emily J. King**, University of Maryland, College Park (1035-42-655)
- 9:30AM  *$\beta$ -Expansion and the Golden Ratio Encoder.*  
▶ (1019) **Yang Wang**, Michigan State University (1035-41-1797)
- 10:00AM *Wavelet sets that are finite unions of convex sets.*  
(1020) **Kathy D. Merrill**, Colorado College (1035-42-1288)
- 10:30AM *Basic Ternary Digit Sets and Associated Tilings.*  
(1021) **Jeffrey C Lagarias**, University of Michigan (1035-11-1377)

**AMS Special Session on Low Genus Curves and Applications, II**

8:00 AM – 10:50 AM

Organizers: **Kristin E. Lauter**, Microsoft Research  
**Peter Stevenhagen**, Leiden University

- 8:00AM *An Efficient Time-Bound Hierarchical Key Management Scheme for Secure Broadcasting.*  
▶ (1022) **Ning Shang\***, **Elisa Bertino** and **Samuel S. Wagstaff**, Purdue University (1035-11-1146)
- 8:30AM *Combinatorics of Elliptic Curves and Chip-Firing Games.*  
(1023) **Gregg Musiker**, Massachusetts Institute of Technology (1035-05-154)
- 9:00AM *Tate-Lichtenbaum Self Pairings and Residuosity.* Preliminary report.  
(1024) **Susan L. Schmoyer**, U.S. Military Academy (1035-11-1317)
- 9:30AM *A Weil pairing on the  $p$ -torsion of ordinary elliptic curves over  $K[\epsilon]$ .*  
(1025) **Juliana V. Belding**, University of Maryland, College Park (1035-11-118)

**AMS Special Session on Algebraic Dynamics, I**

8:00 AM – 10:50 AM

Organizers: **Diana M. Thomas**, Montclair State University  
**Lennard F. Bakker**, Brigham Young University  
**Donald Mills**, Rose-Hulman Institute of Technology

- 8:00AM *Shift Dynamics on Partitions.* Preliminary report.  
▶ (1028) **Brian Hopkins**, Saint Peter's College (1035-05-731)
- 8:30AM *Spatzier's Conjecture and Generalized Symmetries.* Preliminary report.  
(1029) **Lennard F Bakker**, Brigham Young University (1035-37-1472)
- 9:00AM *Ducci Sequences in Higher Dimensions.*  
▶ (1030) **Florian Breuer**, Stellenbosch University, South Africa (1035-11-388)
- 9:30AM *Module Shifts and Measure Rigidity in Linear Cellular Automata.*  
(1031) **Marcus J. Pivato**, Trent University (1035-37-739)
- 10:00AM *Integer Points in Backwards Orbits.*  
(1032) **Vijay Sookdeo**, University of Rochester (1035-11-1479)
- 10:30AM *Permutations for in-place matrix transpose.*  
▶ (1033) **Jeff Hooper** and **Franklin Mendivil\***, Math Dept, Acadia University (1035-11-299)

**AMS Special Session on Biomathematical Modeling, I**

8:00 AM – 11:00 AM

Organizers: **Olcay Akman**, Illinois State University  
**Timothy D. Comar**, Benedictine University

- 8:00AM *Population dynamics and differential equations with discontinuities.*  
(1034) **Marat Akhmet**, Middle East Technical University (1035-92-706)
- 8:30AM *A Computational Algebra Method for Biochemical Network Modeling.* Preliminary report.  
▶ (1035) **Elena S Dimitrova\***, Clemson University, **Reinhard Laubenbacher** and **Abdul Salam Jarrah**, Virginia Bioinformatics Institute (1035-92-554)
- 9:00AM *A Mathematical Model of the Drosophila Heart.*  
▶ (1036) **Genevieve Y. Toutain\***, Arizona State University, **Pamela Reitsma**, University of Maine, and **Sharon Crook**, Arizona State University (1035-92-400)
- 9:30AM *Haematopoietic modelling with stage-structure and variable lifespan.*  
(1037) **Jacques Belair**, Universite de Montreal (1035-92-1875)
- 10:00AM *Detection of Optimal Protein Structures in Homology Modeling Using Various Sequence Fitness Scores.* Preliminary report.  
▶ (1038) **Keith A. Erickson**, United States Military Academy (1035-92-1749)

## Program of the Sessions – Tuesday, January 8 (cont'd.)

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- 10:30AM *A Mathematical Model of Cholesterol Metabolism.*  
▶ (1039) Preliminary report.  
**Saziye Bayram\***, **Joaquin Carbonara**, SUNY-Buffalo State College, and **Mitra S. Feizabadi**, Canisius College (1035-92-1740)

### AMS Special Session on Dynamics and Stability of Coherent Structures, I

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8:00 AM – 10:50 AM

Organizers: **Ricardo Carretero**, San Diego State University  
**Jennifer M. Gorsky**, University of San Diego

- 8:00AM *Recent Results on Stability of Traveling Waves in Nonlinear, Dispersive Media.* Preliminary report.  
(1040) **Jerry L. Bona**, University of Illinois at Chicago (1035-35-57)
- 8:30AM *Dynamics of ultraviolet light filament and vortex propagation in the atmosphere.*  
(1041) **Alejandro B. Aceves\***, **Alexey Sukhinin**, University of New Mexico, and **Jean-Claude Diels**, Department of Physics and Astronomy, U. of New Mexico (1035-78-2016)
- 9:00AM *The pole dynamics of rational solutions of the viscous Burgers equation.*  
(1042) **Bernard Deconinck**, University of Washington (1035-70-463)
- 9:30AM *Azimuthal Modulation Stability for Vortices in the Focusing Nonlinear Schroedinger Equation.*  
(1043) **Ronald Meyer Caplan\***, Computational Science Research Center, San Diego State University, **Ricardo Carretero**, Nonlinear Dynamical Systems Group, San Diego State University, **Enam Hoq**, Western New England College, and **Panayotis G. Kevrekidis**, University of Massachusetts (1035-37-1803)
- 10:00AM *The piston dispersive shock wave problem.*  
(1044) **Mark Hoefer**, National Institute of Standards and Technology, Boulder, CO (1035-35-738)
- 10:30AM *Detection of Ocean Bathymetry from Surface Wave Measurements.*  
(1045) **David P. Nicholls\*** and **Mark Taber**, University of Illinois at Chicago (1035-76-842)

### AMS Special Session on Graph Theory, III

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8:00 AM – 10:50 AM

Organizers: **Andre Kundgen**, California State University, San Marcos  
**K. Brooks Reid**, California State University, San Marcos

- 8:00AM *Saturation Numbers of Books.*  
(1046) **Guantao Chen**, Georgia State University, **Ralph J. Faudree\***, University of Memphis, and **Ron J. Gould**, Emory University (1035-05-480)
- 8:30AM *Properly colored cycles and rainbow cycles in edge-colored graphs.* Preliminary report.  
(1047) **Tao Jiang**, Miami University (1035-05-1445)
- 9:00AM *Rainbow decompositions.*  
(1048) **Raphael Yuster**, University of Haifa (1035-05-405)
- 9:30AM *On transversal problems.*  
(1049) **Penny Haxell**, University of Waterloo (1035-05-1496)
- 10:00AM *Induced-universal graphs for graphs with bounded degree.*  
(1050) **Steve Butler**, UC San Diego (1035-05-479)

- 10:30AM *Large families of subsets avoiding a given configuration.* Preliminary report.  
▶ (1051) **Jerrold R. Griggs**, University of South Carolina (1035-05-879)

### AMS Session on Probability, Statistics, and Applications, I

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8:00 AM – 10:55 AM

- 8:00AM *Standardized conditional expectation and its applications in finance.* Preliminary report.  
(1052) **Radoslav Dimitric**, DBRI, Pittsburgh (1035-60-85)
- 8:15AM *Quest for the constant in the expected length of longest common subsequences.* Preliminary report.  
▶ (1053) **Ilna Yershov**, City College of New York (1035-60-577)
- 8:30AM *Variations on the Ménage Problem I.* Preliminary report.  
▶ (1054) **Eduardo Espinola\***, University of Texas El Paso, **Paige Shy**, University of North Carolina at Asheville, and **Megan Watson**, University of Texas Austin (1035-60-581)
- 8:45AM *Variations on the Ménage Problem II.* Preliminary report.  
▶ (1055) **Megan Watson\***, University of Texas, Austin, **Eduardo Espinola**, University of Texas, El Paso, and **Paige Shy**, University of North Carolina at Asheville (1035-60-586)
- 9:00AM *How close are pairwise and mutual independence?*  
▶ (1056) Preliminary report.  
**Roger B. Nelsen**, Lewis & Clark College (1035-60-589)
- 9:15AM *Biased monotonic random walks in the plane.*  
▶ (1057) Preliminary report.  
**Mohammad Javaheri**, University of Oregon (1035-60-644)
- 9:30AM *Tail Dependence of Multivariate Distributions.*  
(1058) **Yannan Sun**, Washington State University (1035-60-652)
- 9:45AM *Probability of ruin with dependent marginal mortality distribution.* Preliminary report.  
▶ (1059) **Guangwei Fan**, Maryville University (1035-60-850)
- 10:00AM *Backward Stochastic Differential Equations with Jumps and Quadratic Growth.*  
(1060) **Jin Ma**, University of Southern California, and **Meike Niederhausen\***, University of Portland (1035-60-1650)
- 10:15AM *Expected Length of Random Minimum Spanning tree.* Preliminary report.  
(1061) **Wenbo Li** and **Xinyi Zhang\***, University of Delaware (1035-60-1684)
- 10:30AM *Checking the Censored Two-Sample Accelerated Life Model using Integrated Cumulative Hazard Difference.*  
(1062) **Seung-Hwan Lee**, Illinois Wesleyan University (1035-62-904)
- 10:45AM *Toward Quandle Dichotomy.* Preliminary report.  
(1063) **Robert W McGrail**, **Mona B Merling\*** and **Japheth Wood**, Bard College (1035-68-686)

### AMS Session on Applications of Mathematics, III

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8:00 AM – 10:55 AM

- 8:00AM *Reduction and reconstruction aspects of Lagrangian systems with symmetry.*  
(1064) **Tom Mestdag**, University of Michigan (1035-70-1260)

- 8:15AM *The Planar, Circular, Restricted Four-Body Problem.*  
 ▶ (1065) Preliminary report.  
**Gareth E Roberts\***, **Julianne Kulevich** and **Christopher J. Smith**, College of the Holy Cross (1035-70-1701)
- 8:30AM *Applications of reduction in the separation of overall rotation and internal motion in the Hamiltonian dynamics of a three-body system.*  
 (1066) Preliminary report.  
**F. J. Lin**, University of Southern California (1035-70-1776)
- 8:45AM *A Finite Difference Calculation Procedure for the Navier-Stokes Equation on a Staggered Cartesian Grid.*  
 ▶ (1067) **Bashar Zogheib\***, Nova Southeastern University, and **R. M. Barron**, University of Windsor (1035-76-649)
- 9:00AM *On the stability of KdV equation with negative forcing.*  
 (1068) **Jeongwhan Choi\***, Korea University, and **Sungim Whang**, NIMS (1035-76-941)
- 9:15AM *Particle capture by a freezing front in a binary alloy.* Preliminary report.  
 (1069) **Justin C.T. Kao\***, **Alexander A. Golovin** and **Stephen H. Davis**, Engineering Sciences and Applied Mathematics / Northwestern University (1035-76-1049)
- 9:30AM *Granular flow on erodible surface.* Preliminary report.  
 ▶ (1070) **Long H Le**, University of Central Arkansas (1035-76-1122)
- 9:45AM *Implicit Interfacing in a  $C^k$  Least Squares Finite Element Method for a Fluid Structure Interaction Problem.*  
 (1071) **Wayne M. McGee\***, Texas Tech University, and **Padmanabhan Seshaiyer**, George Mason University (1035-76-1937)
- 10:00AM *Shape analysis of droplets on patterned surfaces.*  
 ▶ (1072) **Yousef Daneshbod**, University of La Verne (1035-76-1391)
- 10:15AM *Polytopes and Arrangements: Diameter and Curvature.*  
 (1073) **Yuriy Zinchenko\***, **Antoine Deza** and **Tamas Terlaky**, CAS, McMaster University (1035-90-336)
- 10:30AM *Ensemble Based Simulated Annealing as Applied to Conformal Radiotherapy Planning.* Preliminary report.  
 ▶ (1074) **Abebaw Tadesse**, Langston University (1035-90-358)
- 10:45AM *Robustness in Nonlinear Parameter Estimation with Interval Arithmetic.*  
 (1075) **Humberto Munoz\***, Southern University at Baton Rouge, and **Baker R. Kearfott**, University of Louisiana at Lafayette (1035-90-1483)
- 8:15AM *Diversifying a Math Graduate Program at a Large Public University.* Preliminary report.  
 ▶ (1077) **James P. Lin**, University of California at San Diego (1035-C1-521)
- 8:30AM *Building Diversity in Advanced Mathematics: The North Carolina State University Model.*  
 ▶ (1078) **Aloysius G. Helminck\*** and **Steve Campbell**, North Carolina State University (1035-C1-495)
- 8:45AM *Professional Socialization as a tool to Recruit and Retain Women in Graduate Mathematics.*  
 ▶ (1079) Preliminary report.  
**Orpha K. Ongiti**, University at Albany (1035-C1-1204)
- 9:00AM *The Women's Education Equity Act: Increasing the Representation of Women in Advanced Mathematics.*  
 ▶ (1080) **Patricia Hale**, California State Polytechnic University, Pomona (1035-C1-1754)
- 9:15AM *A Model of Academic Choice for Mathematically Talented College Women.*  
 ▶ (1081) **Judith Lynn Gieger**, Oglethorpe University (1035-C1-253)
- 9:30AM *The Infinite Possibilities Conference: Creating Opportunities for Connectedness and Success for Underrepresented Minority Women in the Mathematical Sciences.* Preliminary report.  
 ▶ (1082) **Kimberly S. Weems\***, North Carolina State University, **Tanya A. Moore**, City of Berkeley, Division of Public Health, and **Leona A. Harris**, The College of New Jersey (1035-C1-1397)
- 9:45AM *Evaluation of a Program to Help Minorities Succeed at College Math: U. C. Berkeley's Professional Development Program.*  
 (1083) **Steven Chin\***, University of California at Berkeley - Professional Development Program, **Jeffrey Perloff**, **Maoyong Fan**, University of California at Berkeley, and **Guido Imbens**, Harvard University (1035-C1-1784)
- 10:00AM *African Americans and STEM: An Examination of One Intervention Program.*  
 ▶ (1084) **Deborah L. Gochenaur**, Elizabethtown College (1035-C1-1448)
- 10:15AM *Montgomery College: Project Portal to Success in Engineering.* Preliminary report.  
 ▶ (1085) **Miriam Carter**, **Sanjay Rai** and **Zine Boudhraa\***, Montgomery College, Rockville (1035-C1-409)
- 10:30AM *The MESA model: Math, Engineering, and Science Achievement in California.*  
 ▶ (1086) **Alyson L. Ponomarenko**, San Diego City College (1035-C1-68)

**MAA Session on Countering "I Can't Do Math": Strategies for Teaching Under-Prepared Math-Anxious Students Interested in Business and the Sciences**

**MAA Session on Building Diversity in Advanced Mathematics: Models that Work**

8:00 AM – 10:40 AM

Organizers: **Abbe H. Herzig**, University at Albany, SUNY

**Patricia L. Hale**, California State Polytechnic University, Pomona

8:00AM *Diversity in Graduate Education: Learning by Example.*  
 ▶ (1076)

**Abbe H. Herzig\***, University at Albany, State University of New York, **Amy Cohen**, Rutgers University, and **David Manderscheid**, University of Nebraska-Lincoln (1035-C1-1217)

8:00 AM – 10:55 AM

Organizers: **Kimberly J. Presser**, Shippensburg University  
**J. Winston Crawley**, Shippensburg University

8:00AM *The Math Inquiry Course: A Gentle Introduction to Sophisticated Mathematical Thinking.*  
 ▶ (1087) **Andrew B. Perry**, Springfield College (1035-E1-1907)

8:20AM *Using Reading Questions in Trigonometry and Calculus.* Preliminary report.  
 ▶ (1088) **Dianne S. Marquart**, National Park Community College, Hot Springs, AR (1035-E1-1843)

## Program of the Sessions – Tuesday, January 8 (cont'd.)

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- 8:40AM *Precalculus with Review for Math-Intensive Majors.*  
▶ (1089) Preliminary report.  
**Annela R Kelly**, Roger Williams University (1035-E1-1644)
- 9:00AM *"I can't do math"—What Helps Some Students Overcome the Attitude?*  
▶ (1090) **Jean M Horn\***, Northern Virginia Community College - Woodbridge Campus, and **Toni T Robertson**, NVCC-Woodbridge (1035-E1-319)
- 9:20AM *Dealing with Anxiety and Attitudes Towards Mathematics in an Algebra Classroom.*  
▶ (1091) **Laura Schmidt**, University of Wisconsin-Stout (1035-E1-370)
- 9:40AM *Successful use of software in college developmental classes: Now being used in our high schools!*  
▶ (1092) **Sue R. Beck**, Morehead State University (1035-E1-439)
- 10:00AM *Coping With Mathematics Anxiety in College: An Analysis of Successful Strategies for Precalculus.*  
▶ (1093) **Fred Peskoff\*** and **Leonid Khazanov**, Borough of Manhattan Community College/CUNY (1035-E1-1166)
- 10:20AM *How to shift a math-anxious student into a "can do" place using language patterns and belief changing strategies.*  
▶ (1094) **Wendiann R Sethi**, Seton Hall University (1035-E1-1756)
- 10:40AM *Individualized Remedial Prescriptions for Mathematically Underprepared Students via ALEKS.*  
(1095) **Ken W Lee**, Missouri Western State University (1035-E1-1522)

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

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8:00 AM – 10:55 AM

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

- 8:00AM *More Linear Algebra for All.*  
▶ (1096) **C. L. Greeno**, MAEI Mathematics Institute (1035-M1-244)
- 8:20AM *Developing Reading Comprehension in an Introductory Linear Algebra Course.* Preliminary report.  
▶ (1097) **J. Alfredo Jimenez**, Penn State Hazleton (1035-M1-1477)
- 8:40AM *Using WeBWorK in linear algebra labs.*  
(1098) **Karen Clark\*** and **Thomas Hagedorn**, The College of New Jersey (1035-M1-724)
- 9:00AM *Classroom Voting in Linear Algebra.*  
(1099) **Holly Zullo\***, **Kelly Cline** and **Mark Parker**, Carroll College (1035-M1-747)
- 9:20AM *Connecting Linear Algebra to the Real World through Group Presentations.*  
▶ (1100) **Elaine T. Hale**, Rice University (1035-M1-1322)
- 9:40AM *More Quantum Mechanics and Linear Algebra: The Neutrinos and Other Subatomic Particles.*  
▶ (1101) **Itai Seggev**, Knox College (1035-M1-1624)
- 10:00AM *Biological Applications Illustrating Linear Algebra Concepts.*  
▶ (1102) **D. Brian Walton**, James Madison University (1035-M1-1591)
- 10:20AM *Singular Value Decomposition and Digital Image Processing.*  
(1103) **Mohamed Allali**, Chapman University (1035-M1-1342)

- 10:40AM *A Remote Sensing Demo Using ENVI.*  
▶ (1104) **Elyn Rykken\*** and **Linda McGuire**, Muhlenberg College (1035-M1-1270)

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

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8:00 AM – 10:45 AM

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

- 8:00AM Opening remarks and BIG SIGMAA announcements.
- 8:10AM *Set Partitions of a Union.* Preliminary report.  
▶ (1105) **R. Peter DeLong**, Math C2 Inc (1035-O1-1765)
- 8:30AM *Using mathematics to improve the automated scoring of short constructed-response answers.* Preliminary report.  
▶ (1106) **James H Fife**, Educational Testing Service (1035-O1-1730)
- 8:50AM *Binary Code Imbalance and DC Bias Rejection for a Simple Hard-Limited Radar Detection Chain.*  
(1107) **Gregory Emmett Coxson**, Technology Service Corporation (1035-O1-1933)
- 9:10AM *Billiards and signal processing.*  
▶ (1108) **David S Mazel** and **Greg E Coxson\***, Technology Service Corporation (1035-O1-1991)
- 9:30AM *What I did on my sabbatical: Experiencing the "real world".*  
(1109) **Mark A Mills**, Central College (1035-O1-183)
- 9:50AM *Longer Hamming Codes Are Better Over BPSK Channels.* Preliminary report.  
▶ (1110) **Peter M. Jarvis**, Castle Rock, CO (1035-O1-1723)
- 10:10AM *Problems and Solutions in Efficient, Accurate Computation of the Airy Functions in the Complex Plane.* Preliminary report.  
(1111) **James K Beard**, Medford NJ (1035-O1-1238)
- 10:30AM *Differential Hierarchical Game Between Manufacturer and Retailer.*  
(1112) **Ellina Grigorieva\***, Texas Woman's University, and **Evgenii Khailov**, Moscow State Lomonosov University (1035-O1-365)

### MAA General Contributed Paper Session, V

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8:00 AM – 10:55 AM

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

Moderators: **Nissa Yestness**, University of Northern Colorado

**Kristi Jarman**, Eastern New Mexico University

**Mahmoud Yousef**, University of Central Missouri

- 8:00AM *Using the Math Fair to Connect Mathematics Curricula and Teaching Experience.*  
(1113) **Mary D Beisiegel**, University of Alberta (1035-Z1-551)
- 8:15AM *A Bridge to Higher Mathematics for Science and Engineering Majors.* Preliminary report.  
▶ (1114) **Ralph W Carr**, St. Cloud State University (1035-Z1-140)
- 8:30AM *A Minimax Entropy Principle Arising in the Treatment of Certain Multivariate Ill-Posed Problems.*  
(1115) **Fred Samuel Greensite**, University of California, Irvine (1035-Z1-300)



- 8:45AM *On a conjecture posed by Bertram Huppert.*  
▶ (1116) **Thomas P Wakefield**, Kent State University (1035-Z1-415)
- 9:00AM *A Computer-Controlled Function Box for Plotting Surfaces.* Preliminary report.  
▶ (1117) **Andrew E Long**, Northern Kentucky University (1035-Z1-848)
- 9:15AM *Functions, how well are they understood?*  
▶ (1118) Preliminary report.  
**Firooz Khosraviyani\***, **Terutake Abe**, **Faridoun Farrokh**, **Juan R. Lira**, Texas A&M International University, and **James J. McCarry**, Laredo Community College (1035-Z1-1541)
- 9:30AM *Mathematical Problems from the Maine Farmer's Almanac.* Preliminary report.  
▶ (1119) **Bruce S. Burdick**, Roger Williams University (1035-Z1-1914)
- 9:45AM *A Means for Updating and Validating Mathematics Programs.*  
(1120) **Laurie A Dunlap**, University of Akron, Akron, Ohio (1035-Z1-1144)
- 10:00AM *Animations Easily Generated and Adapted For Use in Pre-Calculus through Calculus III.*  
▶ (1121) **Brad Bailey**, North Georgia Coll. & State Univ. (1035-Z1-709)
- 10:15AM *Encouraging Critical Thinking With Mathematical Uncertainties.*  
▶ (1122) **Mike Pinter**, Belmont University (1035-Z1-888)
- 10:30AM *Online homework systems and student outcomes: Results of a two-year study.* Preliminary report.  
▶ (1123) **Laurie Lenz**, Marymount University (1035-Z1-846)
- 10:45AM *Biographical podcasts in a history of mathematics course.*  
(1124) **David S Richeson**, Dickinson College (1035-Z1-875)

**SIAM Minisymposium on From Global Predictions to Local Action, III: Working Groups and Round Table Discussion**

8:00 AM – 11:00 AM

*We will summarize the outstanding problems from Monday's sessions and define steps toward the development of integrated economic and climate models.*

Organizers: **Inez Fung**, Berkeley Institute of the Environment, University of California Berkeley  
**Christopher K. Jones**, University of North Carolina  
**Mary Lou Zeeman**, Bowdoin College

**PME Council**

8:00 AM – 11:00 AM

**AMS Session on Numerical Analysis, I**

8:15 AM – 10:40 AM

- 8:15AM *Newton's Method with Fewer Bits.*  
▶ (1125) **Raymond B Moberly**, San Diego State University (1035-65-197)
- 8:30AM *Discretized Picard's Method.*  
▶ (1126) **James H Money**, North Carolina Central University (1035-65-211)

- 8:45AM *Wavelet Collocation Solution to Boundary Integral Equation on a Domain with Corners.* Preliminary report.  
▶ (1127) **Michael Cheng\***, Albany College of Pharmacy, Union University, and **Tzu-chu Lin**, University of Wisconsin-Milwaukee (1035-65-262)
- 9:00AM *An Adaptive Finite Element Method with Lumped Masses for Second Order Hyperbolic Partial Differential Equations in One Space Dimension.* Preliminary report.  
(1128) **M. Ziaul Haque**, Southern Methodist University, Dallas, TX (1035-65-622)
- 9:15AM *A New Wavelet Multigrid Method Applied to the Incompressible Navier-Stokes Problem.* Preliminary report.  
(1129) **Doreen De Leon**, CSU Fresno (1035-65-632)
- 9:30AM *GNUFFT: A Geometric Nonuniform Fast Fourier Transform.*  
(1130) **Ian Sammis\*** and **John Strain**, UC Berkeley (1035-65-1137)
- 9:45AM *Adjoint-based algorithm for optimal control of flow with discontinuities.* Preliminary report.  
(1131) **Wenyuan Liao**, University of Calgary (1035-65-1363)
- 10:00AM *The Discrete Fourier Transform and Fractal Dimension of a Sequence of Hexagonal Arrays for a Multiresolution Digital Earth Model.* Preliminary report.  
(1132) **Xiqiang Zheng**, University of Florida (1035-65-344)
- 10:15AM *Mathematical Modeling and Simulation of Biological Arterial Wall-Flow Interaction.* Preliminary report.  
▶ (1133) **Padmanabhan Seshaiyer\***, George Mason University, **Elizabeth McGinnis**, Monterey High School, **Eugenio Aulisa**, Texas Tech University, and **Kurt Litsch**, Lubbock High School (1035-65-1614)
- 10:30AM *The RBF-QR method on the surface of the sphere and two applications: Stable interpolation and solution of a convective PDE with near-flat radial functions.*  
▶ (1134) **Bengt Fornberg** and **Cecile Piret\***, University of Colorado (1035-65-1488)

**AMS Special Session on Inverse Problems in Geometry, I**

8:30 AM – 10:50 AM

Organizers: **Peter A. Perry**, University of Kentucky  
**Carolyn S. Gordon**, Dartmouth College

- 8:30AM *The broken scattering relation and inverse problems.*  
(1135) **Gunther Uhlmann\***, University of Washington, **Yaroslav Kurylev**, University College London, and **Matti Lassas**, Helsinki University of Technology (1035-53-1244)
- 9:00AM *Partial Wave-traces for Two Classes of Examples of Singular Spaces.*  
(1136) **M. R. Sandoval**, Trinity College, Hartford, Connecticut (1035-58-1234)
- 9:30AM *The wave invariants on Riemannian two-step nilmanifolds.*  
(1137) **Ruth Gornet**, University of Texas at Arlington (1035-58-667)
- 10:00AM *Spectral Asymptotics on Heisenberg Manifolds and Related Problems in Analytic Number Theory.*  
(1138) **Mahta Khosravi**, Johns Hopkins University (1035-58-1962)
- 10:30AM *Spectral problems for orbifolds.*  
(1139) **Emily B. Dryden**, Bucknell University (1035-58-1876)

## Program of the Sessions – Tuesday, January 8 (cont'd.)

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### MAA Invited Address

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9:00 AM – 9:50 AM

- (1140) *The covering congruences of Paul Erdős.*  
**Carl Pomerance**, Dartmouth College (1035-A0-19)

### ASL Invited Address

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9:00 AM – 9:50 AM

- (1141) *Model Theory and algebraic groups.*  
**Gregory L. Cherlin**, Rutgers University  
(1035-03-267)

### MAA Minicourse #12: Part B

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9:00 AM – 11:00 AM

*Developing department self-studies.*  
Organizers: **Donna L. Beers**, Simmons College  
**Richard Alan Gillman**, Valparaiso University

### MAA Minicourse #1: Part B

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9:00 AM – 11:00 AM

*Teaching a Galois theory course for undergraduates.*  
Organizer: **John R. Swallow**, Davidson College

### MAA Minicourse #7: Part B

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9:00 AM – 11:00 AM

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

### MAA Session on Biomathematics in the Undergraduate Curriculum, I

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9:00 AM – 10:55 AM

Organizers: **Timothy D. Comar**, Benedictine University  
**Olcay Akman**, Illinois State University  
**Glenn W. Ledder**, University of Nebraska  
**Lisa G. Townsley**, Benedictine University

- 9:00AM ▶ (1142) *Concepts from Biocalculus: The Spread of a Benevolent Disease.*  
**Eric S Marland**, Appalachian State University (1035-B1-964)
- 9:20AM ▶ (1143) *The 1918 Influenza Pandemic: Mathematics, Biology, and History.*  
**Sheila K. Miller\*** and **Josh Helms**, United States Military Academy (1035-B1-1816)
- 9:40AM ▶ (1144) *Predicting Flu Season Requirements: An Undergraduate Modeling Project.* Preliminary report.  
**G R Kramlich\*** and **J Braunstein**, United States Military Academy (1035-B1-1251)
- 10:00AM ▶ (1145) *Laboratory Projects for a Second Semester of Biocalculus.*  
**Timothy D. Comar**, Benedictine University (1035-B1-634)
- 10:20AM (1146) *A Two-Semester Sequence in Calculus and Modeling.*  
**Laurie J Heyer**, Davidson College (1035-B1-1658)

- 10:40AM ▶ (1147) *Probability and dynamical systems for biology students with minimal calculus background.* Preliminary report.  
**Glenn Ledder**, University of Nebraska-Lincoln (1035-B1-1800)

### AMS Special Presentation

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9:00 AM – 10:55 AM

*Wiki math.*  
Organizer: **William Casselman**, University of British Columbia

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

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9:00 AM – 10:20 AM

*Becoming a teacher of college mathematics: Research on mathematics graduate students' professional development.*  
Organizers: **Kevin E. Charlwood**, Washburn University  
**Larry Chrystal**, University of California Irvine  
**Natasha M. Speer**, Michigan State University  
Panelists: **Jason K. Belnap**, Brigham Young University  
**Shandy Hauk**, University of Northern Colorado  
**David E. Meel**, Bowling Green State University  
**Natasha M. Speer**

### Student Hospitality Center

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9:00 AM – 5:00 PM

### AMS-MAA Grad School Fair

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9:30 AM – 11:00 AM

*Undergrads! Take this opportunity to meet representatives from mathematical sciences graduate programs.*

### Exhibits and Book Sales

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9:30 AM – 5:30 PM

### ASL Invited Address

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10:00 AM – 10:50 AM

- (1148) *Answer Set Programming.*  
**Victor Marek**, University of Kentucky (1035-03-100)

### Math on the Web, III

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10:00 AM – 5:00 PM

- 10:00AM (1149) *Student answers to math homework on the Web using proper mathematical notation: A scalable, universal approach.*  
**John Risley**, WebAssign
- 12:30PM (1150) *One source, two outputs: Using a single LaTeX-like markup to generate both PDF and XHTML+MathML.*  
**William Hammond**, University at Albany, State University of New York

- 1:30PM *Maplets for calculus.*  
(1151) **Doug Meade\***, University of South Carolina, and **Philip Yasskin\***, Texas A&M University
- 2:30PM *Project CALC on the Web.*  
(1152) **Lawrence Moore\*** and **David Smith\***, Duke University
- 3:30PM *The use of MathML and interactive online oracles through Maplesoft's new student help center.*  
(1153) **Tom Lee**, Maplesoft
- 4:30PM *MathType  $\in$  Word  $\cap$  TeX  $\cap$  Wikipedia.*  
(1154) **Robert Miner**, Design Science, Inc.

### AMS Special Presentation

10:00 AM – 10:55 AM

*Who wants to be a mathematician.*

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

### AMS Invited Address

10:05 AM – 10:55 AM

- (1155) *A new mathematical frontier: The social and behavioral sciences.*  
**Donald G. Saari**, University of California Irvine (1035-91-04)

### AMS-MAA Invited Address

11:10 AM – NOON

- (1156) *The mathematics of PageRank.*  
**Fan Chung**, University of California San Diego (1035-05-21)

### AMS Colloquium Lecture: Lecture III

1:00 PM – 2:00 PM

- (1157) *Random conformally invariant pictures (Part III).*  
**Wendelin Werner**, University of Paris-Sud (1035-00-11)

### ASL Invited Address

1:00 PM – 1:50 PM

- (1158) *Proof complexity after  $NP \neq coNP$ .*  
**Pavel R. Hrubes**, Czech Academy of Sciences (1035-03-102)

### MAA Lecture for Students

1:00 PM – 1:50 PM

- (1159) *The Riemann Hypothesis.*  
**J. Brian Conrey**, The American Institute of Mathematics (1035-A0-39)

### AMS Current Events Bulletin

1:00 PM – 4:45 PM

Organizer: **David Eisenbud**, University of California Berkeley

- 1:00PM *Invisibility.*  
(1160) **Günther Uhlmann\***, University of Washington, **Allan Greenleaf**, University of Rochester, **Yaroslav Kurylev**, University College London, and **Matti Lassas**, Helsinki University of Technology (1035-35-1241)

- 2:00PM *Birational Geometry: Old and New.*  
► (1161) **Antonella Grassi**, University of Pennsylvania (1035-14-1565)
- 3:00PM *Conformal Invariance and 2-d Statistical Physics.*  
(1162) **Gregory F. Lawler**, University of Chicago (1035-60-1518)
- 4:00PM *Why are solitons stable?*  
(1163) **Terence C Tao**, UCLA (1035-35-559)

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

1:00 PM – 5:50 PM

Organizers: **Darren A. Narayan**, Rochester Institute of Technology  
**Bernard Brooks**, Rochester Institute of Technology  
**Jacqueline A. Jensen**, Sam Houston State University  
**Vadim Ponomarenko**, San Diego State University  
**Tamas Wiandt**, Rochester Institute of Technology

- 1:00PM *Shifts of Generators and Delta Sets of Numerical Monoids.*  
► (1164) **Tyler Lemberg\***, University of Nebraska-Lincoln, **Christina Zlogar**, Cornell University, **Andrew Niles**, University of Rochester, **Nathan Kaplan**, Princeton University, and **Scott Chapman**, Trinity University (1035-20-150)
- 1:30PM *An Algebraic Approach to Characterizing Graph Invariants, with an Emphasis towards Computation.*  
► (1165) Preliminary report.  
**Elliot Andrew Paquette**, Kalamazoo College (1035-05-380)
- 2:00PM *The Lie Symmetry Groups of Minimal Surfaces.*  
► (1166) **Evelyn Leigh Crofts\***, UC Berkeley, and **Darren Ong**, Texas Christian University (1035-22-704)
- 2:30PM *Pricing the Asian Call Option.*  
► (1167) **Harrison Potter\***, Marietta College, **Brigham Young University REU**, **Vinh Xuan Dang**, Brigham Young University, **Brigham Young University REU**, **Scott Glasgow**, Brigham Young University, and **Stephen Taylor**, Brigham Young University, SUNY Stony Brook (1035-60-637)
- 3:00PM *Analytical connections between nonlinear coupled oscillator models.*  
► (1168) **Rytis Umbrasas**, Lafayette College (1035-34-630)
- 3:30PM *A Buckling Problem for Graphene Sheets.*  
► (1169) **J. Gallagher**, Rochester Institute of Technology, **Y. Milman**, City University of New York, **S. Ryan\***, **D. Golovaty**, **J. P. Wilber** and **A. Buldum**, The University of Akron (1035-74-612)
- 4:00PM *Self-intersection properties of generalized Koch curves.* Preliminary report.  
► (1170) **Michael Cantrell\***, Yale University, and **Robert Price\***, Rider University (1035-51-552)
- 4:30PM *Classification of Subgroups of a Matrix Group of Prime Power Order.* Preliminary report.  
► (1171) **Natalie J. Bowlus\***, Swarthmore College, and **Alex Halperin\***, Rochester University (1035-20-440)
- 5:00PM *Lost on a Torus.*  
(1172) **Marc Allen Pereira\*** and **Mark Andrew Tokarz**, Westfield State College (1035-54-1558)
- 5:30PM *Flat cyclotomic polynomials.*  
(1173) **Nathan Kaplan**, Princeton University (1035-11-2058)

**AMS-MAA Special Session on History of Mathematics, II**

1:00 PM – 5:50 PM

Organizers: **Joseph W. Dauben**, Lehman College, CUNY  
**Patti Hunter**, Westmont College  
**Victor J. Katz**, University of District of Columbia  
**Karen H. Parshall**, University of Virginia

- ▶ 1:00PM (1174) *The early history of  $F = ma$ : approaches to central force motion at the beginning of the eighteenth century.*  
**Niccoló Guicciardini**, Università di Bergamo (Italy) (1035-01-334)
- 1:30PM (1175) *Richard Dedekind (1831–1916): A path-breaking mathematician.*  
**Israel Kleiner**, York University (1035-01-374)
- 2:00PM (1176) *Publishing Research: Specialized Mathematical Journals in Italy (1850-1914).*  
**Laura Martini**, Siena, Italy (1035-01-347)
- ▶ 2:30PM (1177) *Lord Kelvin—the Irish connection.*  
**Raymond G. Flood**, Kellogg College, Oxford University (1035-01-391)
- ▶ 3:00PM (1178) *Formulas, concepts, and the “Jacobi limit”: Observations on change in late-nineteenth-century mathematics.* Preliminary report.  
**Tom Archibald**, Simon Fraser University (1035-01-221)
- 3:30PM (1179) *Jacques Hadamard (1865-1963) and the Calculus of Variations.* Preliminary report.  
**Craig G. Fraser**, University of Toronto (1035-01-592)
- ▶ 4:00PM (1180) *How influential was mechanics in the development of neo-classical economics?*  
**Ivor Grattan-Guinness**, Middlesex University, UK (1035-03-318)
- ▶ 4:30PM (1181) *“Anti-aircraft guns all day long”: Computing for the Ministry of Munitions.*  
**June E Barrow-Green**, The Open University, Milton Keynes, UK (1035-01-279)
- ▶ 5:00PM (1182) *L.S. Pontrjagin’s letters to I.I. Gordon.* Preliminary report.  
**Evgeny I Gordon**, Eastern Illinois University (1035-01-278)
- 5:30PM (1183) *Mathematicians fleeing from Hitler’s Germany.*  
**Reinhard Siegmund-Schultze**, University of Agder, Kristiansand (Norway) (1035-01-332)

**AMS Special Session on Financial Mathematics, II**

1:00 PM – 5:55 PM

Organizers: **Jean-Pierre Fouque**, University of California Santa Barbara  
**Kay Giesecke**, Stanford University  
**Ronnie Sircar**, Princeton University  
**Knut Solna**, University of California Irvine

- 1:00PM (1184) *Toric models for correlated defaults.* Preliminary report.  
**Xin Guo\***, **Onur Filiz**, **Jason Morton** and **Bernd Sturmfels**, UC Berkeley (1035-60-1554)

- 1:30PM (1185) *Modeling dependence between stochastic processes with applications to finance.*  
**Tomasz R Bielecki\***, Illinois Institute of Technology, **Jacek Jakubowski**, Warsaw University, **Andrea Vidozzi** and **Luca Vidozzi**, Illinois Institute of Technology (1035-60-1365)
- 2:00PM (1186) *Local Volatility Stochastic Dynamics as a Building Block for Equity Market Models.*  
**Rene A Carmona**, Princeton University (1035-60-308)
- ▶ 3:00PM (1187) *Geometries and Smile Asymptotics for a Class of Stochastic Volatility Models.* Preliminary report.  
**Alan L. Lewis**, optioncity.net (1035-60-203)
- 3:30PM (1188) *Multiscale Stochastic Volatility Diffusion Models.*  
**Jean-Pierre Fouque**, U.C. Santa Barbara, **George Papanicolaou**, Stanford University, **Ronnie Sircar\***, Princeton University, and **Knut Solna**, U.C. Irvine (1035-91-1368)
- ▶ 4:00PM (1189) *Developments in Volatility Derivatives Pricing.*  
**Jim Gatheral**, Merrill Lynch, NY and Courant Institute of Mathematical Sciences, NYU (1035-91-356)
- 5:00PM (1190) *Hedging Variance Options on Continuous Semimartingales.*  
**Roger Lee**, University of Chicago (1035-60-297)
- 5:30PM (1191) *On the Finite Time Horizon American Put Option for Jump Diffusions: A Smoothness Proof and an Exponentially Fast Algorithm.*  
**Erhan Bayraktar**, University of Michigan (1035-60-252)

**AMS Special Session on Representation Theory and Nonassociative Algebras**

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 (1192) *Nonassociative algebra structures on representations of Lie algebras.* Preliminary report.  
**Andrew Douglas**, New York City College of Technology (CUNY) (1035-17-1387)
- 1:30PM (1193) *Fine gradings on  $e_6$ .*  
**Cristina Draper\***, **Cándido Martín** and **Antonio Viruel**, Universidad de Málaga (1035-17-855)
- 2:00PM (1194) *Free split-null extensions of Lie triple systems.*  
**Nora C. Hopkins**, Indiana State University (1035-17-1083)
- 2:30PM (1195) *Weyl modules for hyper loop algebras.*  
**Dijana Jakelic\***, University of Illinois at Chicago, and **Adriano A. Moura**, University of Campinas (1035-17-1052)
- 3:00PM (1196) *Leibniz algebras and their coquecigrues.*  
**Michael K Kinyon**, University of Denver (1035-17-1599)
- 3:30PM (1197) *Finite-Dimensional Representations of Hyper Loop Algebras Over Non-Algebraically Closed Fields.*  
**Dijana Jakelic**, University of Illinois at Chicago (UIC), and **Adriano Moura\***, University of Campinas (UNICAMP) (1035-20-1018)
- 4:00PM (1198) *Nonassociative bialgebras and loops.*  
**Jacob Mostovoy**, Instituto de Matemáticas (Unidad Cuernavaca), Universidad Nacional Autónoma de México, and **José M. Pérez-Izquierdo\***, Universidad de La Rioja (1035-17-1188)

- 4:30PM *Pro-finite  $p$ -adic Lie algebras.*  
(1199) **David M Riley**, The University of Western Ontario (1035-17-1208)
- 5:00PM *Finite Semifields: Theory and Computational Methods.*  
▶ (1200) **Ignacio Fernandez Rua**, Universidad de Oviedo (1035-17-885)
- 5:30PM *The isomorphism problem for restricted enveloping algebras.*  
(1201) **Hamid Usefi**, University of British Columbia (1035-17-759)

**AMS Special Session on Secant Varieties and Related Topics, II**

1:00 PM – 5:50 PM

Organizers: **Christopher S. Peterson**, Colorado State University  
**Hirotschi Abo**, University of Idaho  
**Anthony V. Geramita**, Queen's University and University of Genoa

- 1:00PM *Secant varieties and ideals.*  
▶ (1202) **Luca Chiantini**, Universita' di Siena, Italy (1035-14-1184)
- 2:00PM *Hilbert functions of fat points in  $P^2$  whose support is a pseudo-linear configuration.*  
(1203) **Susan Cooper**, California Polytechnic State University, **Brian Harbourne\***, University of Nebraska-Lincoln, and **Zach Teitler**, Texas A&M University (1035-14-1113)
- 2:30PM *Comparing Powers and Symbolic Powers of Ideals.*  
(1204) **Cristiano Bocci\***, ITIS A. Avogadro, Abbadia S.S., Italy, and **Brian Harbourne**, University of Nebraska at Lincoln (1035-14-654)
- 3:00PM *Regularity and normality of secant varieties.*  
(1205) **Peter Vermeire**, Central Michigan University (1035-14-275)
- 3:30PM *Multisecants of surfaces in projective fourspace.*  
(1206) **Kristian Ranestad**, University of Oslo (1035-14-1089)
- 4:30PM *Rational normal curves in projective space.*  
(1207) **Enrico Carlini\***, Politecnico di Torino, Turin, Italy, and **Maria Virginia Catalisano**, University of Genoa (1035-14-1021)
- 5:00PM *Secant varieties and statistical models.*  
(1208) **Elizabeth S. Allman\*** and **John A. Rhodes**, University of Alaska Fairbanks (1035-60-1182)
- 5:30PM *Algebraic factor analysis.*  
(1209) **Mathias Drton**, University of Chicago, **Bernd Sturmfels**, University of California, Berkeley, and **Seth Sullivant\***, Harvard University (1035-14-255)

**AMS Special Session on Wavelet Sets and Tilings of  $R^n$ , II**

1:00 PM – 5:50 PM

Organizers: **Kathy D. Merrill**, Colorado College  
**Lawrence W. Baggett**, University of Colorado, Boulder  
**Judith A. Packer**, University of Colorado, Boulder

- 1:00PM *Wavelets and Coxeter Groups.*  
(1210) **Mihaela Dobrescu\***, CNU, and **Gestur Olafsson**, LSU (1035-47-1433)
- 1:30PM *Coxeter Groups and Wavelet Sets.*  
(1211) **David R. Larson\***, Texas A&M University, and **Peter Massopust**, Technische University, Munich (1035-42-1550)

- 2:00PM *Three-way tiling sets in the plane.*  
(1212) **Gestur Olafsson\***, Louisiana State University, **David Larson**, Texas A&M, and **Peter Massopust**, GSF-National Research Center for Environment and Health and the University of Munich (1035-42-1356)
- 2:30PM *The Steinhaus tiling problem for lattices in  $R^n$ .*  
(1213) **R. Daniel Mauldin**, University of North Texas (1035-51-1121)
- 3:00PM *Minimally supported frequency composite dilation wavelets.* Preliminary report.  
(1214) **Jeffrey D. Blanchard**, University of Utah (1035-42-1413)
- 3:30PM *Orthogonal exponentials with respect to convolution measures and iterated function systems.*  
(1215) **Keri Kornelson\***, Grinnell College, **Palle Jorgensen**, University of Iowa, and **Karen Shuman**, Grinnell College (1035-42-1063)
- 4:00PM *Moments and iterated function systems.* Preliminary report.  
(1216) **Palle Jorgensen**, University of Iowa, **Keri Kornelson** and **Karen Shuman\***, Grinnell College (1035-46-1065)
- 4:30PM *Use of radix representations and solenoid in understanding geometries of wavelet sets.*  
(1217) **Palle E. T. Jorgensen**, University of Iowa (1035-42-24)
- 5:00PM *Fractal Wavelet Frames.* Preliminary report.  
(1218) **Jonas D'Andrea**, University of Colorado at Boulder (1035-43-1787)
- 5:30PM *Entropy Encoding using Karhunen-Loève transform in Wavelet Image Compression.*  
(1219) **Myung-Sin Song**, Southern Illinois University Edwardsville (1035-42-673)

**AMS Special Session on Low Genus Curves and Applications, III**

1:00 PM – 5:40 PM

Organizers: **Kristin E. Lauter**, Microsoft Research  
**Peter Stevenhagen**, Leiden University

- 1:00PM *Isogenies and the Discrete Logarithm Problem in Genus Three.*  
(1220) **Benjamin Smith**, INRIA Futurs / Royal Holloway, University of London (1035-11-1289)
- 2:00PM *Using complex multiplication to count points on elliptic curves.*  
(1221) **Alice Silverberg**, University of California, Irvine (1035-11-729)
- 2:30PM *Modular polynomials for genus 2.*  
(1222) **Reinier Broker**, Microsoft Research (1035-14-1227)
- 3:30PM Break.
- 4:00PM *Elliptic factors in the Jacobian varieties of low genus curves.*  
(1223) **Jennifer Paulhus**, Kansas State University (1035-11-1638)
- 4:30PM *Nonisomorphic curves that become isomorphic over extensions of coprime degree.*  
(1224) **Daniel Goldstein**, Center for Communications Research, La Jolla, **Robert M. Guralnick**, University of Southern California, **Everett W. Howe\***, Center for Communications Research, La Jolla, and **Michael E. Zieve**, Center for Communications Research, Princeton (1035-11-765)
- 5:00PM *Elliptic Nets.*  
(1225) **Katherine E Stange**, Brown University (1035-11-1830)

**AMS Special Session on Learning and Math Graduate Students in K-12 Classroom**

1:00 PM – 6:00 PM

Organizers: **Richard S. Millman**, University of Kentucky  
**Loyce M. Adams**, University of Washington  
**Overtoun M. Jenda**, Auburn University  
**M. Helena Noronha**, California State University, Northridge

- ▶ 1:00PM (1226) *The Algebra Cubed GK-12 program of the University of Kentucky in Bath and Powell counties.*  
**Richard S. Millman**, University of Kentucky (1035-97-160)
- 1:30PM (1227) *The University of Washington's GK-12 Program in Mathematics.*  
**Loyce M. Adams**, University of Washington (1035-97-320)
- ▶ 2:00PM (1228) *Graduate student panel on the effect of graduate students on content knowledge issues in the K-12 classroom.*  
**Daniel Kiteck\***, University of Kentucky, **Emily Schnitger\***, California State University, Northridge, and **Matthew Wells\***, University of Kentucky (1035-97-1278)
- ▶ 3:00PM (1229) *The Effects of a K-12 Classroom Experience on Graduate Fellows' Personal Pedagogies.*  
**Rachelle R Bouchat\***, **Erin Militzer\***, University of Kentucky, **Cynthia Shepherd\*** and **Emily Schnitger\***, California State University, Northridge (1035-97-1292)
- ▶ 4:00PM (1230) *FERMAT, a GK-12 Project at California State University Northridge.*  
**M. Helena Noronha**, California State University Northridge (1035-97-790)
- 4:30PM (1231) *Effects of the University of Washington's GK-12 project on fellows' teaching pedagogy and on elementary school teachers' and students' content knowledge.*  
**Kim Gunnerson\***, University of Washington, **Federico Prado\***, University of Washington, Biology Department, **Christiine Lind\***, University of Washington, and **Mebbie Landsness\***, Stoughton High School (1035-97-745)
- ▶ 5:30PM (1232) *Discussion of integration of math research in the K-12 classroom.*  
**Cynthia Flores\***, California State University, Northridge, **Tricia Muldoon\***, University of Kentucky, and **Yeranuhi Semerdjian\***, California State University, Northridge (1035-97-1215)

**AMS Special Session on Algebraic Dynamics, II**

1:00 PM – 5:50 PM

Organizers: **Diana M. Thomas**, Montclair State University  
**Lennard F. Bakker**, Brigham Young University  
**Donald Mills**, Rose-Hulman Institute of Technology

- 1:00PM (1233) *Interval-exchange transformations over algebraic number fields.*  
**Franco Vivaldi\***, Queen Mary, University of London, and **John H Lowenstein**, New York University (1035-37-172)

- 2:00PM (1234) *Twist-wise flow equivalence and matrices over a non-PID ring.*  
**Michael C. Sullivan**, Southern Illinois University - Carbondale (1035-15-147)
- 2:30PM (1235) *Intersections of polynomial orbits, and a dynamical Mordell-Lang conjecture.*  
**Dragos Ghioca**, University of Lethbridge, **Thomas J. Tucker\***, University of Rochester, and **Michael E. Zieve**, Princeton, NJ (1035-11-264)
- 3:00PM (1236) *S-Integral Preperiodic Points for Dynamical Systems over Number Fields.*  
**Clayton Petsche**, CUNY Graduate Center (1035-11-1474)
- 3:30PM (1237) *The algebraic entropy of the automorphism group of a cubic polynomial on  $\mathbb{R}^3$ .*  
**Richard J Brown**, Johns Hopkins University (1035-37-845)
- ▶ 4:00PM (1238) *Intersections of polynomial orbits.*  
**Dragos Ghioca**, University of Lethbridge, **Thomas J Tucker**, University of Rochester, and **Michael E Zieve\***, Center for Communications Research (Princeton) (1035-12-82)
- ▶ 4:30PM (1239) *Dynamical systems on the Riemann sphere.*  
**Morgan Sherman**, California State University, Channel Islands (1035-53-2000)
- 5:00PM (1240) *The branch locus in one-dimensional Pisot substitution tiling spaces.*  
**Marcy Barge\***, Montana State University, **Beverly Diamond**, College of Charleston, and **Richard Swanson**, Montana State University (1035-55-345)
- 5:30PM (1241) *Algebraic actions of the discrete Heisenberg group.* Preliminary report.  
**Douglas Lind**, University of Washington (1035-37-152)

**AMS Special Session on Applications of Computer Algebra in Enumerative and Algebraic Combinatorics**

1:00 PM – 5:55 PM

Organizers: **Akalu Tefera**, Grand Valley State University  
**Moa Apagodu**, Virginia Commonwealth University

- 1:00PM (1242) *Further developments in MacMahon's partition analysis.*  
**George E. Andrews\***, The Pennsylvania State University, and **Peter Paule**, Research Institute for Symbolic Computation, Johannes Kepler University Linz (1035-05-149)
- ▶ 1:30PM (1243) *How to Cleverly Count Pattern-Avoiding Words.*  
**Lara K. Pudwell**, Rutgers University (1035-05-1086)
- 2:00PM (1244) *Solving Multivariate Linear Recurrences in Wedges.*  
**Marko Petkovšek**, University of Ljubljana (1035-05-1216)
- ▶ 2:30PM (1245) *Multi-Summation in Difference Fields.*  
**Carsten Schneider**, RISC, J. Kepler University (1035-33-1044)
- 3:00PM (1246) *The q-WZ Method for Infinite Sums.*  
**William Y. C. Chen\*** and **Ernest X. W. Xia**, Nankai University (1035-33-1631)
- 3:30PM (1247) *Smoothness and Rational Smoothness in Affine Grassmannians.*  
**Sara C. Billey\*** and **Stephen A. Mitchell**, University of Washington (1035-05-1637)
- ▶ 4:00PM (1248) *Computer-Generated Conjectures(!) and Proofs(!) in Combinatorial Game Theory.*  
**Doron Zeilberger\*** and **Thotsaporn "Aek" Thanatipanonda**, Rutgers University (1035-05-1237)

- 4:30PM *Computer-Generated Conjectures(!) and Proofs(!) in Combinatorial Game Theory (II)*.  
▶ (1249) **Thotsaporn “Aek” Thanatipanonda**, Rutgers University (1035-05-1296)
- 5:00PM *Enumerating the Saneblidze-Umble diagonal in Haskell*.  
▶ (1250) **Mikael Vejdemo-Johansson**, Friedrich-Schiller-Universität Jena, Germany (1035-05-110)
- 5:30PM *Implementing Algebraic Combinatorics: Some feedback from the development of MuPAD-Combinat*.  
(1251) **Nicolas Thiéry**, Univ Paris-Sud, Laboratoire de Mathématiques d’Orsay; UC Davis (1035-05-1853)

**AMS Special Session on Biomathematical Modeling, II**

1:00 PM – 5:50 PM

Organizers: **Olcay Akman**, Illinois State University  
**Timothy D. Comar**, Benedictine University

- 1:00PM *Angiogenic Signaling in Tumor Development: Pharmacological Inhibition, Analysis, and Models*.  
▶ (1252) **Mike Martin**, Johnson County Community College (1035-92-1950)
- 1:30PM *Stability in a simplified version of the Jia Li population model for wild and transgenic mosquitoes including heterogeneity*.  
(1253) **Hubertus F von Bremen\***, California State Polytechnic University Pomona, Pomona, California, and **Shyanah D’Amico**, California Edison (1035-92-1899)
- 2:00PM *Predator-prey interaction in a size-structured model*.  
▶ (1254) **Glenn Ledder\*** and **J David Logan**, University of Nebraska-Lincoln (1035-92-1790)
- 2:30PM *An Application of Kohonen Self-Organizing Feature Maps in Ecology*.  
(1255) **Olcay Akman** and **Andrew L Thurman\***, Illinois State University (1035-62-666)
- 3:00PM *The Dynamics of One-Predator Two-Prey Systems*.  
(1256) **Timothy D. Comar\***, **Joy Holowicki** and **Debra Witzczak**, Benedictine University (1035-92-635)
- 3:30PM *Parameter Estimation for a Mathematical Model of Erythropoiesis*.  
(1257) **Azmy S Ackleh**, University of Louisiana at Lafayette, and **Jeremy J Thibodeaux\***, University of Central Oklahoma (1035-92-1167)
- 4:00PM *Computational Strategies in the Evaluation of Attention Deficit/Hyperactivity Disorder (ADHD)*.  
▶ (1258) **Raina S. Robeva\***, Sweet Briar College, and **Tim Loboschewski**, Department of Psychology, Sweet Briar College (1035-92-1125)
- 4:30PM *Length-Biased and Current Duration Sampling*.  
(1259) **Broderick Oluyede**, Georgia Southern University (1035-62-598)
- 5:00PM *Modeling Mammalian Hibernation*.  
▶ (1260) **Marshall Hampton\*** and **Matthew T Andrews**, Univ. Minnesota Duluth (1035-92-1571)
- 5:30PM *Continuum Models for the Spread of Alcohol Abuse*.  
▶ (1261) Preliminary report.  
**Zeynep Teymuroglu**, University of Cincinnati (1035-92-241)

**AMS Special Session on Expanders and Ramanujan Graphs: Construction and Applications, I**

1:00 PM – 5:20 PM

Organizers: **Michael T. Krebs**, California State University, Los Angeles  
**Anthony M. Shaheen**, California State University, Los Angeles  
**Audrey A. Terras**, University of California San Diego

- 1:00PM *Zigzag product, expander constructions, connections and applications*.  
▶ (1262) **Avi Wigderson**, Institute for Advanced Study, Princeton (1035-68-659)
- 2:00PM *On the Ramanujancy of Heisenberg graphs of order 6 or more*.  
(1263) **Michelle DeDeo\***, Univ. of North Florida, **Vincent Dang** and **Yang Ge**, Jacksonville, FL (1035-11-1076)
- 2:30PM *Constructing Expander Graphs using the Generalized Riemann Hypothesis*.  
(1264) **David Y Jao**, University of Waterloo (1035-11-1490)
- 3:00PM *Symmetric Group Characters and Applications*.  
(1265) **Yuval Roichman**, Bar-Ilan University, Israel (1035-05-994)
- 4:00PM *Exact Groups, K-theory, and Expanders*.  
(1266) **Paul Frank Baum**, Penn State University (1035-20-774)
- 5:00PM *Expansion and Product Decompositions of Finite Groups: Variations on a Theme of Gowers*.  
(1267) **László Babai\***, University of Chicago, **Nikolay Nikolov**, Imperial College, London, and **László Pyber**, Rényi Institute, Budapest (1035-05-802)

**AMS Special Session on Dynamics and Stability of Coherent Structures, II**

1:00 PM – 5:50 PM

Organizers: **Ricardo Carretero**, San Diego State University  
**Jennifer M. Gorsky**, University of San Diego

- 1:00PM *Solitons and the Inverse Scattering Method*.  
▶ (1268) **Robert M. Miura**, New Jersey Institute of Technology (1035-35-486)
- 1:30PM *Formation of vortices, vortex lines and vortex rings in sliced condensates*.  
▶ (1269) **Ricardo Carretero\***, San Diego State University, **Panayotis G. Kevrekidis**, Nathaniel Whitaker, University of Massachusetts, Amherst, **Dimitri J. Frantzeskakis**, University of Athens, and **Brian P. Anderson**, University of Arizona (1035-37-2023)
- 2:00PM *Krein Signature for Non-selfadjoint Spectral Problems*.  
(1270) **Richard Kollar**, University of Michigan (1035-34-1721)
- 2:30PM *Defect Eigenvalues and Diophantine Equations via the Evan’s function*. Preliminary report.  
(1271) **Jared C Bronski\***, University of Illinois Urbana-Champaign, and **Zoi Rapti**, University of Illinois (1035-34-1468)
- 3:00PM *Semi-strong pulse interaction in thermally detuned PNLs equation*.  
(1272) **Keith Promislow\***, Michigan State University, and **Richard Moore**, NJIT (1035-35-1160)
- 3:30PM *Unique continuation for Camassa-Holm and Degasperis-Procesi equations*.  
(1273) **A. Alexandrou Himonas**, University of Notre Dame (1035-35-1012)

- 4:00PM *Breather solutions in the discrete NLS with parametric forcing.*  
(1274) **Panayotis Panayotaros**, Universidad Nacional Autonoma de Mexico (1035-37-360)
- 4:30PM *Wave Propagation in Phononic Crystals.*  
(1275) **Mason Alexander Porter**, University of Oxford (1035-70-50)
- ▶ 5:00PM *Numerical experiments on the propagation and interaction of well-prepared and non-well-prepared pulses in dispersive media.* Preliminary report.  
(1276) **Christopher Chong\***, University of Karlsruhe, Germany, and **Guido Schneider**, University of Stuttgart, Germany (1035-35-226)
- 5:30PM *A diagnostic tool for ergodicity.*  
(1277) **Sherry E Scott\***, Marquette University, **Chris Jones**, University of North Carolina, Chapel Hill, **Igor Mezic**, University of California Santa Barbara, **Thomas Corey Redd**, Louisiana State University Baton Rouge, and **Leonid Kuznetsov**, Susquehanna International Group, LLP (1035-37-116)

**AMS Special Session on Inverse Problems in Geometry, II**

1:00 PM – 5:50 PM

Organizers: **Peter A. Perry**, University of Kentucky  
**Carolyn S. Gordon**, Dartmouth College

- 1:00PM *Can you hear the shape of an analytic drum: Higher dimensions.*  
(1278) **Steve Zelditch**, Johns Hopkins University (1035-35-839)
- 1:30PM *Counting nodal lines which touch the boundary of an analytic domain.* Preliminary report.  
(1279) **John A. Toth\***, McGill University, and **Steve Zelditch**, Johns Hopkins University (1035-58-849)
- 2:00PM *Upper and lower bounds on resonances for manifolds hyperbolic near infinity.*  
(1280) **David Borthwick**, Emory University (1035-58-999)
- 2:30PM *Metric Degeneration and Spectral Convergence.*  
(1281) **J M Rowlett**, University of California at Santa Barbara (1035-58-1187)
- 3:00PM *Scattering with Singular Muira Potentials on the Line.*  
(1282) **Christopher S Frayer**, University of Kentucky (1035-00-1013)
- 3:30PM Break.
- 4:00PM *A negative mass theorem for the 2-torus.*  
(1283) **Kate Okikiolu**, University of California, San Diego (1035-58-1835)
- 4:30PM *Length and eigenvalue equivalence.*  
(1284) **D. B. McReynolds\***, University of Chicago, **Christopher J Leininger**, University of Illinois at Urbana-Champaign, **Walter D. Neumann**, Barnard College, Columbia University, and **Alan W. Reid**, University of Texas (1035-51-854)
- 5:00PM *Semiclassical analogues of the heat invariants.* Preliminary report.  
(1285) **Alejandro Uribe**, University of Michigan (1035-58-1225)
- 5:30PM *Equivalence of geometric quantizations of isospectral manifolds.*  
(1286) **William D Kirwin**, Max Planck Institute for Mathematics in the Natural Sciences (1035-53-1502)

**MAA Minicourse #13: Part B**

1:00 PM – 3:00 PM

*Teaching and the philosophy of mathematics.*  
Organizer: **Martin E. Flashman**, Humboldt State University

**MAA Minicourse #2: Part B**

1:00 PM – 3:00 PM

*Some deterministic models in mathematical biology and their simulations.*  
Organizers: **Cammy Cole Manning**, Meredith College  
**Huseyin Kocak**, University of Miami  
**James F. Selgrade**, North Carolina State University

**MAA Minicourse #9: Part B**

1:00 PM – 3:00 PM

*Classroom response systems: Teaching with clickers.*  
Organizers: **Derek Bruff**, Vanderbilt University  
**Matthew Leingang**, Harvard University  
**Kelly Cline**, Carroll College  
**Mark R. Parker**, Carroll College  
**Holly S. Zullo**, Carroll College

**AMS Session on Algebra and Group Theory, III**

1:00 PM – 4:55 PM

- 1:00PM *Finite Index Subgroups of R. Thompson's Group F.*  
(1287) **Bronlyn Wassink\***, SUNY at Binghamton, and **Collin Bleak**, University of Nebraska-Lincoln (1035-20-1099)
- 1:15PM *Endomorphism Rings of Representations of  $S_5$  in Characteristic 2.*  
(1288) **Jennifer Froelich**, The University of Iowa (1035-20-1118)
- 1:30PM *An Examination of Subgroups that Satisfy the Frattini Argument or Strong Frattini Argument.*  
(1289) **Joseph Evan**, King's College (1035-20-1228)
- ▶ 1:45PM *The Probability that Two Elements of a Semigroup Commute.* Preliminary report.  
(1290) **Berit Nilsen Givens**, Cal Poly Pomona (1035-20-1384)
- 2:00PM *If You Can Expand a Group to a Semigroup, What Can You Expand a Semigroup to?*  
(1291) **Rebecca Noonan Heale**, Department of Mathematics and the Maxwell Institute for Mathematical Sciences, Heriot-Watt University (1035-20-1585)
- 2:15PM *Pseudo-Levi subgroups and finite double coset collections.* Preliminary report.  
(1292) **W Ethan Duckworth**, Loyola College in Maryland (1035-20-1697)
- ▶ 2:30PM *Examples of Non-Rigid CAT(0) Groups from the Category of Knot Groups.*  
(1293) **Christopher P Mooney**, University of Wisconsin-Milwaukee (1035-20-1814)
- 2:45PM *Subsemigroups of  $BS$  containing the idempotents.*  
(1294) **Neil Hindman\***, Howard University, and **Dona Strauss**, University of Leeds (1035-22-891)
- 3:00PM Break



- 3:15PM *Realizations of intersection matrix algebras.*  
(1295) Preliminary report.  
**Sandeep Bhargava**, York University, Toronto  
(1035-17-476)
- 3:30PM *The Centroid of the Cheng-Kac Jordan  
Superalgebras.* Preliminary report.  
**Pamela A Richardson**, Westminster College  
(1035-17-660)
- 3:45PM *Vertex Algebras and Strongly Homotopy Lie  
Algebras.*  
**Daniel F. Pinzon**, University of Arkansas at Fort  
Smith (1035-17-1887)
- 4:00PM *Combinatorics of Crystal Bases for Certain  
Demazure Modules.*  
**Julie C Beier**, North Carolina State University  
(1035-17-1989)
- 4:15PM *The structure of endomorphism monoids in  
conjugate categories.* Preliminary report.  
**Randall D. Helmstutler\*** and **Roberto Palomba**,  
University of Mary Washington (1035-18-1045)
- 4:30PM *Covers for Interpretations.*  
(1300) **Daniel Kiteck**, University of Kentucky  
(1035-18-1930)
- 4:45PM *The minimum rank problem over finite fields.*  
▶ (1301) Preliminary report.  
**Jason Grout**, Iowa State University (1035-15-1905)

**AMS Session on Abstract Harmonic Analysis and  
Operator Theory, II**

1:00 PM – 5:10 PM

- 1:00PM *Variation of the Radon Transform.*  
(1302) **James V. Peters**, Long Island University  
(1035-44-20)
- 1:15PM *A Class of Calderon-Zygmund Integral Operators.*  
(1303) **Jean-Paul Pemba**, Prairie View A&M University  
(1035-44-712)
- 1:30PM *A Rees Product for Topological Semihypergroup.*  
(1304) **Norbert N. Youmbi**, Saint Francis University  
(1035-43-920)
- 1:45PM *Admissibility for Generalized 2d Oscillator Groups.*  
(1305) **Brad Currey** and **Tom McNamara\***, St. Louis  
University (1035-43-1396)
- 2:00PM *Discrete and Continuous Optimization of Asset  
Replacement in Economics and OR.*  
▶ (1306) **Yuri Yatsenko\***, Houston Baptist University, and  
**Natali Hritonenko**, Prairie View A&M University  
(1035-45-386)
- 2:15PM *On the Mean Value Theorems for Functions of Two  
Variables.* Preliminary report.  
**Nasser Dastrange**, Buena Vista University  
(1035-26-944)
- 2:30PM *A New Approach to Totally Positive Functions and  
Sequences.*  
▶ (1308) **Michael I. Ganzburg**, Hampton University  
(1035-26-105)
- 2:45PM *Strongly Quasibounded Maximal Monotone  
Perturbations for the Berkovits-Mustonen  
Topological Degree Theory.*  
**Dhruba R. Adhikari\***, Mississippi University for  
Women, Columbus, Mississippi, and **Athanassios  
G. Kartsatos**, University of South Florida, Tampa,  
Florida (1035-47-468)
- 3:00PM Break
- 3:15PM *Block matrix operators and p-hyponormality.*  
(1310) Preliminary report.  
**George R. Exner\***, Bucknell University, **Il Bong Jung**  
and **Mi Ryeong Lee**, Kyungpook National University  
(1035-47-568)

- 3:30PM *On nonstandard nonlinear spectral theory.*  
(1311) **Dan D. Pascali**, Courant Institute, New York  
University (1035-47-578)
- 3:45PM *Toeplitz-composition  $C^*$ -algebras with piecewise  
continuous symbols.*  
(1312) **Rebecca Schmitz**, University of Virginia  
(1035-47-692)
- 4:00PM *Linear Operators on Some Fractional p-adic Hilbert  
Spaces.* Preliminary report.  
▶ (1313) **Toka Diagana**, Howard University (1035-47-827)
- 4:15PM *Topological Degree Theory for Multivalued Densely  
Defined  $(S_+)_L$ - Perturbation of Multivalued Maximal  
Monotone Operators in Reflexive Banach Spaces.*  
(1314) Preliminary report.  
**Boubakari Ibrahimou**, University of South Florida  
(1035-47-940)
- 4:30PM *Stepanov-like Almost Automorphic Solutions for  
Nonlocal Cauchy Problems.* Preliminary report.  
(1315) **Peter Frempong-Mireku\*** and **Haewon Lee**, Dillard  
University (1035-47-974)
- 4:45PM *A Uniqueness Result for Unitary Group.*  
(1316) **Alexandru G Atim**, University of North Texas  
(1035-47-1098)
- 5:00PM *Classes of Stable Complex Matrices Defined via the  
Theorems of Geršgorin and Lyapunov.*  
(1317) **Sivaram K. Narayan**, Central Michigan University  
(1035-47-1404)

**AMS Session on Numerical Analysis, II**

1:00 PM – 3:55 PM

- 1:00PM *On the Validity and Order of Convergence of a  
Novel Numerical Method for Models in Population  
Biology.*  
(1318) **Kailash C. Patidar\*** and **Jo-anne Wyngaardt**,  
University of the Western Cape (1035-65-117)
- 1:15PM *An application of quaternions to a problem in  
position registration.*  
(1319) **Carl Toews**, Duquesne University (1035-65-1997)
- 1:30PM *Numerical Analysis of Approximate Deconvolution  
Models of Turbulence.*  
(1320) **Iuliana Stanculescu**, University of Pittsburgh  
(1035-65-1911)
- 1:45PM *An Iterative Substructuring Algorithm for  $C^0$   
Interior Penalty Methods.*  
(1321) **Kening Wang\***, University of North Florida, and  
**Brenner**, Louisiana State University (1035-65-1877)
- 2:00PM *Numerical study of a set of differential boundary  
conditions for a problem of constrained evolution.*  
▶ (1322) Preliminary report.  
**Alexander M. Alekseenko**, California State  
University, Northridge (1035-65-1798)
- 2:15PM *An efficient algorithm for the solution of  
high-frequency scattering by infinite rough  
surfaces.*  
(1323) **Harun Kurkcu\*** and **Fernando Reitich**, University  
of Minnesota (1035-65-1509)
- 2:30PM *Adaptive panel method for partial simulation of  
three dimensional vortex sheet motion.*  
▶ (1324) **Leon Kaganovskiy\***, New College of Florida, and  
**Robert Krasny**, University of Michigan Ann Arbor  
(1035-65-1652)
- 2:45PM *Unorthodox Approach to Solve an Overdetermined  
System.*  
(1325) **Saadat Moussavi**, University of Wisconsin Oshkosh  
(1035-65-1825)

- 3:00PM *A Parametric Sensitivity Analysis for Fluid Models.*  
(1326) Preliminary report.  
**Faranak Pahlevani**, The City University of New York, Medgar Evers College (1035-65-1634)
- ▶ 3:15PM *On Numerical Solutions of a Nonlinear Differential Equation with Square Root Dissipative Term.*  
(1327) **Ron Buckmire\***, Occidental College, **Ron S. Mickens**, Clark Atlanta University, and **Karl McMurtry**, Occidental College (1035-65-170)
- 3:30PM *Optimized waveform relaxation methods for circuit simulations.*  
(1328) **Mohammad Al-Khaleel\***, Yarmouk University, and **Martin J. Gander**, University of Geneva (1035-65-1497)
- 3:45PM *Computing the complete CS decomposition.*  
(1329) **Brian D. Sutton**, Randolph-Macon College (1035-15-564)

- 3:30PM *An Update on the Trichotomy Character of*  
▶ (1339)  $x_{n+1} = \frac{\beta_n x_n + \gamma_n x_{n-1}}{A_n + B_n x_n}$  with Period-two Coefficients. Preliminary report.  
**Carol H. Gibbons**, Salve Regina University, RI, **Senada Kalabusic**, University of Sarajevo, Sarajevo, Bosnia, and Herzegovina, and **Carol B Overdeep\***, Saint Martin's University, Lacey, WA (1035-39-97)
- 3:45PM *Forced second order nonlinear oscillation on time scales.*  
(1340) **Lynn H. Erbe\***, **Allan Peterson**, University of Nebraska-Lincoln, and **Samir Saker**, Mansoura University (1035-39-1313)
- 4:00PM *Oscillation for a Certain Nonlinear Second Order Dynamic Equation on a Time Scale.* Preliminary report.  
(1341) **Raegan J Higgins**, University of Nebraska-Lincoln (1035-39-1145)
- 4:15PM *Global Attractivity of the Positive Equilibrium of*  
(1342)  $x_{n+1} = \frac{\alpha + \beta x_n + \gamma x_{n-1}}{A + B x_n + C x_{n-1}}$  with Positive Parameters in the Non-Hyperbolic Case.  
**Sukanya Basu**, University of Rhode Island (1035-39-1324)
- 4:30PM *On Dual Space Characterizations of Real Locally C\*- and Locally JB-Algebras.*  
(1343) **Alexander A. Katz**, St. John's University, and **Oleg Friedman\***, University of South Africa (1035-46-1582)
- 4:45PM *The Radon-Nikodym Property for Tensor Products of Banach Lattices II.*  
(1344) **Q. Bu**, **G. Buskes** and **W. Lai\***, The University of Mississippi (1035-46-1625)
- 5:00PM *Operators Determined by Subspaces.* Preliminary report.  
(1345) **Elizabeth M Bator\***, University of North Texas, and **Rhonda Huettenmueller**, Texas Woman's University (1035-46-1715)
- 5:15PM *Cyclic Behavior of Certain Operators on the Disc Algebra.* Preliminary report.  
(1346) **Gabriela Bulancea**, University of Puerto Rico at Cayey (1035-46-1926)

**AMS Session on Analysis and Functional Analysis, I**

1:00 PM – 5:25 PM

- 1:00PM *Bochner-Riesz Means With Respect to a 2 by 2 Cylinder.*  
(1330) **Paul T Taylor**, Shippensburg University (1035-42-1042)
- 1:15PM *Size and Derivative Estimates for the Szegő Kernel on a Model Non-Pseudoconvex Domain.* Preliminary report.  
(1331) **Christine Carracino\***, Richard Stockton College of New Jersey, and **Jennifer Halfpap**, University of Montana-Missoula (1035-42-1321)
- 1:30PM *Estimates for multilinear singular integral operators associated with Borel measures.* Preliminary report.  
(1332) **Geoff Diestel\***, University of South Carolina, and **Loukas Grafakos**, University of Missouri (1035-42-1357)
- 1:45PM *Multivariate Hausdorff Transformations Generated by the Linear Group.* Preliminary report.  
(1333) **Constantine Georgakis**, DePaul University (1035-42-1938)
- ▶ 2:00PM *An Examination of Fingerprint Analysis Using the Fourier Transform.* Preliminary report.  
(1334) **Micah J Smith** and **Jonathan Hunt\***, Berea College (1035-42-2005)
- ▶ 2:15PM *Vieta like products involving Fibonacci and Lucas numbers.*  
(1335) **Thomas J. Osler**, Rowan University (1035-40-606)
- ▶ 2:30PM *The periodic character of some rational difference equations of arbitrary order with truncation.* Preliminary report.  
(1336) **Kenneth S. Berenhaut** and **Richard T Guy\***, Wake Forest University (1035-39-1132)
- ▶ 2:45PM *Basic uniqueness and approximation results for positive solutions to nonlinear dynamic equations on time scales.*  
(1337) **Allan C. Peterson\***, **Lynn Erbe**, University of Nebraska-Lincoln, and **C. C. Tisdell**, University of New South Wales (1035-39-1138)
- 3:00PM Break
- 3:15PM *Singular second order boundary value problems on purely discrete time scales.*  
(1338) **Curtis J Kunkel**, University of Tennessee at Martin (1035-39-665)

**MAA Session on Cryptology for Undergraduates, I**

1:00 PM – 4:35 PM

- Organizers: **Chris Christensen**, Northern Kentucky University  
**Robert E. Lewand**, Goucher College
- 1:00PM *Finding Large Primes: Miller-Rabin and Beyond.*  
▶ (1347) **Jeffrey A. Ehme**, Spelman College (1035-G1-1090)
- ▶ 1:20PM *Using Maple worksheets to enable explorations of cryptography with minimal background.*  
(1348) **Mike May**, Saint Louis University (1035-G1-825)
- ▶ 1:40PM *Zero-knowledge proofs: How to convince someone you know everything without telling them anything.*  
(1349) **Cheryl Beaver**, Western Oregon University (1035-G1-293)
- ▶ 2:00PM *Cryptology on Campus During World War II.* Preliminary report.  
(1350) **Craig Bauer**, York College of Pennsylvania (1035-G1-114)
- ▶ 2:20PM *Cryptology as Outreach to Prospective College Students in a Summer Enrichment Program.*  
(1351) **David E Boliver**, University of Central Oklahoma (1035-G1-651)
- ▶ 2:40PM *Teaching Cryptography in a Wireless Environment using Maplelets.* Preliminary report.  
(1352) **Neil P Sigmon**, Radford University (1035-G1-1126)

- ▶ 3:00PM *Cyclic Patterns of Points on Koblitz Curves.*  
(1353) Preliminary report.  
**John H. Wilson**, Centre College (1035-G1-913)
- ▶ 3:20PM *Public Key Cryptography with TI Voyage 200.*  
(1354) **Jerzy Wojdylo**, Southeast Missouri State University (1035-G1-1202)
- ▶ 3:40PM *The Pohlig-Hellman exponentiation cipher as a bridge between classical and modern cryptography.*  
(1355) **Joshua Brandon Holden**, Rose-Hulman Institute of Technology (1035-G1-836)
- ▶ 4:00PM *Lessons from a Course in Cryptography.*  
(1356) Preliminary report.  
**Yesem Kurt**, Randolph College, Lynchburg, VA (1035-G1-1259)
- ▶ 4:20PM *Are You Talking to Me? An Introduction to Identity-Based Encryption.*  
(1357) **Kristen A. Meyer**, Wisconsin Lutheran College (1035-G1-674)
- ▶ 4:45PM *Effects of Teacher Practices on Mathematics Achievement Gain of First-Grade Children of Different Racial-Ethnic Backgrounds.* Preliminary report.  
**Anna E. Bargagliotti\***, University of Memphis, **Cassandra Guarino**, Michigan State University, and **William Mason**, University of California, Los Angeles (1035-L1-520)
- ▶ 5:05PM *Teaching Calculus Coherently.* Preliminary report.  
(1367) **Tevian Dray**, Oregon State University (1035-L1-1140)
- ▶ 5:25PM *Providing Support for Pre-service Teachers' Development of Mental Computation Strategies.*  
(1368) **Ian Whitacre\*** and **Susan D. Nickerson**, San Diego State University (1035-L1-1970)
- ▶ 5:45PM *Teaching Finite Mathematics Using Learner-Centered Pedagogy.*  
(1369) **Debra L Hydorn**, University of Mary Washington (1035-L1-1714)

**MAA Session on Guided Discovery in Mathematics Education**

1:00 PM – 6:00 PM

Organizers: **Jerome S. Epstein**, Polytechnic University  
**Chris Rasmussen**, San Diego State University

- 1:00PM Introduction.
- ▶ 1:05PM *Applying Physics Education Research to Math Education.*  
(1358) **John M Clement**, St. Pius X High School, Houston, TX (1035-L1-1868)
- ▶ 1:45PM *Using Contextual Problems to Support Student Discovery in Pre-Calculus Mathematics: Exemplars and Efficacy.*  
(1359) **Christian Hirsch**, Western Michigan University (1035-L1-2025)
- ▶ 2:25PM *An Integrated Math and Physical Science Laboratory Program for Cognitive Development.*  
(1360) **Jerome Epstein**, Polytechnic University, Dept. of Mathematics (1035-L1-694)
- ▶ 3:05PM *Guided Discovery: Theoretical Implications and Practical Considerations.*  
(1361) **Robert G Stein**, California State University, San Bernardino (1035-L1-1273)
- ▶ 3:25PM *Concept Development Using Guided Discovery.*  
(1362) Preliminary report.  
**Nathaniel Miller\*** and **Frieda Parker**, University of Northern Colorado (1035-L1-328)
- ▶ 3:45PM *Undergraduate Mathematics Majors' and Prospective Mathematics Teachers' Conceptions of Proof after Lecture-Based and the Problem-Based Instruction.* Preliminary report.  
(1363) **Sera Yoo\*** and **Jennifer C. Smith**, The University of Texas at Austin (1035-L1-1839)
- ▶ 4:05PM *An Inquiry-oriented Approach to Undergraduate Mathematics.*  
(1364) **Chris L Rasmussen\***, San Diego State University, and **Oh Nam Kwon**, Seoul National University (1035-L1-1819)
- ▶ 4:25PM *Guided Discovery at the Riverbend Community Math Center.* Preliminary report.  
(1365) **Amanda Katharine Serenevy**, Riverbend Community Math Center (1035-L1-1011)

**MAA General Contributed Paper Session, VI**

1:00 PM – 5:55 PM

- Organizer: **Sarah L. Mabrouk**, Framingham State College
- Moderators: **Mihaela D. Iftime**, Massachusetts College of Pharmacy and Health Sciences  
**Marc Brodie**, Wheeling Jesuit University  
**Gavin Waters**, Missouri Western State University  
**J. Alan Alewine**, McKendree University  
**Andrew B. Perry**, Springfield College  
**Robert L. Wilson**, University of Wisconsin-Madison
- ▶ 1:00PM *How Would Muppets Multiply? Using Base 6 in Courses for Future Mathematics Teachers.* Preliminary report.  
(1370) **John R. Prather**, Ohio University-Eastern (1035-Z1-720)
  - ▶ 1:15PM *Using the Internet/computers as a tool for developing critical thinking skills within a general educational mathematics course.* Preliminary report.  
(1371) **Gavin J Waters**, Missouri Western State University (1035-Z1-526)
  - ▶ 1:30PM *Review and Refinement: An Update on a Mathematics Capstone Course in a Small Department.*  
(1372) **Alan Alewine**, McKendree University (1035-Z1-419)
  - ▶ 1:45PM *Transitioning to higher mathematics via programming and proofs, Part I.*  
(1373) **Jeffrey K Denny\*** and **Keith E Howard**, Mercer University (1035-Z1-1343)
  - ▶ 2:00PM *Transitioning to higher mathematics via programming and proofs, Part II.*  
(1374) **Keith E Howard\*** and **Jeffrey K Denny**, Mercer University (1035-Z1-1344)
  - ▶ 2:15PM *A Naïve Introduction to Trans-Elliptic Diophantine Equations.*  
(1375) **Donald E Hooley**, Bluffton University (1035-Z1-680)
  - ▶ 2:30PM *The MacLane Class and the Interaction Between Coefficient Conditions and Solution Conditions of Differential Equations in the Unit Disk.* Preliminary report.  
(1376) **Kari Fowler**, University of Tampa (1035-Z1-202)

**Program of the Sessions – Tuesday, January 8 (cont'd.)**

- 2:45PM *Explaining Standard Deviation Geometrically.*  
 ▶ (1377) Preliminary report.  
**Michael S Marion** (1035-Z1-664)
- 3:00PM *4-Moves on Links up to Two Components.*  
 ▶ (1378) **Ramanjit K Sahi\***, Austin Peay State University, and **Mieczyslaw K. Dabkowski**, The University of Texas at Dallas (1035-Z1-1056)
- 3:15PM *Building a Learning Community for Instructors of Remedial Courses.* Preliminary report.  
 ▶ (1379) **Janet Nichols**, Colorado State University - Pueblo (1035-Z1-1622)
- 3:30PM *Bacterial Computers: Can E. coli Solve a Hamilton Path Problem?* Preliminary report.  
 ▶ (1380) **Jeffrey L. Poet\***, Missouri Western State University, **A. Malcolm Campbell**, Davidson College, **Todd T. Eckdahl**, Missouri Western State University, and **Laurie J. Heyer**, Davidson College (1035-Z1-1047)
- 3:45PM *Revising and Studying a Capstone Course for Future High School Mathematics Teachers.* Preliminary report.  
 ▶ (1381) **Richard O. Hill**, Michigan State University (1035-Z1-1739)
- 4:00PM *Active Learning and Teaching with Technology.* Preliminary report.  
 ▶ (1382) **Mihaela D Iftime**, MCP & Boston U. (1035-Z1-478)
- 4:15PM *It is time to integrate dynamic geometry with computer algebra system.* Preliminary report.  
 ▶ (1383) **Wei-Chi Yang**, Radford University (1035-Z1-208)
- 4:30PM *What do Korean preservice secondary teachers learn during their university teacher education program?*  
 ▶ (1384) **Jin-Ah Kwon**, **Jun-Soo Choa**, Sungkyunkwan University, Seoul, Korea, and **Jihwa Noh\***, University of Northern Iowa (1035-Z1-1151)
- 4:45PM *Calculus Activities Inspired by the History of Mathematics.*  
 ▶ (1385) **Gabriela R Sanchis**, Elizabethtown College (1035-Z1-1834)
- 5:00PM *Generating random numbers using chaotic equations.*  
 ▶ (1386) **Ken S. Li**, Southeastern Louisiana University (1035-Z1-1993)
- 5:15PM *Analysis of optimal solutions and its tiling in  $m \times n$  size Black-Out Game.*  
 ▶ (1387) **Duk-Sun Kim\*** and **Sang-Gu Lee**, Sungkyunkwan University (1035-Z1-838)
- 5:30PM *Teaching Mathematics Course using Creative Hands-on Activities.* Preliminary report.  
 ▶ (1388) **Ryo Ohashi**, King's College (1035-Z1-675)
- 5:45PM *Improving Teaching and Learning at Midsemester.*  
 ▶ (1389) **Diane L Johnson**, Humboldt State University (1035-Z1-1034)
- Vicky Williams Klima**, Appalachian State University
- 1:00PM *Summer Bridge vs. Non-Summer Bridge Students' First Year Retention and Achievement in Calculus: Addressing Undergraduate Mathematics Achievement for Underrepresented Ethnic Students.* Preliminary report.  
 ▶ (1390) **Joy Moore**, Xavier University (1035-Z1-1508)
- 1:15PM *Kinesthetic Math: Is That Like Mathematical Calisthenics? (No.).* Preliminary report.  
 ▶ (1391) **Carolyn Yackel**, Mercer University (1035-Z1-1547)
- 1:30PM *Using DyKnow Vision and Tablet PCs to Facilitate Active Learning in Calculus.*  
 ▶ (1392) **Matthew DeLong**, Taylor University (1035-Z1-1194)
- 1:45PM *Group Projects Reinforcing Most Crucial Concepts of an Introductory Statistics Class.* Preliminary report.  
 ▶ (1393) **Katarzyna Potocka**, Ramapo College of New Jersey (1035-Z1-822)
- 2:00PM *The unexpected expected value.*  
 ▶ (1394) **Roman Wong\*** and **Tyler Raspat**, Washington and Jefferson College (1035-Z1-453)
- 2:15PM *Multidisciplinary research and training for enhancing teaching and learning of undergraduate mathematics.* Preliminary report.  
 ▶ (1395) **Padmanabhan Seshaiyer**, George Mason University (1035-Z1-1657)
- 2:30PM *An old tool revisited: What liberal arts students can learn from spreadsheet mathematics.* Preliminary report.  
 ▶ (1396) **Margaret L Morrow**, SUNY Plattsburgh (1035-Z1-1927)
- 2:45PM *Teacher's Attitude in the Classroom: A Student's Perspective.* Preliminary report.  
 ▶ (1397) **Mahmoud Yousef\***, University of Central Missouri, and **Khaled Al-Agha**, Wiley College (1035-Z1-1200)
- 3:00PM *What Is Studied In, Written For, and Remembered From Western Oregon University's Bridge Course.* Preliminary report.  
 ▶ (1398) **Michael B Ward**, Western Oregon University (1035-Z1-429)
- 3:15PM *Quantitative Literacy, A Lesson Plan Revision and Curriculum Development Workshop for In-Service K-12 Teachers.* Preliminary report.  
 ▶ (1399) **Lisa E Marano**, West Chester University of PA (1035-Z1-548)
- 3:30PM *Using Discussion Activities in the Abstract Algebra Classroom.* Preliminary report.  
 ▶ (1400) **Vicky Williams Klima**, Appalachian State University (1035-Z1-1319)
- 3:45PM *Geometric Forensics.*  
 ▶ (1401) **James W Mauch**, Cedar Crest College (1035-Z1-399)
- 4:00PM *Using student-created digital learning objects in mathematics and science.* Preliminary report.  
 ▶ (1402) **Rebecca L LeDocq\***, **Jennifer J Kosiak** and **Bob Hoar**, University of Wisconsin - La Crosse (1035-Z1-1734)
- 4:15PM *Students Don't Do Optional.* Preliminary report.  
 ▶ (1403) **Tristan Denley**, University of Mississippi (1035-Z1-1430)
- 4:30PM *Some Puzzling Results.* Preliminary report.  
 ▶ (1404) **Marc A. Brodie**, Wheeling Jesuit University (1035-Z1-874)
- 4:45PM *Teacher Retention through Building Professional Learning Communities.* Preliminary report.  
 ▶ (1405) **Barbara Johnson Pence**, San Jose State University (1035-Z1-1355)

**MAA General Contributed Paper Session, VII**

1:00 PM – 5:55 PM

- Organizer: **Sarah L. Mabrouk**, Framingham State College
- Moderators: **Jim Fulmer**, University of Arkansas at Little Rock  
**Tom McMillan**, University of Arkansas at Little Rock  
**Carolyn Yackel**, Mercer University  
**Barbara Pence**, San Jose State University  
**Janet Nichols**, Colorado State University-Pueblo

- ▶ 5:00PM *Using Maple to Enhance Understanding of 3D Problems in Multivariable Calculus Courses.* Preliminary report.  
**David Brian Williams**, Clayton State University (1035-Z1-1874)
- ▶ 5:15PM *Road Rage and the FTC.*  
**Jody M Sorensen\***, Augsburg College, **Maureen T Carroll**, University of Scranton, and **Elyn K Rykken**, Muhlenberg College (1035-Z1-1954)
- ▶ 5:30PM *Enriching Calculus with Montessori Materials.* Preliminary report.  
**Theodore S. Erickson**, Wheeling Jesuit University (1035-Z1-1028)
- ▶ 5:45PM *Adaptive Error Control for an Elliptic Optimization Problem.*  
**Sheldon Lee\*** and **Don Estep**, Colorado State University (1035-Z1-1629)

- ▶ 3:30PM *A Uniqueness Result for Nonlinear Hyperbolic Initial Value Problems.*  
**Greg S Spradlin**, Embry-Riddle University (1035-Z1-1506)
- ▶ 3:45PM *Authorship and Statistical Profiling.* Preliminary report.  
**Alan Safer\*** and **Eric Chuk**, California State University, Long Beach (1035-Z1-646)
- ▶ 4:00PM *Improving Undergraduate Calculus Students' Learning through Ability Group Sectioning.*  
**Randal E. Hickman**, United States Military Academy, West Point (1035-Z1-1597)
- ▶ 4:15PM *A generalization of Ceva's Theorem and Menelaus' Theorem.* Preliminary report.  
**Kelly B Funk\*** and **Robert Powers**, University of Louisville (1035-Z1-841)
- ▶ 4:30PM *A Construction of Convex Figures of Constant Width.* Preliminary report.  
**Zokhrab Mustafaev**, University of Houston-Clear Lake (1035-Z1-153)
- ▶ 4:45PM *What is geometric superspace ?*  
**James S Cook**, North Carolina State University (1035-Z1-298)
- ▶ 5:00PM *Active Learning through Classroom Voting.*  
**Kelly S. Cline\***, **Mark R. Parker** and **Holly S. Zullo**, Carroll College (1035-Z1-750)
- ▶ 5:15PM *Models of Computational Science Curricula.*  
**Ignatios E Vakalis**, CalPoly, San Luis Obispo (1035-Z1-1973)
- ▶ 5:30PM *A Seminar for Pre-Service Teachers on the Teaching of College Algebra.*  
**Angela Marie Hodge**, North Dakota State University (1035-Z1-1846)
- ▶ 5:45PM *On Orbits of Automorphism Groups.*  
**Marian Deaconescu**, Kuwait University, and **Gary L Walls\***, West Texas A&M University (1035-Z1-917)

**MAA General Contributed Paper Session, VIII**

1:00 PM – 5:55 PM

- Organizer: **Sarah L. Mabrouk**, Framingham State College y
- Moderators: **David B. Williams**, Clayton State University  
**Gary L. Walls**, West Texas A&M University  
**Joy Moore**, Xavier University  
**Theodore S. Erickson**, Wheeling Jesuit University  
**Dominic Klyve**, Carthage College  
**Paul R. Coe**, Dominican University
- ▶ 1:00PM *Interdisciplinary Case Studies for an Intermediate Statistics Course.*  
**Terje Hoim\*** and **Stephanie Fitchett**, Florida Atlantic University, Honors College (1035-Z1-1240)
  - ▶ 1:15PM *Analog-modeling scientific activities as a vehicle for exploration basic statistical concepts: Case study in future teachers' statistics education classes.*  
**Olga Kosheleva\*** and **Laura Serpa**, University of Texas at El Paso (1035-Z1-1873)
  - ▶ 1:30PM *Vector Measures and the Strong Operator Topology.*  
**Paul Lewis\***, University of North Texas, **Kimberly Muller**, Lake Superior State University, and **Andy Yingst**, University of South Carolina Lancaster (1035-Z1-721)
  - ▶ 1:45PM *Large-Lecture Techniques.* Preliminary report.  
**Patrick X Rault**, UW Madison (1035-Z1-924)
  - ▶ 2:00PM *Using Force Fields to Construct 1-1 Complex Polynomials.*  
**Alan D. Gluchoff\*** and **Frederick W. Hartmann**, Villanova University (1035-Z1-42)
  - ▶ 2:15PM *An algorithm for creating "equal" regions.*  
**Mark A Mills**, Central College (1035-Z1-184)
  - ▶ 2:30PM *Minimum Sets Forcing Monochromatic Triangles.*  
**Arie Bialostocki** and **Mark J. Nielsen\***, University of Idaho (1035-Z1-1428)
  - ▶ 2:45PM *Inverse Preserving Functions.*  
**David J Schmitz\*** and **Charles W Gatz**, North Central College (1035-Z1-366)
  - ▶ 3:00PM *A search for Wieferich primes to  $6 \times 10^{15}$ .*  
**Dominic W. Klyve\***, Carthage College, and **François G. Dorais**, Cornell University (1035-Z1-1546)
  - ▶ 3:15PM *Comparing Mechanical and Thermal Damping in Elastic Beams.* Preliminary report.  
**Richard J. Marchand**, Slippery Rock University (1035-Z1-1718)

**NAM Granville-Brown-Haynes Session of Presentations by Recent Doctoral Recipients in the Mathematical Sciences**

1:00 PM – 3:15 PM

- Organizer: **Dawn A. Lott**, Delaware State University
- ▶ 1:00PM *Volumes of hyperbolic orbifolds.*  
**Ilesanmi Adeboye**, University of Southern California (1035-57-600)
  - ▶ 1:20PM *Case-Control Association Testing with Incomplete Genealogy.* Preliminary report.  
**Timothy Alvin Thornton**, University of California, Berkeley (1035-62-1162)
  - ▶ 1:40PM *Edgeworth Type Expansion Of The Distribution Of The Largest Eigenvalue In Classical Random Matrix Ensembles.*  
**Leonard N Choup**, University of Alabama in Huntsville (1035-60-1371)
  - ▶ 2:00PM *Characterizing Right-veering Surface Homeomorphisms using the Burau Representation.*  
**Emille K. Davie**, University of California, Santa Barbara (1035-57-1417)
  - ▶ 2:20PM *The Dimension of the Space of Smooth Splines of Degree 8 on Tetrahedral Partitions.*  
**Ben N. Kamau**, Delaware State University (1035-41-1480)
  - ▶ 2:40PM *Evaluation of a Rotavirus Vaccine Program.*  
**Omayra Y Ortega**, University of Iowa / Arizona State University at the West campus (1035-92-1844)

## Program of the Sessions – Tuesday, January 8 (cont'd.)

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3:00PM *Parabolic Equation Techniques for Range-Dependent Seismo-Acoustics.*  
(1436) **Donald A. Outing**, United States Military Academy  
(1035-35-2012)

### AMS Committee on Education Panel Discussion

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1:00 PM – 2:30 PM

*Making teacher preparation our business*

Organizer: **William G. McCallum**, The University of Arizona

Panelists: **Solomon Friedberg**, Boston College  
**Theodore W. Gamelin**, University of California Los Angeles  
**James Lewis**, University of Nebraska  
**Magnhild Lien**, California State University, Northridge

### MAA Special Presentation

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1:00 PM – 2:20 PM

*A quick introduction to WebWork, a web-based interactive homework system.*

Organizers: **Michael E. Gage**, University of Rochester  
**Arnold K. Pizer**, University of Rochester  
**Vicki Roth**, University of Rochester

### Project NeXT Panel Discussion

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1:00 PM – 2:20 PM

*Capstone and one-semester research projects for a variety of students.*

Organizers: **Steven W. Morics**, University of Redlands  
**Mary D. Shepherd**, Northwest Missouri State University

Panelists: **William E. Fenton**, Bellarmine University  
**Steven W. Morics**  
**Barbara Reynolds**, Cardinal Stritch University

### SIAM Minisymposium on From Global Predictions to Local Action, IV: Working Groups and Panel Discussion

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1:00 PM – 5:00 PM

*This session includes a panel discussion on how to develop the training required to tackle the mathematical challenges in modeling climate change.*

Organizers: **Inez Fung**, Berkeley Institute of the Environment, University of California Berkeley  
**Christopher K. Jones**, University of North Carolina  
**Mary Lou Zeeman**, Bowdoin College

### ASL Session for Contributed Papers, I

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2:00 PM – 5:10 PM

2:00PM *Turing computable embeddings into  $p$ -groups.*  
(1437) **Sara Quinn**, University of Notre Dame

2:25PM *The degree of categoricity for an algebraic number field.*  
(1438)

**Russell Miller**, Queens College and C.U.N.Y. Graduate Center

2:50PM *Reverse mathematics and Gödel's Dialectica interpretation (preliminary report).*  
(1439)

**Jeffrey L. Hirst**, Appalachian State University

3:15PM *Genericity and Schnorr triviality.*  
(1440)

**Johanna N. Franklin**, National University of Singapore

3:40PM Break.

4:00PM *A new notion of reducibility.*

**Brooke Andersen**, Dartmouth College

4:25PM *Topological aspects of poset spaces.*

(1442) **Carl Mummert\***, University of Michigan, and **Frank Stephan**, National University of Singapore

4:50PM *Sets with a non-uniform self-modulus.*

(1443) **Peter M. Gerdes**, UC Berkeley

### RMMC Board of Directors

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2:15 PM – 4:10 PM

### MAA Presentations by Teaching Award Recipients

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2:30 PM – 4:25 PM

Organizer: **Martha J. Siegel**, Towson University

Moderator: **Joseph A. Gallian**, University of Minnesota-Duluth

2:30PM *Everyone Can Teach Applications.*

(1444) **Gilbert Strang**, Massachusetts Institute of Technology (1035-A0-2056)

3:00PM *(Speaking in favor of) Redundancy, Inefficiency, Extravagance, and Waste.*

(1445) **Annalisa Crannell**, Franklin & Marshall College (1035-A0-315)

3:30PM *Elementary School Teachers as Mathematicians: The Vermont Model for Raising Student Mathematics Achievement.*

▶ (1446) **Kenneth I. Gross**, University of Vermont (1035-A0-966)

4:00PM *Motivation in Mathematics and Undergraduate Research.*

(1447) **James A. Morrow**, University of Washington (1035-A0-2057)

### SUMMA Special Presentation

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2:30 PM – 3:50 PM

*Summer research programs.*

Organizers: **William A. Hawkins Jr**, MAA

**Robert E. Megginson**, University of Michigan

Panelists: **Tuncay Aktosum**, University of Texas at Arlington

**Minerva Cordero**, University of Texas at Arlington

**Monica Stephens**, Spelman College

### AMS Committee on Science Policy Panel Discussion

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3:00 PM – 4:30 PM

*Advocating for mathematics: Influencing policymakers through congressional visits in districts and states.*

Organizer: **Sheldon H. Katz**, University of Illinois at Urbana-Champaign

**MAA Poster Session for Undergraduates**

3:00 PM – 5:30 PM

Organizer: **Diana M. Thomas**, Montclair State University

**MAA Minicourse #14: Part B**

3:30 PM – 5:30 PM

*Beyond formulas and algorithms: Teaching a conceptual/thematics single variable calculus course.*

Organizer: **Shahriar Shahriari**, Pomona College

**MAA Minicourse #3: Part B**

3:30 PM – 5:30 PM

*Introduction to the mathematics of modern cryptography.*

Organizers: **Jeffrey Ehme**, Spelman College  
**Colm K. Mulcahy**, Spelman College

**MAA Minicourse #8: Part B**

3:30 PM – 5:30 PM

*Mathematics and geometry of voting.*

Organizer: **Donald G. Saari**, University of California Irvine

**AMS Session on Applications of Mathematics, IV**

3:45 PM – 4:40 PM

- 3:45PM *Results on the dynamical behavior of a one island, selection-migration model with partial dominance.*  
▶ (1448) Preliminary report.  
**Jordan West Bostic**, North Carolina State University (1035-39-1755)
- 4:00PM *Boundary control approach to the spectral estimation problem.*  
▶ (1449) **Anna S. Bulanova\*** and **Sergei A. Avdonin**, University of Alaska Fairbanks (1035-93-2018)
- 4:15PM *Replicator Equation and the Principal of Minimum Discrimination Information.*  
(1450) **Georgy P Karev**, National Center for Biotechnological Information, NIH (1035-92-1773)
- 4:30PM *An Omnivore Brings Chaos.*  
▶ (1451) **Joseph P Previte\***, Penn State Erie, The Behrend College, and **James Greene**, Penn State (1035-92-615)

**MAA Information Session**

5:00 PM – 7:00 PM

*Current issues in actuarial science education.*

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

**SIGMAA on Mathematics and Computational Biology Business Meeting and Reception**

6:00 PM – 7:00 PM

Organizer: **Jennifer R. Galovich**, St. Johns University

**MAA Film Presentation and Reception**

6:00 PM – 8:30 PM

*Hard Problems: A documentary about the USA team's participation in the 2006 International Mathematical Olympiad.*

Organizer: **George P. Csicsery**, Zala Films

**AMS Mathematical Reviews Reception**

6:00 PM – 7:00 PM

**SIGMAA on Research in Undergraduate Mathematics Business Meeting**

6:30 PM – 7:30 PM

**MAA Dramatic Presentation**

7:00 PM – 8:00 PM

*So you want to teach environmental math, do you?*

Presenters: **Martin E. Walter**, University of Colorado at Boulder  
**Patricia Clark Kenschaft**, Bloomfield College

**Young Mathematicians Network Town Meeting**

7:00 PM – 8:00 PM

**MAA-Project NExT Reception**

8:30 PM – 10:30 PM

*All Project NExT Fellows, consultants, and other friends of Project NExT are invited.*

Organizers: **T. Christine Stevens**, St. Louis University  
**Joseph A. Gallian**, University of Minnesota, Duluth  
**Aparna W. Higgins**, University of Dayton

**NAM Cox-Talbot Address**

8:45 PM – 9:30 PM

(1452) *Title to be announced.*  
**Earl R. Barnes**, Morgan State University

**Wednesday, January 9**

**MAA Minority Chairs Breakfast Meeting**

7:00 AM – 8:45 AM

**Joint Meetings Registration**

7:30 AM – 2:00 PM

**AMS Session on Combinatorics, III**

7:45 AM – 10:40 AM

- 7:45AM *On k-ordered hamiltonian connectivity of graphs.* (1453)  
**Bing Wei**, University of Mississippi (1035-05-1250)
- 8:00AM *On Chromatic, Flow, and Tutte Polynomial Unique Graphs.* (1454)  
**Yinghua Duan**, Nankai University, **Haidong Wu\***, University of Mississippi, and **Qinglin Yu**, Nankai University and Thompson Rivers University (1035-05-1400)
- ▶ 8:15AM *Critical Pebbling Numbers of Graphs.* Preliminary report. (1455)  
**Joshua D Laison\***, Willamette University, **Courtney R. Gibbons**, University of Nebraska Lincoln, and **Erick J. Paul**, University of California Santa Barbara (1035-05-1415)
- 8:30AM *Skew Hadamard Difference Sets from the Ree-Tits Slice Symplectic Spreads in  $PG(3, 3^{2h+1})$ .* (1456)  
**Cunsheng Ding**, Hong Kong University of Science and Technology, **Zeying Wang\*** and **Qing Xiang**, University of Delaware (1035-05-1463)
- 8:45AM *Hamiltonian cycles in subspace graphs.* Preliminary report. (1457)  
**Petre I Ghenciu**, University of Wisconsin-Stout (1035-05-1484)
- 9:00AM *Latin squares especially order 8 and planes.* (1458)  
**Robert W Sternfeld**, Indiana State University, **David Koster**, University of Wisconsin, La Crosse, **Larry Taylor**, California State University, Bakersfield, and **Raymond Killgrove\***, Vista, California (1035-05-1504)
- ▶ 9:15AM *Semiordeers and Riordan Numbers.* (1459)  
**Barry A Balof\*** and **Jacob V Menashe**, Whitman College (1035-05-1618)
- 9:30AM *The subconstituent algebra of a Latin square.* (1460)  
**Ibtisam Daqqa**, University of South florida (1035-05-1632)
- 9:45AM *Higher Dimensional Spanning Trees.* (1461)  
**Molly Maxwell**, Augsburg College, Minneapolis, Minnesota (1035-05-1654)
- 10:00AM *Forbidden characterization of the fractional weak discrepancy of posets.* (1462)  
**Jeong Ok Choi**, University of Illinois at Urbana-Champaign (1035-05-1659)
- 10:15AM *Classification of Hadamard matrices by switching and codes.* (1463)  
**William P. Orrick**, Indiana University, Bloomington (1035-05-1581)
- 10:30AM *Infinite families of non-embeddable quasi-residual Menon designs.* Preliminary report. (1464)  
**Tariq A. Alraqad** and **Mohan S. Shrikhande\***, Central Michigan University (1035-05-1543)

**AMS Session on Statistics, Game Theory, and Social Sciences**

7:45 AM – 10:55 AM

- 7:45AM *Utility functions for vaccination games with delay-strategies.* Preliminary report. (1465)  
**Timothy C. Reluga**, Penn State (1035-91-1912)
- 8:00AM *Partitioning k Multivariate Normal Populations with Respect to a Standard Vector and Its Equivalence in Multiple Testing.* (1466)  
**Weixing Cai\*** and **Pinyuen Chen**, Syracuse University (1035-62-1779)

- 8:15AM *Some Properties of the Exact and Score Methods for Binomial Proportion and Sample Size Calculation.* (1467)  
**Jie Peng\*** and **K. Krishnamoorthy**, University of Louisiana at Lafayette (1035-62-764)
- ▶ 8:30AM *Compressed Sensing Signal Recovery in the Presence of Noise.* (1468)  
**Elaine T. Hale**, Rice University (1035-62-1284)
- ▶ 8:45AM *Bayesian Mark Recapture for Small Samples.* Preliminary report. (1469)  
**Joe Liddle**, University of Alaska Southeast (1035-62-1395)
- ▶ 9:00AM *Parametric Estimation for Single Photon Emission Computed Tomography (SPECT).* Preliminary report. (1470)  
**Arkady Shemyakin**, University of St Thomas, St. Paul, MN, and **Jason Q McClintic\***, University of St Thomas, St Paul, MN (1035-62-1410)
- 9:15AM *Inference on the Common Variance of Correlated Normal Random Variables.* (1471)  
**Daniel J. Ghezzi**, King's College (1035-62-1615)
- ▶ 9:30AM *Singular Value Decomposition and Its Applications to Fourier Transform Infrared Spectroscopy Studies of Amyloid Protein Dynamics.* (1472)  
**Taylor R Pressler\*** and **Sean M Decatur**, Mount Holyoke College (1035-62-1859)
- ▶ 9:45AM *Inflationary Trends with Bayesian Learning.* (1473)  
**Barbara A Bennie\*** and **Jarod V Hart**, University of Wisconsin - La Crosse (1035-91-416)
- ▶ 10:00AM *Separable Preferences and Referendum Elections.* (1474)  
**Jonathan K Hodge**, Grand Valley State University (1035-91-436)
- ▶ 10:15AM *Restricted Truthful Combinatorial Auction Mechanisms.* (1475)  
**Andrei Lapets** and **Alex Levin\***, Harvard University (1035-91-1482)
- ▶ 10:30AM *Using evolutionary models to infer leadership structure from linguistic data.* Preliminary report. (1476)  
**W. Garrett Mitchener**, College of Charleston (1035-91-1736)
- ▶ 10:45AM *Voting by Proportional Representation: Theory and Practice.* Preliminary report. (1477)  
**Richard H. Burkhart**, Seattle, WA (1035-91-129)

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

8:00 AM – 10:50 AM

- Organizers: **Darren A. Narayan**, Rochester Institute of Technology  
**Bernard Brooks**, Rochester Institute of Technology  
**Jacqueline A. Jensen**, Sam Houston State University  
**Vadim Ponomarenko**, San Diego State University  
**Tamas Wiandt**, Rochester Institute of Technology
- 8:00AM *A combinatorial Lusternik-Schnirelman-Borsuk theorem on the d-cube.* (1478)  
**Kyle E. Kinneberg**, Claremont McKenna College, **Aaron Mazel-Gee\***, Brown University, **Mutiara Sondjaja** and **Francis Edward Su**, Harvey Mudd College (1035-52-135)
  - ▶ 8:30AM *Effects of Localized Forcing on Driven Thin Liquid Films.* (1479)  
**Rachel Levy** and **Steven Rosenthal\***, Harvey Mudd College (1035-35-137)



- 9:00AM *A probability model in population genetics.*  
▶ (1480) Preliminary report.  
**Eline Boghaert\***, Cooper Union, **Sandhya Ramakrishnan**, Massachusetts Institute of Technology, and **Evan Fisher**, Lafayette College (1035-60-962)
- 9:30AM *The Stick Index of Satellite Knots.*  
▶ (1481) **Tirasan Khandhawit**, Duke University (1035-54-954)
- 10:00AM *Bishop's Volume Comparison Theorem with Integral Curvature-Bounds on Lorentz Manifolds.*  
▶ (1482) **Bryon Aragam\***, University of Tennessee - Knoxville, **Justin Corvino**, Lafayette College, **Andrew Karl**, University of Notre Dame, and **Austin Rochford**, University of Maryland - Baltimore County (1035-53-930)
- 10:30AM *Alexander Polynomials of Central Braid Knots.*  
▶ (1483) Preliminary report.  
**Nathan Brothers\***, University of North Carolina, Asheville, and **Sean Evans**, Millersville University (1035-57-834)

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

8:00 AM – 10:50 AM

Organizers: **Bonnie S. Saunders**, University of Illinois, Chicago  
**William H. Barker**, Bowdoin College  
**Dale R. Oliver**, Humboldt State University  
**Michael Starbird**, University of Texas, Austin

- 8:00AM *Helping Students Cross the Bridge.*  
▶ (1484) **Susanna S. Epp**, DePaul University (1035-97-1263)
- 8:30AM *How do your students think about proof? A DVD resource for mathematicians.*  
(1485) **Lara J. Alcock**, Mathematics Education Centre, Loughborough University, UK (1035-97-768)
- 9:00AM *The Necessity Principle and Its Implementation in Mathematics Instruction.*  
▶ (1486) **Guershon Harel**, University of California, San Diego (1035-97-733)
- 9:30AM *The Learning of Infinity-Related Topics in Bridge Courses.*  
(1487) **Kirk Weller**, University of Michigan - Flint (1035-97-691)
- 10:00AM *A Beginning Graduate Transition-to-Proof Course.*  
▶ (1488) **Annie Selden\*** and **John Selden**, New Mexico State University (1035-97-797)
- 10:30AM *Discussion of the Bridge to the Upper Division: From Pedagogical Research into Pedagogy and Back Again.*  
(1489) **George R. Exner\***, Bucknell University, and **Christopher C. Leary**, SUNY Geneseo (1035-97-1024)

**AMS-MAA Special Session on History of Mathematics, III**

8:00 AM – 10:50 AM

Organizers: **Joseph W. Dauben**, Lehman College, CUNY  
**Patti Hunter**, Westmont College  
**Victor J. Katz**, University of District of Columbia  
**Karen H. Parshall**, University of Virginia

- 8:00AM *The method for the extraction of square roots in Giacomo Rho's 'Chou Suan'.* Preliminary report.  
▶ (1490) **Jose A. Cervera**, Tecnologico de Monterrey (1035-01-558)
- 8:30AM *Beyond Trigonometry: On the Study of Quadrilaterals in the Early 17th Century Dutch Republic.* Preliminary report.  
▶ (1491) **Eisso J Atzema**, University of Maine (1035-01-455)
- 9:00AM *When Euler Met l'Hospital.*  
▶ (1492) **William Dunham**, Muhlenberg College (1035-01-272)
- 9:30AM *Euler (and DeMoivre) Meet Doc Holliday: The Mathematical Analysis of a Popular Game of Chance.* Preliminary report.  
▶ (1493) **Todd Timmons**, University of Arkansas-Fort Smith (1035-01-421)
- 10:00AM *Benjamin Franklin's Numbers.*  
▶ (1494) **Paul C. Pasles**, Villanova University (1035-01-503)
- 10:30AM *It's All for the Best: Optimization in the History of Science.* Preliminary report.  
▶ (1495) **Judith V. Grabiner**, Pitzer College (1035-01-705)

**AMS-SIAM Special Session on Environmental Mathematics: Some Mathematical Problems on Climate Change and Geophysical Fluid Dynamics, III**

8:00 AM – 10:50 AM

Organizers: **Samuel S. Shen**, San Diego State University  
**Gerald R. North**, Texas A&M University

- 8:00AM *Hysteresis in a Rotating Differentially Heated Spherical Shell of Boussinesq Fluid.*  
(1496) **William F. Langford\***, University of Guelph, and **Gregory M. Lewis**, University of Ontario Institute of Technology (1035-76-45)
- 8:30AM *On the dissipativity of the two-layer quasi-geostrophic beta plane equations.*  
(1497) **R. Lee Panetta**, Texas A&M University (1035-86-1394)
- 9:00AM *Macroturbulence and the General Circulation of the Atmosphere.*  
▶ (1498) **Tapio Schneider**, California Institute of Technology (1035-76-817)
- 9:30AM *Bayesian Climate Change Assessments.*  
▶ (1499) **Richard A. Levine**, San Diego State University (1035-62-735)
- 10:00AM *Reconstruction of Meteorological Fields Using Spatial Functions With Examples.*  
(1500) **Thomas M Smith\***, NOAA/STAR/SCSB, **Samuel Shen**, San Diego State University, **Phillip A Arkin** and **Mathew Sapiano**, CICS/ESSIC, University of Maryland (1035-86-569)
- 10:30AM *A Theory for Estimating Uncertainties in the Assessment of Global, Hemispherical and Regional Surface Air Temperature Changes Since 1861.*  
(1501) **Samuel S Shen**, San Diego State University (1035-86-431)

**AMS Special Session on Financial Mathematics, III**

8:00 AM – 10:55 AM

Organizers: **Jean-Pierre Fouque**, University of California Santa Barbara  
**Kay Giesecke**, Stanford University  
**Ronnie Sircar**, Princeton University  
**Knut Solna**, University of California Irvine

- 8:00AM *Inverse problems in option pricing: a probabilistic solution via random mixtures of martingales.*  
(1502) **Rama Cont**, Columbia University (1035-60-363)
- 9:00AM *On a second order numerical scheme for computing exercise regions of American lookback options.*  
▶ (1503) Preliminary report.  
**Stephane Villeneuve\***, University of California Santa Barbara, and Toulouse School of Economics, and **Antonino Zanette**, Finanziari Universita di Udine (1035-65-545)
- 9:30AM *Markovian projection on stochastic volatility models.*  
(1504) **Alexandre Antonov**, NumeriX, **Timur Misirpashaev\***, Merrill Lynch, and **Vladimir Piterberg**, Barclays Capital (1035-60-372)
- 10:00AM *Putting Your Money Where Your Mouth Is: The Effect of Commitment and Competition on Mutual Fund Allocations.*  
(1505) **Ron Kaniel**, Duke University, **Stathis Tompaidis\*** and **Ti Zhou**, University of Texas at Austin (1035-91-364)
- 10:30AM *A Multi Time Scale Microstructure Model — An Empirical Study.* Preliminary report.  
(1506) **Zhifeng Zhang**, LaBranche Structured Products, LLC (1035-62-702)

**AMS Special Session on Heegaard Splittings, Bridge Positions, and Low Dimensional Topology, I**

8:00 AM – 10:50 AM

Organizers: **Jesse Johnson**, Yale University  
**Abigail A. Thompson**, University of California Davis  
**Robin Wilson**, University of California Santa Barbara

- 8:00AM *The width complex for knots and 3-manifolds.*  
(1507) Preliminary report.  
**Jennifer Schultens**, UC Davis (1035-57-198)
- 8:30AM *Studying knots via c-compressions.*  
(1508) **Maggy Tomova**, Rice University (1035-57-938)
- 9:00AM *A Classification of Spanning Surfaces for Alternating Knots and Links.*  
(1509) **Colin C Adams\***, Williams College, and **Thomas Kindred**, University of California-Santa Barbara (1035-57-1562)
- 9:30AM *Circular thin position for 3-manifolds.* Preliminary report.  
(1510) **Fabiola Manjarrez-Gutierrez**, University of California, Davis (1035-57-603)
- 10:00AM *Stabilization and amalgamation of Heegaard splittings.*  
(1511) **Ryan Derby-Talbot**, The American University in Cairo (1035-57-851)
- 10:30AM *Counterexamples to the Stabilization Conjecture.*  
(1512) **David C Bachman**, Pitzer College (1035-57-166)

**AMS Special Session on E-Theory, Extensions, and Elliptic Operators, I**

8:00 AM – 10:40 AM

Organizers: **Constantin D. Dumitrescu**, University of Arizona  
**John D. Trout**, Dartmouth College

- 8:00AM *Dirac operator and K-theory for discrete groups.*  
(1513) **Paul Frank Baum**, Penn State University (1035-19-773)

- 9:00AM *Projective and Semiprojective C\*-Algebras Related to K-Theory.* Preliminary report.  
(1514) **Terry A Loring**, University of New Mexico (1035-46-1420)
- 9:30AM *Wreath products and their invariants.* Preliminary report.  
(1515) **C Farsi\***, University of Colorado, and **C Seaton**, Rhodes College (1035-19-459)
- 10:00AM *Contractions of semisimple groups and the Mackey analogy.*  
(1516) **Nigel Higson**, Penn State University (1035-22-1149)

**AMS Special Session on Algebraic and Geometric Aspects of Integrable Systems, I**

8:00 AM – 10:50 AM

Organizers: **Baofeng Feng**, University of Texas-Pan American  
**Wenxiu Ma**, University of South Florida  
**Kenichi Maruno**, University of Texas-Pan American  
**Zhijun Qiao**, University of Texas-Pan American  
**Taixi Xu**, Southern Polytechnic State University

- 8:00AM *A New Multi-component KP Hierarchy.*  
(1517) **Yunbo Zeng**, Tsinghua University (1035-35-1429)
- 8:30AM *The Generic Dimension of the Space of Smooth Splines of Degree 7 on Tetrahedral Partitions.*  
(1518) **Xiquan Shi\***, **Ben Kamau**, Delaware State University, **Baocai Yin**, College of Computer Science, Beijing Polytechnic University, and **Fengshan Liu**, Delaware State University (1035-65-60)
- 9:00AM *Multicusped solitons of the Camassa-Holm equation.*  
(1519) **Allen Parker**, Newcastle University (1035-35-2001)
- 9:30AM *Cupsons and Smooth Solitons of the Degasperis-Procesi Equation Under Inhomogeneous Boundary Condition.*  
(1520) **Guoping Zhang\***, Morgan State University, and **Zhijun Qiao**, University of Texas-Pan American (1035-35-1108)
- 10:00AM *Finite-Dimensional Integrable Systems Associated with the Modified Dispersive Water Wave Equation.*  
(1521) **Taixi Xu**, Southern Polytechnic State University (1035-35-1678)
- 10:30AM *A connection between HH3 and KdV with one source.*  
(1522) **Junxiao Zhao\***, School of Mathematical Sciences of Graduate University of Chinese Academy of Sciences, and **Robert Conte**, SPEC/CEA Saclay, (1035-35-1505)

**AMS Special Session on Expanders and Ramanujan Graphs: Construction and Applications, II**

8:00 AM – 10:40 AM

Organizers: **Michael T. Krebs**, California State University, Los Angeles  
**Anthony M. Shaheen**, California State University, Los Angeles  
**Audrey A. Terras**, University of California San Diego

- 8:00AM *Connectivity of a family of expanders.* Preliminary report.  
(1523) **Patrick Bahls**, University of North Carolina, Asheville (1035-05-171)

- 8:30AM *On the Probability that Random Graphs are Ramanujan.*  
 ▶ (1524) **Steven J Miller\***, Brown University, **Tim Novikoff**, Cornell University, and **Anthony Sabelli**, Brown University (1035-05-92)
- 9:00AM *Jacobian of a finite graph.*  
 (1525) **Tatiana Smirnova-Nagnibeda**, University of Geneva, Switzerland (1035-05-1123)
- 9:30AM *The Spectra of Random Cayley Graphs.*  
 (1526) **Alexander C Russell**, University of Connecticut (1035-43-1552)
- 10:00AM *Applications of Ramanujan graphs in Cryptography.*  
 (1527) **Kristin E Lauter**, Microsoft Research (1035-11-1953)

**AMS Special Session on Probability Theory and Statistical Mechanics, I**

8:00 AM – 10:40 AM

Organizers: **Itai Benjamini**, Weizmann Institute and Microsoft Research  
**Wendelin Werner**, University of Paris-Sud

- 8:00AM *Statistical mechanics on sparse random graphs.*  
 (1528) **Andrea Montanari**, Stanford University (1035-82-2026)
- 9:00AM *Dynamical sensitivity of critical planar percolation, and the incipient infinite cluster.*  
 (1529) **Pete Gabor**, Microsoft Research (1035-60-1902)
- 10:00AM *Eigenvalue order statistics for random Schrödinger operators with doubly exponential tails.* Preliminary report.  
 (1530) **Marek Biskup\***, UCLA, and **Wolfgang König**, Leipzig University (1035-82-1486)

**AMS Special Session on Global Optimization and Operations Research Applications, I**

8:00 AM – 10:50 AM

Organizer: **Ram U. Verma**, University of Central Florida

- 8:00AM *A Transformation-Based Optimization Method.*  
 (1531) **George Leitmann**, College of Engineering, University of California (1035-49-23)
- 8:30AM *Scheduling Algorithms with Applications to Radar Resource Management.*  
 ▶ (1532) **Zoran Spasojevic**, MIT-Lincoln Laboratory (1035-05-228)
- 9:00AM *Optimal Control of Systems Determined by Strongly Nonlinear Operator Valued Measures.*  
 (1533) **N.U Ahmed**, University of Ottawa (1035-93-159)
- 9:30AM *Advances on the Bessis-Moussa-Villani trace conjecture.*  
 ▶ (1534) **Christopher J Hillar**, Texas A&M University (1035-15-648)
- 10:00AM *Gradient Methods for Minimization in Non-Hilbert Sobolev Spaces with Applications.* Preliminary report.  
 (1535) **Ivie Stein Jr.**, University of Toledo (1035-49-831)
- 10:30AM *Analysis of Greedy Approximation with Nonsubmodular Potential Function.*  
 (1536) **Ding-Zhu Du**, University of Texas at Dallas (1035-68-256)

**MAA Session on Biomathematics in the Undergraduate Curriculum, II**

8:00 AM – 10:35 AM

Organizers: **Timothy D. Comar**, Benedictine University  
**Olcay Akman**, Illinois State University  
**Glenn W. Ledder**, University of Nebraska  
**Lisa G. Townsley**, Benedictine University

- 8:00AM *A Joint Computer Lab Can Serve Both Biocalculus and Traditional Calculus Students.*  
 (1537) **Lisa Townsley**, Benedictine University (1035-B1-576)
- 8:20AM *S<sup>3</sup>: Sand, Surf, and Slopes - Integration of Marine Science (and Computing Sciences) into Precalculus.* Preliminary report.  
 ▶ (1538) **Pam Crawford\***, **Anne Acker**, and **Daniel McCarthy**, Jacksonville University (1035-B1-799)
- 8:40AM *Evolution of a Statistics/Biology Learning Community.*  
 ▶ (1539) **William Ardis\*** and **Sukanya Subramanian**, Collin County Community College (1035-B1-1783)
- 9:00AM *Linking The Mathematics Curriculum to Investigative Biology Exercises.* Preliminary report.  
 ▶ (1540) **Hema Gopalakrishnan\*** and **Kirk Bartholomew**, Sacred Heart University (1035-B1-1303)
- 9:20AM *An Extension of Tajima's D Statistic by a Student-Faculty Cross-Interdisciplinary Team.* Preliminary report.  
 ▶ (1541) **Pam J Ryan**, Truman State University (1035-B1-740)
- 9:40AM *Inspiring Examples from Biology for Teaching Limit Theorems in Probability.*  
 ▶ (1542) **Raina S. Robeva**, Sweet Briar College (1035-B1-1129)
- 10:00AM *Multiple Visualizations of Quantitative Biology: The ESTEEM Collection.*  
 ▶ (1543) **Rama Viswanathan\***, Beloit College, and **Gretchen A. Koch**, Goucher College (1035-B1-1967)
- 10:20AM *Programming bioinformatics: Using biopython and sage to make life easier.*  
 ▶ (1544) **Marshall Hampton**, Univ. Minnesota Duluth (1035-B1-1561)

**MAA Session on Cryptology for Undergraduates, II**

8:00 AM – 10:55 AM

Organizers: **Chris Christensen**, Northern Kentucky University  
**Robert E. Lewand**, Goucher College

- 8:00AM *Art and Science of Secret Communication.* Preliminary report.  
 ▶ (1545) **Semra Kilic-Bahi** and **LaVonne Batalden\***, Colby-Sawyer College (1035-G1-808)
- 8:20AM *Cryptology as a Pedagogical Tool.*  
 ▶ (1546) **Manmohan Kaur**, Benedictine University (1035-G1-1946)
- 8:40AM *ECrypting Images and Sound.* Preliminary report.  
 ▶ (1547) **Tim McDevitt**, Elizabethtown College (1035-G1-1746)
- 9:00AM *Applications of Galois Field to Coding Theory and Cryptology.* Preliminary report.  
 ▶ (1548) **Ahlam E Tannouri\*** and **Sam F Tannouri**, Morgan State University (1035-G1-1961)

- 9:20AM *Cryptology with Spreadsheets: A Computer Course for Everyone*. Preliminary report.  
▶ (1549) **James M. Belk**, Texas A&M University (1035-G1-1918)
- 9:40AM *"Codes, Ciphers, and Cryptography": An Honors Colloquium in Mathematics*.  
▶ (1550) **Michael Karls**, Ball State University (1035-G1-1534)
- 10:00AM *Attacking Digraphs using Singular Value Decomposition*. Preliminary report.  
▶ (1551) **Bill Linderman\*** and **Andrew Simoson**, King College (1035-G1-1795)
- 10:20AM *Cryptology Course: A Perfect Marriage of Theory and Applications*.  
(1552) **Izabela Kanaana**, Sonoma State University (1035-G1-1709)
- 10:40AM *Coding Theory Topics for Your Cryptology Course*. Preliminary report.  
▶ (1553) **Keith E. Mellinger**, University of Mary Washington (1035-G1-1093)

**David M. Strong**, Pepperdine University

**Joe Yanik**, Emporia State University

- 8:00AM *Flash mathlets incorporating student-drawn graphs*.  
▶ (1563) **Daniel Gries**, Merrimack College (1035-P1-192)
- 8:20AM *Steal this Applet!*  
▶ (1564) **Doug Ensley\***, Shippensburg University, and **Barbara Kaskosz**, University of Rhode Island (1035-P1-417)
- 8:40AM *Parametric Functions in a Flash*.  
(1565) **Therese Shelton**, Southwestern University (1035-P1-618)
- 9:00AM *Applying the Lessons of Flash at the Beach (MAA PREP 2007 Workshop) to Developing Mathlets for Calculus*.  
▶ (1566) **Barbara H Margolius**, Cleveland State University (1035-P1-1769)
- 9:20AM *Incorporating Conceptual Software into an Introductory Statistics Service Course*.  
▶ (1567) **John D McKenzie**, Babson College (1035-P1-1840)
- 9:40AM *ComplexTool: An applet and discovery activities to visualize complex functions*. Preliminary report.  
▶ (1568) **Beth Schaubroeck\*** and **Jim Rolf**, U.S. Air Force Academy (1035-P1-1100)
- 10:00AM *Maplets for Calculus—Intuition, Computation, Drill and Simple Proofs*.  
▶ (1569) **Philip B. Yasskin\***, Texas A&M University, and **Douglas B. Meade**, University of South Carolina (1035-P1-1661)
- 10:20AM *Spreadsheets Make EXCELlent Tools for Exploring Statistics*.  
▶ (1570) **Sarah L Mabrouk**, Framingham State College (1035-P1-1959)
- 10:40AM *Demonstrating a Tool for Content MathML Authoring*.  
▶ (1571) **Thomas E Leathrum**, Jacksonville State Univ. (1035-P1-1267)

**MAA Session on Mathematics and the Arts, II**

8:00 AM – 10:55 AM

Organizer: **Douglas E. Norton**, Villanova University

- 8:00AM *The Aesthetics of Rectangles*.  
(1554) **Kevin Hartshorn**, Moravian College (1035-N1-1452)
- 8:20AM *Origami Fold Patterns as Patchwork: An Origami Crane Quilt*.  
▶ (1555) **Elaine T. Hale**, Rice University (1035-N1-1323)
- 8:40AM *Teaching Symmetry with Depression Glass*.  
▶ (1556) **Darrah P. Chavey**, Beloit College (1035-N1-1916)
- 9:00AM *Fractal Patchwork Quilts*. Preliminary report.  
▶ (1557) **Pedro Teixeira**, Knox College (1035-N1-1096)
- 9:20AM *Design, Fabrication, and Properties of a Fractal Crystal*. Preliminary report.  
▶ (1558) **Robert W. Fathauer\***, Tessellations Company, **Nicholas Duchnowski** and **Hank Kaczmarek**, Beckman Institute, University of Illinois at Urbana-Champaign (1035-N1-1305)
- 9:40AM *Kaleidoscopes and Other Reflections*. Preliminary report.  
▶ (1559) **Anne M. Burns**, Long Island University (1035-N1-306)
- 10:00AM *Blackwork embroidery and algorithms for maze traversals*.  
▶ (1560) **Joshua Brandon Holden**, Rose-Hulman Institute of Technology (1035-N1-826)
- 10:20AM *Knitting Uniformly Curved Pants*.  
▶ (1561) **Sarah-Marie Belcastro**, Smith College and Hampshire College Summer Studies in Mathematics (1035-N1-956)
- 10:40AM *Models of Surfaces and Abstract Art in the Early 20th Century*.  
▶ (1562) **Angela G. Vierling-Claassen**, Lesley University (1035-N1-626)

**MAA Session on Using Innovative Technologies to Implement Active Learning in Mathematics (and in other STEM disciplines)**

8:00 AM – 10:55 AM

Organizers: **Marilyn A. Reba**, Clemson University  
**Beth Simon**, University of California San Diego

- 8:00AM *Realizing active learning in a physics classroom using Ubiquitous Presenter and Tablet PCs*.  
▶ (1572) **Ed Price\***, California State University San Marcos, and **Beth Simon**, Carl Wieman Science Education Initiative, University of British Columbia (1035-Y1-1757)
- 8:20AM *Active Learning in Stem Courses via Tablet PCs with Web-Based Classroom Interaction Software*.  
(1573) **Marilyn Reba**, Clemson University (1035-Y1-1864)
- 8:40AM *Tablet PC as a Gateway to Calculus*. Preliminary report.  
(1574) **Kyle Riley\*** and **Jill Trimble**, South Dakota School of Mines & Technology (1035-Y1-1616)
- 9:00AM *Successful implementation of Tablet PC technology in future teachers' mathematics education classes*.  
▶ (1575) **Olga Kosheleva\***, The University of Texas at El Paso, **Ana Medina-Rusch**, University of Georgia, and **Vera Ioudina**, University of California at Los Angeles (1035-Y1-1364)

**MAA Session on Mathlets and Web Resources for Mathematics and Statistics Education, I**

8:00 AM – 10:55 AM

Organizers: **Thomas E. Leathrum**, Jacksonville State University  
**Patricia B. Humphrey**, Georgia Southern University  
**Christopher J. Lacke**, Rowan University

- 9:20AM (1576) *PRAXIS Project: Interactive Materials for Future Teachers.*  
**Erick B Hofacker**, University of Wisconsin-River Falls, and **Kathryn T Ernie\***, University of Wisconsin - River Falls (1035-Y1-1858)
- ▶ 9:40AM (1577) *Using Clickers in Introductory Statistics to Enhance Conceptual Understanding.* Preliminary report.  
**Teri J Murphy**, University of Oklahoma (1035-Y1-679)
- 10:00AM (1578) *Claiming Virtual Worlds for Mathematics Education.*  
**Jon Roginski**, United States Military Academy at West Point (1035-Y1-1766)
- ▶ 10:20AM (1579) *Using the TI-Navigator Network of Graphing Calculators in College Algebra.*  
**Bernadette M. Mendoza-Spencer\***, **Joe Champion**, University of Northern Colorado, and **Robert Powers**, University of Northern Colorado (1035-Y1-1653)
- 10:40AM (1580) *Integrating Clickers into Calculus.*  
**Kimberly A. Roth**, Juniata College (1035-Y1-1793)

**MAA General Contributed Paper Session, IX**

8:00 AM – 10:40 AM

Organizer: **Sarah L. Mabrouk**, Framingham State College  
 Moderators: **Elizabeth A. Stanhope**, Lewis & Clark College  
**Leigh L. Noble**, USMA West Point & Army Research Lab  
**K. Scott Alberts**, Truman State University  
**Brad Bailey**, North Georgia College & State University

- ▶ 8:00AM (1581) *The Advent Of Sound Pedagogy In Early Nineteenth Century Elementary American Textbooks.*  
**Andrew B Perry**, Springfield College (1035-Z1-1758)
- ▶ 8:15AM (1582) *Mathematics legends: Real, purely imaginary, and complex.* Preliminary report.  
**David Fowler**, University of Nebraska - Lincoln (1035-Z1-1646)
- 8:30AM (1583) *Just-in-time precalculus reviews for calculus students.*  
**Jeffrey L. Hirst\*** and **William C. Bauldry**, Appalachian State University (1035-Z1-259)
- ▶ 8:45AM (1584) *Illustrating Economic Inequality Analysis Techniques with Major League Baseball Salary Data.*  
**J Travis Hale**, LBJ School of Public Affairs – University of Texas at Austin (1035-Z1-343)
- ▶ 9:00AM (1585) *Toward Free, Open Source Textbooks.*  
**David R Guichard**, Whitman College (1035-Z1-402)
- 9:15AM (1586) *New Math Faculty.* Preliminary report.  
**Nissa R Yestness\*** and **Shandy Hauk**, University of Northern Colorado (1035-Z1-1741)
- 9:30AM (1587) *Fishing for Estimates.*  
**Paul R. Coe**, Dominican University (1035-Z1-1969)
- ▶ 9:45AM (1588) *Fostering Technical Writing in the Undergraduate Math Classroom.*  
**Leigh L Noble**, USMA West Point & Army Research Lab (1035-Z1-1881)
- ▶ 10:00AM (1589) *Using Ideas from Asian Mathematic in the Classroom.*  
**Shinemin Lin**, Savannah State University, Savannah, Georgia (1035-Z1-451)

- ▶ 10:15AM (1590) *A fundamental theorem of algebra for the perplex numbers.*  
**Robert D. Poodiack\*** and **Kevin J. LeClair**, Norwich University (1035-Z1-925)
- ▶ 10:30AM (1591) *Magic squares and a magic tortoise developed in the 17th century in Korea.* Preliminary report.  
**Heakyung Lee**, Winthrop University (1035-Z1-323)

**SIAM Minisymposium on Graph Coloring and Partitioning, I**

8:00 AM – 10:50 AM

Organizers: **Andre Kundgen**, California State University, San Marcos  
**Radhika Ramamurthi**, California State University, San Marcos

- 8:00AM (1592) *Recent results and open problems in mixed hypergraph coloring.*  
**Vitaly Voloshin**, Troy University (1035-05-287)
- ▶ 8:30AM (1593) *Computer methods for finding graph decompositions.* Preliminary report.  
**Stephen G. Hartke**, University of Nebraska-Lincoln (1035-05-1022)
- ▶ 9:00AM (1594) *Coloring triangle-free graphs on surfaces.*  
**Zdenek Dvorak\***, Georgia Institute of Technology, **Daniel Kral**, Charles University, Prague, Czech Republic, and **Robin Thomas**, Georgia Institute of Technology (1035-68-570)
- 9:20AM Break.
- 9:35AM (1595) *List-coloring outerplanar graphs.*  
**Joan P. Hutchinson**, Macalester College (1035-05-934)
- ▶ 10:00AM (1596) *Star coloring planar graphs.*  
**Craig M. Timmons**, California State University San Marcos (1035-05-1406)
- ▶ 10:30AM (1597) *On-line Ramsey theory in bounded-degree graphs.*  
**Jane Butterfield**, **Tracy Grauman**, **Bill Kinnersley**, **Kevin Milans**, **Christopher Stocker** and **Douglas B. West\***, University of Illinois - Urbana (1035-05-605)

**ASL Session for Contributed Papers, II**

8:00 AM – 8:45 AM

- 8:00AM (1598) *On Russell's mathematical philosophy: Is also Set Theory a part of philosophy?*  
**Sandro Skansi**, Zagreb, Croatia
- 8:25AM (1599) *Integration and differentiation in an elementary topos.*  
**Matthew Jackson**, Lawrence University

**AWM Workshop**

8:20 AM – 4:20 PM

*This session has several parts that will be listed separately by time in the program. All presentations are open to all JMM participants.*

**AMS Session on Analysis and Ordinary Differential Equations, III**

8:30 AM – 10:10 AM

- 8:30AM (1600) *Compactness of the  $\bar{\partial}$ -Neumann operator.*  
**Mehmet Celik**, Texas A&M University (1035-32-786)
- 8:45AM (1601) *A sufficient condition and higher regularity of strong local minimizers.*  
**Worku T. Bitew\*** and **Yury Grabovsky**, Temple University (1035-49-78)

## Program of the Sessions – Wednesday, January 9 (cont'd.)

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- 9:00AM *Hybrid Functions Approach for the Solution of Nonlinear Problems in the Calculus of Variations.*  
(1602) **Mohsen Razzaghi**, Mississippi State University (1035-49-219)
- 9:15AM *Lipschitzian Stability and Optimal Value Functions via Generalized Differentiation.*  
(1603) **Boris Mordukhovich**, Wayne State University, and **Mau Nam Nguyen\***, University of Texas-Pan American (1035-49-485)
- 9:30AM *The Power-Law Asymptotics for Some Model Problems of Polycrystal Plasticity.*  
(1604) **Marian Bocea**, North Dakota State University (1035-49-492)
- 9:45AM *On a Verification Theorem for an Optimal Control Problem.* Preliminary report.  
(1605) **Jesus A Pascal**, American University of Nigeria (1035-49-1111)
- 10:00AM *Optimal control of a time-dependent thermistor problem.* Preliminary report.  
(1606) **Volodymyr Hryniv\***, Worcester Polytechnic Institute, **Suzanne Lenhart**, University of Tennessee at Knoxville, and **Vladimir Protopopescu**, ORNL (1035-49-1348)

### AMS Session on Algebra and Group Theory, IV

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8:30 AM – 10:25 AM

- 8:30AM *Killing-Coxeter Diagrams in the Root Lattice.*  
(1607) **Miriam H. Lamb**, University of Wisconsin Oshkosh (1035-22-1717)
- 8:45AM *A Grothendieck Module with Applications to Rationality of the Poincaré Series.*  
(1608) **Daniel R Jordan**, Columbia College Chicago (1035-18-104)
- 9:00AM *Non-connective delooping of K-theory of exact categories.*  
(1609) **Seshendra Pallekonda**, SUNY at Binghamton (1035-19-1067)
- 9:15AM *Supercharacter theories of cyclic p-groups.*  
(1610) **Anders O. F. Hendrickson**, University of Wisconsin - Madison (1035-20-1855)
- 9:30AM *Structure Theorems for Subgroups of Homeomorphisms Groups of the Unit Circle.* Preliminary report.  
(1611) **Collin Bleak**, University of Nebraska, Lincoln, **Martin Kassabov** and **Francesco Matucci\***, Cornell University (1035-20-1849)
- 9:45AM *IA-automorphisms and localization of nilpotent groups.*  
(1612) **Marcos Zyman**, City University of New York-BMCC (1035-20-1910)
- 10:00AM *Restricting supercharacters of the finite group of unipotent uppertriangular matrices.*  
(1613) **Nat Thiem**, University of Colorado at Boulder, and **Vidya Venkateswaran\***, University of Chicago (1035-20-1974)
- 10:15AM *Braids Without Twists.*  
(1614) **James M. Belk\***, Texas A&M University, and **Francesco Matucci**, Cornell University (1035-20-1861)

### AWM Workshop: Research Presentations by Recent Ph.D.'s, I

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8:30 AM – 10:20 AM

- 8:30AM *Graceful Labelings Meet Directed Graphs.*  
(1615) **Alison Marr**, Southwestern University

- 9:00AM *Hypergeometric functions over  $F_p$  and Ramanujan's T-Function.*  
(1616) **Jenny Fuselier**, United States Military Academy
- 9:30AM *Growth of the Bass Numbers.*  
(1617) **Janet Striuli**, University of Nebraska-Lincoln
- 10:00AM *Random Effects Models for Quantitative Trait Locus (QTL) Mapping with Inbred Strains.*  
(1618) **Lara Bauman**, University of California Los Angeles

### AMS Invited Address

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9:00 AM – 9:50 AM

- (1619) *Progress in Hyperbolic Conservation Laws.*  
**Constantine M. Dafermos**, Brown University (1035-35-02)

### ASL Invited Address

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9:00 AM – 9:50 AM

- (1620) *Applications of set theory to operator algebras.*  
**Ilijas Farah**, York University (1035-03-103)

### AMS Special Session on The Feynman Integral in Mathematics and Physics, I

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9:00 AM – 11:00 AM

- Organizer: **Lance W. Nielsen**, Creighton University
- 9:00AM *Path Integral Representations for the Propagators Associated to Schrödinger Operators on Local Fields.*  
(1621) **Trond Digernes**, The Norwegian University of Science and Technology (NTNU), **V. S. Varadarajan**, University of California Los Angeles (UCLA), and **David E. Weisbart\***, The Norwegian University of Science and Technology (1035-81-1186)
- 9:30AM *Noncommutative space variables and a letter of von Neumann.*  
▶ (1622) **Randall Crist**, Creighton University (1035-01-1971)
- 10:00AM *Taylor's formula with remainder in Feynman's operational calculus.*  
(1623) **Byoung Soo Kim**, School of Liberal Arts, Seoul National University of Technology (1035-44-1183)
- 10:30AM *Weak Convergence and Vector-Valued Functions: Improving the Stability Theory of Feynman's Operational Calculi.*  
(1624) **Lance Nielsen**, Creighton University (1035-47-590)

### MAA Minicourse #10: Part B

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9:00 AM – 11:00 AM

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

### MAA Minicourse #15: Part B

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9:00 AM – 11:00 AM

- Evaluating student presentations in mathematics.*  
Organizers: **Suzanne Dorée**, Augsburg College  
**Richard Jardine**, Keene State College  
**Thomas Linton**, Central College

**MAA Minicourse #4: Part B**

9:00 AM – 11:00 AM

*Wavelets and applications: A multidisciplinary undergraduate course with an emphasis on scientific computing.*

Organizers: **Patrick J. Van Fleet**, University of St. Thomas  
**David K. Ruch**, Metropolitan State College of Denver

**NAM Panel Discussion**

9:00 AM – 9:50 AM

**Student Hospitality Center**

9:00 AM – 2:00 PM

**Exhibits and Book Sales**

9:00 AM – 1:00 PM

**Project NExT Panel Discussion**

9:30 AM – 11:00 AM

*New technologies for faculty: Wikis, discussion boards, and clickers.*

Organizers: **Mason A. Porter**, University of Oxford  
**Holly S. Zullo**, Carroll College

Panelists: **Joy L. Becker**, University of Wisconsin, Stout  
**Kris Green**, St. John Fisher College  
**Jean McGivney-Burelle**, University of Hartford  
**Steven W. Morics**, University of Redlands  
**Reva Narasimhan**, Kean University

**ASL Invited Address**

10:00 AM – 10:50 AM

(1625) *Measures and their random reals.*  
**Jan Reimann**, University of California Berkeley  
(1035-03-266)

**NAM Business Meeting**

10:00 AM – 10:50 AM

**MAA Retiring Presidential Address**

10:05 AM – 10:55 AM

(1626) *The teaching-technology linkage in mathematics.*  
**Carl C. Cowen**, Indiana University-Purdue University Indianapolis (1035-A0-16)

**AWM Workshop: Poster Session with Presentations from Women Graduate Students**

10:30 AM – 11:00 AM

Organizer: **Bettye Anne Case**

10:30AM *Computing Cryptographic Curves Using the*  
(1627) *Canonical Lift of Supersingular Elliptic Curves.*  
**Juliana Belding**, University of Maryland

10:30AM *Minimal Distortion Bending and Morphing of*  
(1628) *Compact Manifolds.*  
**Oksana Bihun**, University of Missouri-Columbia

10:30AM *Using Regularized Singularities and Spectral*  
(1629) *Deferred Correction Methods to Model Fluid Flow Generated by a.*  
**Elizabeth Bouzarth**, University of North Carolina at Chapel Hill

10:30AM *Prime Ideals in Rings of Power Series over the*  
(1630) *Integers.*  
**Christina Eubanks-Turner**, University of Nebraska-Lincoln

10:30AM *On the Classification of Orbits of Minimal Parabolic*  
(1631) *k-Subgroups Acting on Symmetric k-Varieties of  $SL(n, k)$ .*  
**Stacy Beun**, North Carolina State University †

10:30AM *Solving Boundary Value Problems Using Critical*  
(1632) *Point Theory.*  
**Heidi Feller**, University of Nebraska-Lincoln

10:30AM *Representations of Some Hopf Algebras Associated*  
(1633) *to the Symmetric Group.*  
**Andrea Jedwab**, University of Southern California

10:30AM *The Relative Strength of the Atomic Homogeneous*  
(1634) *Model Theorems.*  
**Karen Lange**, University of Chicago

10:30AM *Redefining Gorenstein: Toward a Theory of*  
(1635) *Non-Noetherian Gorenstein Rings.*  
**Livia Miller**, University of Nebraska-Lincoln

10:30AM *Computing Distance in the Space of Phylogenetic*  
(1636) *Trees.*  
**Megan Owen**, Cornell University

10:30AM *The Geometry and Topology of Reconfiguration.*  
(1637) **Valerie Peterson**, University of Illinois at Urbana-Champaign

10:30AM *Nonlinear Dynamics of a Double Bilipid Membrane.*  
(1638) **Christine Sample**, Northwestern University

10:30AM *Cabling Homomorphisms and the Knot*  
(1639) *Concordance Group.*  
**Cornelia Van Cott**, Indiana University

10:30AM *Expected Length of Random Minimum Spanning*  
(1640) *Tree.*  
**Xinyi Zhang**, University of Delaware

10:30AM *Universal Deformation Rings Related to the*  
(1641) *Symmetric Group  $S_5$ .*  
**Jennifer Froelich**, University of Iowa

**MAA Business Meeting**

11:10 AM – 11:40 AM

Organizer: **Martha J. Siegel**, Towson University  
Moderator: **Joseph A. Gallian**, University of Minnesota-Duluth

**AMS Business Meeting**

11:45 AM – 12:15 PM

**NAM Claytor-Woodard Lecture**

1:00 PM – 1:50 PM

(1642) *Box Products 25 Years Later.*  
**Scott W. Williams**, SUNY at Buffalo (1035-22-2054)

**ASL Invited Address**

1:00 PM – 1:50 PM

- (1643) *A Descriptive View of Geometric Group Theory.*  
**Simon R. Thomas**, Rutgers University  
(1035-03-101)

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

1:00 PM – 5:50 PM

Organizers: **Darren A. Narayan**, Rochester Institute of Technology  
**Bernard Brooks**, Rochester Institute of Technology  
**Jacqueline A. Jensen**, Sam Houston State University  
**Vadim Ponomarenko**, San Diego State University  
**Tamas Wiandt**, Rochester Institute of Technology

- ▶ 1:00PM *Normal Subgroups of the Free Group.*  
(1644) **Natasha Komarov**, Carnegie Mellon University, **Reagin Taylor McNeill\***, Smith College, and **Justin Webster**, University of San Diego (1035-55-1075)
- ▶ 1:30PM *The Genus and  $m$ -alternating Excess of Central Braid Knots.*  
(1645) **Carolyn M Yarnall\***, University of San Diego, and **Debra Witzczak**, Benedictine University (1035-57-1020)
- ▶ 2:00PM *Combinatorics and Characterizations for Involutions and Twisted Involutions of Weyl Groups.*  
(1646) **Constance G. Baltera\***, Smith College, **Kathryn A. Brenneman**, North Carolina State University, and **Ashley E. Hatfield**, Smith College (1035-08-1117)
- 2:30PM *Arc presentations: A new way to look at knots.*  
(1647) **Matt Steinke**, Denison University (1035-55-1205)
- ▶ 3:00PM *Symmetric Permutations Avoiding a Pattern of Length Three and a Pattern of Length Four.*  
(1648) **Jonah K Ostroff\*** and **David Lonoff**, Carleton College (1035-05-1266)
- ▶ 3:30PM *Energy Decay Estimates for the Dissipative Wave Equation with Space-Time Dependent Potential.*  
(1649) **Jonathan J. Kenigson\*** and **Jessica S. Kenigson**, University of Tennessee (1035-35-1320)
- ▶ 4:00PM *Arithmetic Derivatives and Number Theory.*  
(1650) **Arielle M Leitner**, California State University, Chico (1035-11-1386)
- ▶ 4:30PM *Synchronization in Coupled Phase Oscillators.*  
(1651) Preliminary report.  
**Natasha A. Cayco Gajic**, California Institution of Technology (1035-37-1440)
- ▶ 5:00PM *Some Remarks on a Fibonacci-Type Polynomial Sequence.* Preliminary report.  
(1652) **Tom McCollum\*** and **Aklilu Zeleke**, Michigan State University (1035-05-1462)
- ▶ 5:30PM *Parseval-Type Relations for Laplace Transform and their Applications.*  
(1653) **Matthew R Rogala**, Ithaca College (1035-44-1556)

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

1:00 PM – 5:40 PM

Organizers: **Bonnie S. Saunders**, University of Illinois, Chicago  
**William H. Barker**, Bowdoin College

**Dale R. Oliver**, Humboldt State University

**Michael Starbird**, University of Texas, Austin

- 1:00PM *Focus on Mathematics: Mathematicians Working in Schools.*  
(1654) **Al Cuoco**, Center for Mathematics Education, EDC (1035-97-2002)
- ▶ 1:30PM *Teachers' Circles.* Preliminary report.  
(1655) **Tom Davis**, San Jose Math Circle (1035-97-1610)
- 2:00PM *The SMARTS (Science and Mathematics Avenues to Renewed Teachers and Students) project.*  
(1656) **Walter I Seaman**, University of Iowa (1035-97-895)
- 2:30PM *Influence on content courses for preservice teachers resulting from the participation of mathematicians and math graduate students in the ALGEBRA CUBED project.*  
(1657) **Richard Millman**, University of Kentucky (1035-97-957)
- 3:00PM *Classroom experiences with new curriculum materials during the implementation of performance standards in mathematics: A case study of teachers coping with change.*  
(1658) **Samuel Obara**, Texas State University, San Marcos Texas (1035-97-1770)
- ▶ 3:30PM *Physical Manipulatives for Visualizing Multivariable Concepts and How They Can Reform Mathematics Courses Such as Basic Algebra, Precalculus and Calculus.*  
(1659) **Daniel Lee McGee\***, University of Puerto Rico - Mayaguez, **Deborah Moore-Russo**, SUNY - Buffalo, **David Lomen**, University of Arizona, **Dennis Ebersole**, Northhampton Community College, and **Maider Marin Quintero**, University of Puerto Rico - Mayaguez (1035-97-38)
- 4:00PM *Women in the Mathematical Sciences: The University of California Context.*  
(1660) **Kenneth C Millett**, University of California, Santa Barbara (1035-00-1116)
- ▶ 4:30PM *Project Catalyst: Positive Actions to Recruit and Retain Women Faculty in the Mathematical and Physical Sciences.*  
(1661) **Margaret-Ann Armour**, University of Alberta (1035-97-1085)
- 5:00PM *Recommendations for Change: Why and How.*  
(1662) **Cathy Kessel**, Berkeley, California (1035-97-1884)

**AMS-MAA Special Session on History of Mathematics, IV**

1:00 PM – 5:50 PM

- Organizers: **Joseph W. Dauben**, Lehman College, CUNY  
**Patti Hunter**, Westmont College  
**Victor J. Katz**, University of District of Columbia  
**Karen H. Parshall**, University of Virginia
- ▶ 1:00PM *Sophie Germain's manuscripts on Fermat's Last Theorem: A further evaluation of their scope, depth, and original techniques.*  
(1663) **Reinhard Laubenbacher**, Virginia Polytechnic Institute and State University, and **David Pengelley\***, New Mexico State University (1035-01-348)
  - ▶ 1:30PM *Hubert Newton and the study of mathematics in the mid-nineteenth century.*  
(1664) **Steve Batterson**, Emory University (1035-01-490)



- 2:00PM *The Mathematics of Nature, 1869-1900.*  
 ▶ (1665) **Sloan Evans Despeaux**, Western Carolina University (1035-01-302)
- 2:30PM *The Algorithmic Side of Riemann's Mathematics.*  
 (1666) **Harold M. Edwards**, New York University (1035-01-443)
- 3:00PM *Paucissima et Maturissima: Kurt Goedel's Reluctance to Publish in the Philosophy of Mathematics.* Preliminary report.  
 ▶ (1667) **Thomas Drucker**, University of Wisconsin-Whitewater (1035-01-505)
- 3:30PM *American Mathematicians and School Reform: A Survey of Motives, Methods, and Outcomes from the 1890s to the Present.* Preliminary report.  
 ▶ (1668) **David Lindsay Roberts**, Prince George's Community College (1035-01-473)
- 4:00PM *Who was Miss Mullikin?*  
 ▶ (1669) **Thomas L. Bartlow**, Villanova University, and **David E. Zitarelli\***, Temple University (1035-01-571)
- 4:30PM *Tracing curve tracing.* Preliminary report.  
 (1670) **John McCleary**, Vassar College (1035-14-1557)
- 5:00PM *Mathematician In Search of War Work: Alice Bache Gould, 1917-1918.* Preliminary report.  
 ▶ (1671) **Deborah Kent**, Hillsdale College (1035-01-1026)
- 5:30PM *Priority arguments are not priority disputes.* Preliminary report.  
 (1672) **John W Dawson**, Pennsylvania State University, York (Emeritus) (1035-01-396)

**AMS Special Session on Financial Mathematics, IV**

1:00 PM – 5:55 PM

Organizers: **Jean-Pierre Fouque**, University of California Santa Barbara  
**Kay Giesecke**, Stanford University  
**Ronnie Sircar**, Princeton University  
**Knut Solna**, University of California Irvine

- 1:00PM *Stochastic partial differential equations and portfolio choice.*  
 (1673) **Marek Musiela**, BNP Paribas, and **Thaleia Zariphopoulou\***, University of Texas at Austin (1035-60-1416)
- 2:00PM *Interacting Particle Systems for the Efficient Computation of CDO Tranche Spreads with Rare Defaults.*  
 (1674) **Doug Vestal\***, UC Santa Barbara, **Rene Carmona**, Princeton University, and **Jean-Pierre Fouque**, UC Santa Barbara (1035-60-125)
- 2:30PM *Monte Carlo Simulations with Skews of Implied Volatilities.*  
 (1675) **Jean-Pierre Fouque\***, University of California Santa Barbara, **Ronnie Sircar**, ORFE, Princeton University, and **Knut Solna**, University of California Irvine (1035-60-389)
- 3:00PM *Investing and Pricing for the Long Run.*  
 (1676) **Paolo Guasoni\*** and **Scott Robertson**, Boston University (1035-91-527)
- 3:30PM *A new approach to singular stochastic control with applications to optimal hedging and investment-consumption under transaction costs.*  
 (1677) **Tze Leung Lai**, Department of Statistics, Stanford University, **Tiong Wee Lim**, Department of Statistics and Applied Probability, National University of Singapore, and **Kevin J Ross\***, Stanford University (1035-60-595)

- 4:00PM *Optimal portfolio liquidation: Market impact models, algorithms, and competition.*  
 (1678) **Aurélien Alfonsi**, Ecole Nationale des Ponts et Chaussées, Marne-la-vallée, France, **Alexander Schied\***, TU Berlin and Cornell University, **Torsten Schöneborn** and **Antje Schulz**, QP Lab and TU Berlin, Germany (1035-90-274)
- 5:00PM *Indifference pricing with  $L^2$  convex risk measures: A first step towards risk calibration.*  
 (1679) **Antoine Toussaint**, Stanford University (1035-60-1161)
- 5:30PM *The correlation-neutral measure for counting processes.*  
 (1680) **Kay Giesecke**, Stanford University, Department of Management Science and Engineering (1035-60-497)

**AMS Special Session on the Feynman Integral in Mathematics and Physics, II**

1:00 PM – 5:20 PM

- Organizer: **Lance W. Nielsen**, Creighton University
- 1:00PM *Disentanglement in the Construction Formulation of the Feynman Operator calculus.*  
 (1681) **Tepper L. Gill\*** and **Woodford W. Zachary**, Howard University (1035-47-752)
- 1:30PM *Inverse integral transforms and the generalized convolution product.*  
 (1682) **Seung Jun Chang**, Dankook University (1035-44-700)
- 2:00PM *The Weyl-McCoy operational calculi as a subfamily of Feynman's operational calculi for non-commuting operators.* Preliminary report.  
 (1683) **Gerald W. Johnson\***, University of Nebraska-Lincoln, and **Lisa M. Rezac**, University of St. Thomas (1035-28-587)
- 2:30PM *Feynman Integrals with Highly Singular Potentials.* Preliminary report.  
 (1684) **Michel L. Lapidus**, University of California, Riverside (1035-58-471)
- 3:00PM *Feynman-Kac formulas, backward stochastic differential equations and Markov processes.*  
 (1685) **Jan A. Van Casteren**, University of Antwerp (1035-60-489)
- 3:30PM *The generalized Feynman-Kac formula a Lebesgue-Stieltjes measure.*  
 (1686) **Jun Tanaka**, University of California Riverside (1035-81-481)
- 4:00PM *Multiple stochastic integrals with respect to Volterra random fields: Properties and applications.*  
 (1687) **Anna Amirdjanova**, University of Michigan (1035-60-311)
- 4:30PM *Integral Transforms of Functions in  $L_2(Ca, b[0, T])$ .*  
 (1688) **Seung Jun Chang**, **Hyun Soo Chung**, Dankook University, and **David L. Skoug\***, University of Nebraska-Lincoln (1035-28-470)
- 5:00PM *Quantum Hidden Subspace Algorithm.*  
 (1689) **Jeremy James Becnel**, Stephen F. Austin State University (1035-46-249)

**AMS Special Session on Heegaard Splittings, Bridge Positions, and Low Dimensional Topology, II**

1:00 PM – 5:50 PM

Organizers: **Jesse Johnson**, Yale University  
**Abigail A. Thompson**, University of California Davis

**Robin Wilson**, University of California  
Santa Barbara

- 1:00PM *Lower bounds for the distance of a Heegaard splitting.* Preliminary report.  
(1690) **John Hempel**, Rice University (1035-57-1669)
- 1:30PM *Heegaard splittings of amalgamated 3-manifolds and distance in the curve complex.*  
(1691) **Tao Li**, Boston College (1035-57-833)
- 2:00PM *Constructing knot tunnels using giant steps.*  
(1692) **Sangbum Cho** and **Darryl McCullough\***, University of Oklahoma (1035-57-811)
- 2:30PM *Bridge numbers of tunnel number one knots.*  
(1693) **Sangbum Cho\*** and **Darryl McCullough**, University of Oklahoma (1035-57-973)
- 3:00PM *Surface Homeomorphisms that Do Not Extend to Any Handlebody and the Johnson Filtration.*  
(1694) **Jamie B. Jorgensen**, Rice University (1035-57-194)
- 3:30PM *Random Heegaard Splittings.*  
(1695) **Joseph Maher**, Oklahoma State (1035-57-168)
- 4:00PM *Finiteness properties of 3-manifolds related by non-zero degree maps.* Preliminary report.  
(1696) **J Hyam Rubinstein\***, University of Melbourne, **M. Boileau** and **S. Wang** (1035-57-1985)
- 4:30PM *Curvature bounds for strongly irreducible Heegaard surfaces in hyperbolic 3-manifolds.*  
(1697) **William Breslin**, University of California at Davis (1035-57-1810)
- 5:00PM *Creating small Seifert fiber spaces by Dehn surgery on knots in  $S^3$ .* Preliminary report.  
(1698) **Kenneth Baker\***, Georgia Institute of Technology, **Cameron Gordon** and **John Luecke**, University of Texas at Austin (1035-57-573)
- 5:30PM *Lens space surgeries and tunnel number one knots.*  
(1699) **Michael J. Williams**, University of California, Davis (1035-57-1401)

**AMS Special Session on The Linear Diophantine Problem of Frobenius**

1:00 PM – 5:50 PM

Organizers: **Matthias Beck**, San Francisco State University  
**Stanley Wagon**, Macalester College  
**Kevin M. Woods**, Oberlin College

- ▶ 1:00PM *On a linear Diophantine problem of Frobenius in three variables.* Preliminary report.  
(1700) **Amitabha Tripathi**, Indian Institute of Technology, Delhi, and SUNY at Oswego (1035-11-1569)
- ▶ 1:30PM *Integer Linear Programming, Frobenius Instances, and Frobenius Numbers.*  
(1701) **Daniel A Lichtblau**, Wolfram Research (1035-11-456)
- ▶ 2:00PM *My Favorite Simplicial Complex and Applications to the Frobenius Problem.*  
(1702) **Herbert E. Scarf**, Yale University (1035-05-953)
- 2:30PM *When is the Frobenius Problem Easy?*  
(1703) **David M Einstein**, Structured Decisions Corporation (1035-05-824)
- 3:00PM *Computing Frobenius Numbers Using Test Sets.*  
(1704) **Bjarke Hammersholt Roune**, University of Aarhus (1035-11-1032)
- 3:30PM *Automated Proofs of Quadratic Frobenius Formulas.*  
(1705) **Stan Wagon**, Macalester College (1035-11-141)
- 4:00PM *Frobenius number, covering radius, and well-rounded lattices.*  
(1706) **Lenny Fukshansky\***, Claremont McKenna College, and **Sinai Robins**, Temple University (1035-11-109)

- 4:30PM *The Frobenius Problem in a Free Monoid.*  
(1707) **Jeffrey O. Shallit** and **Zhi Xu\***, School of Computer Science, University of Waterloo (1035-05-355)
- ▶ 5:00PM *Fibonacci semigroups and their duals.* Preliminary report.  
(1708) **Gretchen L Matthews**, Clemson University (1035-20-713)
- ▶ 5:30PM *The Multi-Dimensional Frobenius Problem.*  
(1709) **J. Amos**, Kansas State University, **Iuliana Pascu**, Wellesley College, **Vadim Ponomarenko\***, San Diego State University, **Enrique Trevino**, Dartmouth College, and **Yan Zhang**, Harvard University (1035-15-880)

**AMS Special Session on E-Theory, Extensions, and Elliptic Operators, II**

1:00 PM – 5:50 PM

Organizers: **Constantin D. Dumitrascu**, University of Arizona  
**John D. Trout**, Dartmouth College

- 1:00PM *First steps towards a noncommutative theory of nonlinear elliptic equations.* Preliminary report.  
(1710) **Jonathan M. Rosenberg**, University of Maryland (1035-46-1039)
- 2:00PM *Functional analytic properties of cubical complexes.*  
(1711) **Erik Guentner\***, University of Hawaii at Manoa, **Nigel Higson**, Pennsylvania State University, **Jacek Brodzki**, **Sarah Campbell**, **Graham Niblo** and **Nick Wright**, University of Southampton (1035-57-1573)
- 2:30PM *Lefschetz-type invariants for correspondences.*  
(1712) **Heath Emerson**, University of Victoria (1035-97-542)
- 3:00PM *Asymptotic morphisms on separable metrisable algebras.*  
(1713) **Edwin J Beggs**, Swansea University (1035-19-1446)
- 3:30PM *K-theory for non-Hausdorff groupoids.*  
(1714) **Radu Popescu**, Instituto Superior Tecnico, Lisbon, Portugal (1035-19-1247)
- 4:00PM *Traces and Determinants of Toeplitz Operators.*  
(1715) **Efton Park**, Texas Christian University (1035-47-1088)
- 4:30PM *Asymptotic Tensor Norms.*  
(1716) **Oscar Antonio Campos**, Dartmouth College (1035-46-783)
- 5:00PM *Asymptotic morphisms and extensions of  $C^*$ -algebras (after V. Manuilov and K. Thomsen).*  
(1717) **Constantin Dorin Dumitrascu**, University of Arizona (1035-46-1869)
- 5:30PM Open problems/Discussions.

**AMS Special Session on Algebraic and Geometric Aspects of Integrable Systems, II**

1:00 PM – 5:50 PM

Organizers: **Baofeng Feng**, University of Texas-Pan American  
**Wenxiu Ma**, University of South Florida  
**Kenichi Maruno**, University of Texas-Pan American  
**Zhijun Qiao**, University of Texas-Pan American  
**Taixi Xu**, Southern Polytechnic State University

- 1:00PM *On Head-on Collisions Between Two Solitary Waves of General Boussinesq Model.*  
(1718) **Chen Chunli**, Shanghai Jiao Tong University (1035-76-1501)

- 1:30PM *Integrable systems and invariant geometrical flows in Klein geometry.* Preliminary report.  
(1719) **Changzheng Qu**, Northwest University, Xi'an, P.R. China (1035-53-1890)
- 2:00PM *Integrable systems associated to Hopf surfaces.*  
(1720) **Ruxandra Moraru**, University of Waterloo (1035-51-467)
- 2:30PM *On the classical inhomogeneous Heisenberg spin chain.*  
(1721) **Atsushi Mukaihira**, Ohio State University (1035-35-1458)
- 3:00PM *Hamiltonian Structures of Integrable Couplings.*  
(1722) **Wen-Xiu Ma**, University of South Florida (1035-37-464)
- 3:30PM *A dispersionless limit of the Calogero-Bogoyavlenskii-Schiff hierarchy.*  
(1723) **K Toda**, Toyama Prefectural University (1035-35-653)
- 4:00PM *Cable Knot Solutions of the Vortex Filament Flow.*  
(1724) **Thomas A. Ivey\*** and **Annalisa M. Calini**, College of Charleston (1035-35-1134)
- 4:30PM *Integrable systems and soliton theory on noncommutative spaces.*  
(1725) **Masashi Hamanaka**, University of Nagoya (1035-35-993)
- 5:00PM *The Pfaff lattice and the symplectic eigenvalue problem.*  
(1726) **Yuji Kodama** and **Virgil U. Pierce\***, The Ohio State University (1035-34-1211)
- 5:30PM *Vector soliton and multi-component KP hierarchy.*  
(1727) **Kenichi Maruno\***, The University of Texas-Pan American, **Yasuhiro Ohta**, Kobe University, and **Masayuki Oikawa**, Kyushu University (1035-35-1679)

**AMS Special Session on Expanders and Ramanujan Graphs: Construction and Applications, III**

1:00 PM – 5:40 PM

Organizers: **Michael T. Krebs**, California State University, Los Angeles  
**Anthony M. Shaheen**, California State University, Los Angeles  
**Audrey A. Terras**, University of California San Diego

- 1:00PM *Covering graphs and block diagonalization techniques.*  
(1728) **Howard Skogman\***, SUNY Brockport, and **Marvin Minei**, University of California, Irvine (1035-05-911)
- 1:30PM *Rigidity of Ramanujan graphs.* Preliminary report.  
(1729) **Brigitte Servatius**, WPI (1035-05-801)
- 2:00PM *Ramanujan hypergraphs and Drinfeld modules.*  
(1730) **Alireza Sarveniazi**, University of Applied Sciences Karlsruhe, and **Stefan Wiedmann\***, Mathematics Institute Göttingen (1035-05-852)
- 3:00PM *Eigenvalues and the structure of graphs.*  
▶ (1731) Preliminary report.  
**Sebastian M Cioabă**, University of California, San Diego (1035-05-394)
- 4:00PM *Ramanujan Graphs and Optimal Expander Graphs from Algebraic Geometric Codes.*  
(1732) **Heeralal Janwa**, University of Puerto Rico (1035-94-1794)
- 5:00PM *Graphs whose subgraphs tend to be acyclic.*  
(1733) **Eitan Bachmat**, Ben-Gurion U. (1035-05-795)

**AMS Special Session on Probability Theory and Statistical Mechanics, II**

1:00 PM – 5:40 PM

Organizers: **Itai Benjamini**, Weizmann Institute and Microsoft Research  
**Wendelin Werner**, University of Paris-Sud

- 1:00PM *Noise Sensitivity in Criticality.* Preliminary report.  
(1734) **Eyal Lubetzky**, Microsoft Research (1035-60-1309)
- 2:00PM *Random Averaging.*  
▶ (1735) **Eli Ben-Naim**, Los Alamos National Laboratory (1035-60-927)
- 3:00PM *Random Sorting Networks.*  
▶ (1736) **Alexander E Holroyd\***, University of British Columbia, **Omer Angel**, University of Toronto, **Dan Romik**, Hebrew University, Jerusalem, and **Balint Virag**, University of Toronto (1035-60-803)
- 4:00PM *Spin glasses and Stein's method.*  
(1737) **Sourav Chatterjee**, University of California at Berkeley (1035-60-793)
- 5:00PM *The loop-erased random walk and the uniform spanning tree on the four-dimensional discrete torus.*  
(1738) **Jason Schweinsberg**, University of California at San Diego (1035-60-427)

**AMS Special Session on Global Optimization and Operations Research Applications, II**

1:00 PM – 5:50 PM

Organizer: **Ram U. Verma**, University of Central Florida

- 1:00PM *Global invertibility for ray-proper and related operators in optimization and nonlinear functional analysis.* Preliminary report.  
(1739) **M. Zuhair Nashed**, University of Central Florida (1035-49-2029)
- 1:30PM *Some Global Optimization Methods and Applications of Inequalities.*  
(1740) **R N Mohapatra**, University of Central Florida (1035-49-1295)
- 2:00PM *Mellin and global optimization techniques for singular integrals in two dimensions.*  
(1741) **Katharine A Ott**, University of Virginia (1035-35-1349)
- 2:30PM *Discrete Optimization Models for the Number Partitioning Problem.*  
(1742) **Bala Krishnamoorthy\***, **William Webb** and **Nathan Moyer**, Washington State University, Pullman (1035-11-139)
- 3:00PM *On the Semilocal Convergence Analysis of Newton's Method.*  
(1743) **Ioannis Konstantinos Argyros**, Cameron University (1035-65-357)
- 3:30PM *Necessary and sufficient conditions for global weak Pareto solutions in constrained multiobjective optimization.*  
(1744) **Bao Quang Truong\*** and **Boris S Mordukhovich**, Wayne State University (1035-49-90)
- 4:00PM *Second Order Necessary Optimality Conditions for Problems with Locally Lipschitz Data.*  
(1745) **Elena Constantin**, University of Pittsburgh at Johnstown (1035-90-333)

- 4:30PM *Generalizations of the Concept of Almost Automorphy and their Applications to Abstract Differential Equations*. Preliminary report.  
**Haewon Lee\*** and **Peter Frempong-Mireku**, Dillard University (1035-47-969)
- ▶ 5:00PM *The Lying Oracle With a Biased Coin*.  
 (1747) **Robb T Koether**, **Marcus Pendergrass**, Hampden-Sydney College, and **John K Osoinach\***, Millsaps College (1035-91-121)
- 5:30PM *Design of Electron Devices using 3D Simulation Codes and Computer Optimization*.  
 (1748) **Adam R Attarian\***, **John David** and **Hien Tran**, North Carolina State University (1035-49-1016)

### AMS Special Session on Mathematical Problems in Biological Formations

1:00 PM – 5:50 PM

Organizer: **Yuanwei Qi**, University of Central Florida

- 1:00PM *Asymptotic Analysis of Dirichlet Problem for Parabolic and Elliptic Equations on a Domain with Coated Boundary*.  
 (1749) **Jingyu Li**, Northeast Normal University, **Steve Rosencrans**, **Xuefeng Wang\***, Tulane University, and **Kaijun Zhang**, Northeast Normal University (1035-35-1744)
- 1:30PM *Strange Attractors for PDE's*.  
 (1750) **Kening Lu\***, Brigham Young University, **Qidong Wang**, University of Arizona, and **Lai-Sang Young**, New York University (1035-35-1287)
- 2:00PM *Formation of Morphogen Gradients in Dorsal Ventral Patterning*.  
 (1751) **Qing Nie**, U. of California, Irvine (1035-92-886)
- 2:30PM *Approximating the Ideal Free Distribution via Reaction-Diffusion-Advection Equations*.  
 (1752) **Yuan Lou\***, Ohio State University, **Robert Stephen Cantrell** and **Chris Cosner**, University of Miami (1035-35-778)
- 3:00PM *Pattern Formation on Growing Square Domains: A Case Study via Mode Interactions*.  
 (1753) **Adela Nicoleta Comanici\***, Virginia Tech, and **Martin Golubitsky**, University of Houston (1035-35-736)
- 3:30PM *Solvability conditions for inhomogeneous reaction diffusion equations*.  
 (1754) **Qi S. Zhang\*** and **J. M. Wrkich**, UC Riverside (1035-35-641)
- 4:00PM *Analysis on a reaction-diffusion system in pattern formation*.  
 (1755) **Huiqiang Jiang**, University of Pittsburgh (1035-35-621)
- 4:30PM *Some recent results on auto-catalytic chemical reactions*.  
 (1756) **Yuanwei Qi**, University of Central Florida (1035-35-488)
- 5:00PM *Stability of Travelling Waves with Noncritical Speeds for Double Degenerate Fisher-Type Equations*.  
 (1757) **Yi Li\***, University of Iowa, and **Yaping Wu**, Capital Normal University, Beijing, China (1035-35-376)
- 5:30PM *Stability of the Bicarbonate System in the Blood*.  
 (1758) **Jisun Lim\***, University of Colorado at Boulder, and **Seungjoon Choi**, Ajou University School of Medicine (South Korea) (1035-35-133)

### MAA Minicourse #11: Part B

1:00 PM – 3:00 PM

*More music and mathematics.*

Organizer: **Leon Harkleroad**, Wilton, ME

### MAA Minicourse #16: Part B

1:00 PM – 3:00 PM

*A beginner's guide to the scholarship of teaching and learning in mathematics.*

Organizers: **Curtis D. Bennett**, Loyola Marymount University  
**Jacqueline M. Dewar**, Loyola Marymount University

### MAA Minicourse #5: Part B

1:00 PM – 3:00 PM

*Visualizing abstract mathematics with cellular automata.*

Organizers: **Michael J. Bardzell**, Salisbury University  
**Donald E. Spickler**, Salisbury University

### AMS Session on Combinatorics, IV

1:00 PM – 4:40 PM

- 1:00PM *The 2-color Rado Number of  $x + y + kz = 3w$* . Preliminary report.  
 ▶ (1759) **Dan Saracino** and **Brian Wynne\***, Colgate University (1035-05-1681)
- 1:15PM *Feedback Arc Sets and Girth in Digraphs*.  
 ▶ (1760) **Blair Dowling Sullivan**, Princeton University (1035-05-1568)
- 1:30PM *Path and Cycle Decomposition Numbers*.  
 ▶ (1761) **Hosien S. Moghadam\***, **G. Bullington**, **L. Eroh** and **S. Winters**, Univ. of Wisconsin Oshkosh (1035-05-1725)
- 1:45PM *Making Your House Safe from Zombie Attacks*. Preliminary report.  
 ▶ (1762) **Maria T. Belk\*** and **James M. Belk**, Texas A&M University (1035-05-1763)
- 2:00PM *Linear Diophantine Equations in Graph Decompositions*.  
 (1763) **Robert A. Beeler**, East Tennessee State University (1035-05-1033)
- 2:15PM *Uniquely pairable graphs*. Preliminary report.  
 ▶ (1764) **Zhongyuan Che**, Penn State University Beaver Campus (1035-05-945)
- 2:30PM *Tree Pegging*.  
 (1765) **Ariel R Levavi**, Carnegie Mellon University (1035-05-952)
- 2:45PM *A Non-Tableaux Proof for Duality of the Euclidean Property for Oriented Matroids*.  
 (1766) **Leandro Junes**, SUNY at Binghamton (1035-05-1025)
- 3:00PM Break
- 3:15PM *Differentials on Paths and Grids*.  
 ▶ (1767) **Sandra L. Gaskins** and **Mark C Ginn\***, Appalachian State University (1035-05-1095)
- 3:30PM *Rainbow Connectivities of Graphs*.  
 ▶ (1768) **Futaba Okamoto**, University of Wisconsin - La Crosse (1035-05-1158)

- 3:45PM *The spectral gap of a random subgraph of a graph.* (1769) **Fan Chung** and **Paul K Horn\***, University of California, San Diego (1035-05-1176)
- ▶ 4:00PM *The Tableaux Graph of a Permutation.* Preliminary report. (1770) **Eric S Egge\***, Carleton College, and **Kristina Garrett**, St. Olaf College (1035-05-1201)
- 4:15PM *Edge Coloring of Multigraphs: Some Results on the Chromatic Structure of Overflow Subgraphs Under Optimal Colorings.* Preliminary report. (1771) **Christopher McClain**, The Ohio State University (1035-05-1249)
- ▶ 4:30PM *Degree sum conditions in graph pebbling.* (1772) **Anna Blasiak**, Cornell University, and **John Roger Schmitt\***, Middlebury College (1035-05-1290)

**AMS Session on Mathematics Education**

1:00 PM – 6:10 PM

- ▶ 1:00PM *Effect of a Web-based Instruction on Preservice Teachers' Knowledge of Fraction.* Preliminary report. (1773) **Cheng-Yao Lin**, Southern Illinois University Carbondale (1035-97-251)
- ▶ 1:15PM *Mathematical Analysis of Diabetes in America.* Preliminary report. (1774) **Jon Roginski\*** and **Tyler B. Smith**, United States Military Academy (1035-97-1735)
- ▶ 1:30PM *The Relationships Between California High School Teachers' Mathematics History Knowledge and Their Images of Mathematics.* (1775) **Danielle M Goodwin**, Penn State Erie (1035-97-59)
- ▶ 1:45PM *An Electronic Classroom Model for Content Courses: Influences on Classroom Teaching.* (1776) **Brooke Evans\***, **Patty McKenna**, **Jim Loats**, **Don Gilmore** and **Lew Romagnano**, The Metropolitan State College of Denver (1035-97-98)
- ▶ 2:00PM *U.C. Davis Explore Math: A model for bringing together graduate, undergraduate, and high school students.* (1777) **Y. Yvonne Lai**, UC Davis Explore Math: Math Circle Program (1035-97-126)
- ▶ 2:15PM *Impact of Human Resource Capital on Student Engagement in Communities of Practice and Mathematics Identities.* (1778) **Tracey L Keck**, Winston-Salem State University (1035-97-196)
- ▶ 2:30PM *Strategies and Content Every Prospective Mathematics Teacher Should Know.* (1779) **Elizabeth K. Mauch**, Bloomsburg University of Pennsylvania (1035-97-230)
- ▶ 2:45PM *Enhancing Middle School Teachers Mathematics Knowledge for Teaching.* Preliminary report. (1780) **Harvey B. Keynes**, University of MN (1035-97-277)
- ▶ 3:00PM *Some topics for undergraduate research using computer algebra systems.* (1781) **Duane M Broline** and **Evgeny I Gordon\***, Eastern Illinois University (1035-97-420)
- ▶ 3:15PM *Calculus I Oral Assessments: Improved Grades, Retention, and Calculus II Success.* (1782) **Mary Ann Nelson\***, University of Colorado, Boulder, and **Michael Ruston**, University of Colorado, Boulder (1035-97-433)
- 3:30PM Break
- ▶ 3:45PM *The Sound of Mathematics and The Standards for Introductory College Mathematics.* (1783) **Ann H Pham\*** and **Andy Wekin**, Washington State University (1035-97-1294)

- ▶ 4:00PM *Research Experience for All!* (1784) **Timothy G. Feeman**, Villanova University (1035-97-441)
- ▶ 4:15PM *Why Do Chinese Students Excel on the International Mathematical Olympiad?* (1785) **Zengxiang Tong Tong**, Otterbein College, and **Zhaochi Zhang\***, The Northwestern Polytechnical University (1035-97-741)
- 4:30PM *A Model for Shifts in Viewpoint, as Applied to Mathematics Education.* (1786) **Paul S Prueitt**, Talladega College (1035-97-813)
- ▶ 4:45PM *Assisting Students Be Successful on the Mathematics PRAXIS II Exam.* (1787) **Kenneth J Bernard**, Virginia State University (1035-97-914)
- ▶ 5:00PM *The Use of On-Line Quiz and Homework Systems in Precalculus Mathematics.* Preliminary report. (1788) **Steven E. Rigdon**, Southern Illinois University Edwardsville (1035-97-1628)
- 5:15PM *An Intermediate Algebra Experimental Class.* (1789) **Dan Boros**, Otterbein College (1035-97-1695)
- ▶ 5:30PM *Using a Wiki for a Mathematics Class.* Preliminary report. (1790) **John F Carter**, Franklin and Marshall College (1035-97-1772)
- ▶ 5:45PM *Cryptology: An Attractor Set for Undergraduate Research.* (1791) **Manmohan Kaur**, Benedictine University (1035-97-1792)
- ▶ 6:00PM *Choosing the right representation: A key to successful proof.* (1792) **May F Hamdan**, Lebanese American University (1035-97-1977)

**AMS Session on Probability, Statistics, and Applications, II**

1:00 PM – 5:10 PM

- 1:00PM *Recurrence and Transience of Some Vertex Reinforced Random Walks.* Preliminary report. (1793) **Noah Dean**, Purdue University (1035-60-1196)
- 1:15PM *System Reliability: A Dynamic Model Using Counting Processes.* Preliminary report. (1794) **Marcus Agustin**, Southern Illinois University Edwardsville (1035-60-1280)
- 1:30PM *Quenched limits for a transient one-dimension random walk in random environment.* (1795) **Jonathon Peterson**, University of Minnesota (1035-60-737)
- 1:45PM *On a Form of Coordinate Percolation.* (1796) **Elizabeth R Moseman\***, United States Military Academy, and **Peter Winkler**, Dartmouth College (1035-60-1281)
- 2:00PM *The long-range dependence of unbalanced log-fractional stable motion.* Preliminary report. (1797) **Joshua B. Levy**, The University of Texas of the Permian Basin (1035-60-475)
- 2:15PM *Supremum concentration inequality and modulus of continuity for generalized sub-Gaussian processes using Malliavin derivatives and generic chaining.* (1798) **Andrew B Vizcarra**, Purdue University (1035-60-1325)
- ▶ 2:30PM *An Optimal Pension Funding under Stochastic Investment Returns.* Preliminary report. (1799) **J Tao**, University of Central Missouri (1035-60-1812)

- 2:45PM *A notion of robust geodesic distance between data points.* Preliminary report.  
(1800) **Maxim J. Goldberg\***, Ramapo College of New Jersey, and **Seonja Kim**, The College of New Jersey (1035-60-1934)
- ▶ 3:00PM *Possible biological applications of time scales.* Preliminary report.  
(1801) **Unal Ufuktepe**, Izmir University of Economics (1035-60-698)
- ▶ 3:15PM *Stochastic extinction of epidemics in large populations and role of vaccinations.*  
(1802) **Alexandra Sasha Landsman\***, Ira B Schwartz, Dynamical Systems Section, Naval Research Lab, Washington DC, and **Mark I Dykman**, Physics Dept., Michigan State University (1035-60-1645)
- 3:30PM *Estimating linear functionals of indirectly observed input functions.*  
(1803) **Eun-Joo Lee\***, Millikin University, and **F Ruymgaart**, Texas Tech University (1035-62-910)
- 3:45PM *Generating Functions: Web-based SOCR Applets and Computational Library Interfaces.*  
(1804) **Rahul A Gidwani\***, **Nicolas Christou** and **Ivo D Dinov**, UCLA (1035-62-1789)
- ▶ 4:00PM *A New Approach to Learning Game Theory and Its Applications.*  
(1805) **James Kuodo Huang**, California Information Technology (1035-68-43)
- ▶ 4:15PM *Exactness of Grover's original quantum search algorithm.*  
(1806) **Zijian Diao**, Ohio University Eastern Campus (1035-68-1434)
- 4:30PM *On the standard deviation of position distribution for a quantum walk on the line.*  
(1807) **Chaobin Liu**, Bowie State University (1035-81-668)
- 4:45PM *Eigenvalue Statistics for Random CMV Matrices.*  
(1808) **Mihai V Stoiciu**, Williams College (1035-82-2004)
- 5:00PM *The Highly Damped Quasinormal Modes of Extremal Non-Rotating, Charged Black Holes.*  
(1809) **Ramin G. Daghigh** and **Michael D. Green\***, Metropolitan State University (1035-83-1398)
- 2:15PM *Some constructive proofs of Bollobás' Extension to the Bishop-Phelps Theorem for the spaces  $C(K)$  and  $C_0$ .*  
(1815) **Antonia E. Cardwell**, Millersville University of Pennsylvania (1035-46-809)
- 2:30PM *The tracial Rokhlin property: Very outer group actions.*  
(1816) **Dawn Archey**, University of Oregon (1035-46-840)
- 2:45PM *Spaces of Operators with  $c_0$  and  $l_\infty$ .* Preliminary report.  
(1817) **Polly Schulle**, University of North Texas (1035-46-948)
- 3:00PM *Flows of weights and automorphism groups of real a.f.d. factors of type  $III_\lambda$ ,  $0 < \lambda < 1$ .* Preliminary report.  
(1818) **Shukhrat M Usmanov**, Ashford University (1035-46-1119)
- 3:15PM *Unitarily Invariant Norms Related to Factor von Neumann Algebras.*  
(1819) **Junsheng Fang\*** and **Don W. Hadwin**, University of New Hampshire (1035-46-1173)
- 3:30PM Break
- 3:45PM *Noncompact Operators on a Banach Space.*  
(1820) **Frank Sanacory**, SUNY-Old Westbury (1035-46-1314)
- 4:00PM *An  $A^1$  Function that is Not in  $Lip_\alpha$  For Any Positive  $\alpha$ .*  
(1821) **Ryan Mullen**, Sacred Heart University (1035-46-887)
- 4:15PM *On the existence of eigenvalues of self-adjoint Toeplitz operators associated with representing measures on multiply connected planar regions II.*  
(1822) **Cyrus Parsi Aryana**, Saginaw Valley State University (1035-46-1407)
- 4:30PM *Homotopy class of projections in Corona algebras of a non-simple stable  $C^*$ -algebra.* Preliminary report.  
(1823) **Larry G Brown** and **Hyun Ho Lee\***, Purdue University in West Lafayette (1035-46-1424)
- 4:45PM *On Stochastic Ergodic Theorem for Besicovitch Bounded Sequences in Jordan Algebras.*  
(1824) **Genady Ya Grabarnik\***, T. J. Watson IBM Research Center, **Alexander A Katz**, St. John's University, and **Laura Schwartz**, University of South Africa (1035-46-1431)
- 5:00PM *Criteria of Stochastic Banach Principal for the JBW Algebras.*  
(1825) **Genady Ya Grabarnik** and **Larisa Schwartz\***, IBM T. J. Watson Research (1035-46-1460)

### AMS Session on Analysis and Functional Analysis, II

1:00 PM – 5:10 PM

- ▶ 1:00PM *A reexamination of the structure of the irrational numbers.* Preliminary report.  
(1810) **Emily H Sprague\***, Edinboro University of PA, and **Berhane T. Ghaim**, Baldwin-Wallace College (1035-46-49)
- 1:15PM *On locally Kaplansky algebras and abstract characterization of locally  $W^*$ -algebras.*  
(1811) **Alexander A Katz**, St. John's University, NY (1035-46-238)
- 1:30PM  *$L^*$ -structures and Nash equilibrium theorems.* Preliminary report.  
(1812) **Wladyslaw Kulpa**, Silesian University, Katowice, Poland, and C.S. Wyszynski University, Warszawa, Poland, and **Andrzej Szymanski\***, Slippery Rock University of Pennsylvania (1035-46-375)
- 1:45PM *Applications of Schwartz functions to wavelet analysis and random fields.*  
(1813) **George K Yang**, Tennessee State University (1035-46-623)
- 2:00PM *Normalizers of Subalgebras of  $II_1$  Factors.*  
(1814) **Alan D Wiggins**, Vanderbilt University (1035-46-670)

### MAA Session on Biomathematics in the Undergraduate Curriculum, III

1:00 PM – 3:55 PM

- Organizers: **Timothy D. Comar**, Benedictine University  
**Olcay Akman**, Illinois State University  
**Glenn W. Ledder**, University of Nebraska  
**Lisa G. Townsley**, Benedictine University
- ▶ 1:00PM *Helping Calculus Students Predict the Health of a Natural Water System.*  
(1826) **Gregory H. Graves\*** and **Lance Edling**, U.S. Military Academy (1035-B1-1706)
- ▶ 1:20PM *BioMath I: Getting Biology Students Prepared for a Course in Mathematical Biology.* Preliminary report.  
(1827) **James P. Peirce**, University of Wisconsin - La Crosse (1035-B1-629)

- ▶ 1:40PM *Media to Motivate: Math in the Middle.*  
(1828) **Mike Martin**, Johnson County Community College (1035-B1-1958)
- ▶ 2:00PM *Teaching a course on biodiversity.* Preliminary report.  
(1829) **Paul H. Schuette**, Meredith College (1035-B1-1683)
- ▶ 2:20PM *On The Mathematics Component of a Biological Imaging Course.*  
(1830) **Gary Greenfield\***, **Carolyn Marks** and **Gary Radice**, University of Richmond (1035-B1-243)
- ▶ 2:40PM *Geometry and biology—a project-based course.*  
(1831) **Greg Huber**, University of Connecticut (1035-B1-1768)
- ▶ 3:00PM *Mathematics and Biology Student Engagement in Biomathematics Research Projects.*  
(1832) **Olcay Akman**, Illinois State University (1035-B1-1647)
- ▶ 3:20PM *Math-Biophysics in the class room.*  
(1833) **Hala Jadallah**, Purdue University (1035-B1-1403)
- ▶ 3:40PM *If You Build It (Carefully), They Will Come.*  
(1834) **Christopher N Hay-Jahans**, University of Alaska Southeast, Juneau Campus (1035-B1-1665)

- ▶ 1:00PM *A Simulation Application for the Exponential.*  
(1843) **Richard Cornez**, University of Redlands, Redlands, CA. (1035-P1-46)
- ▶ 1:20PM *Interactive Web-Based Probability Distribution Mathlets: www.SOCR.ucla.edu.*  
(1844) **Rahul Ashok Gidwani\***, **Christou** and **Dinov**, UCLA (1035-P1-707)
- ▶ 1:40PM *Mathlets for Problem Analysis.*  
(1845) **Michael E. Mays**, West Virginia University (1035-P1-67)
- ▶ 2:00PM *Modeling data with linear, quadratic, exponential, and other functions.* Preliminary report.  
(1846) **Mary R. Parker\***, Austin Community College, and **Hunter D. Ellinger**, Exemplar Technologies, Inc. (1035-P1-1939)

**MAA Session on Mathematics and the Arts, III**

1:00 PM – 3:35 PM

Organizer: **Douglas E. Norton**, Villanova University

- ▶ 1:00PM *Learning Geometry in the Dance Studio.*  
(1835) **Jason Parsley\*** and **Christina Soriano**, Wake Forest University (1035-N1-1893)
- ▶ 1:20PM *Mathematics in International Folk Dances.*  
(1836) **Leon Harkleroad**, Wilton, ME (1035-N1-265)
- ▶ 1:40PM *Group Structure in Musical Inversions.*  
(1837) **Craig M Johnson**, Marywood University (1035-N1-423)
- ▶ 2:00PM *Demonstrating Fourier Series and Its Applications Through Music.* Preliminary report.  
(1838) **Michelle L Ghrist**, U.S. Air Force Academy (1035-N1-1341)
- ▶ 2:20PM *Making Pictures of Music.*  
(1839) **James S. Walker**, University of Wisconsin-Eau Claire (1035-N1-743)
- ▶ 2:40PM *Juggling Permutations.* Preliminary report.  
(1840) **Nate M Iverson**, Bowling Green State University (1035-N1-1593)
- ▶ 3:00PM *Building Reason: Baroque History and Mathematics.*  
(1841) **Barbara T Faires**, Westminster College (1035-N1-1737)
- ▶ 3:20PM *How many books are there in the Library of Babel?* Preliminary report.  
(1842) **David L. Neel\*** and **Charles Tung**, Seattle University (1035-N1-1733)

**MAA Session on Mathlets and Web Resources for Mathematics and Statistics Education, II**

1:00 PM – 2:15 PM

Organizers: **Thomas E. Leathrum**, Jacksonville State University  
**Patricia B. Humphrey**, Georgia Southern University  
**Christopher J. Lacke**, Rowan University  
**David M. Strong**, Pepperdine University  
**Joe Yanik**, Emporia State University

**MAA Session on Research on the Teaching and Learning of Undergraduate Mathematics, III**

1:00 PM – 5:15 PM

Organizers: **David E. Meel**, Bowling Green State University  
**Michelle J. Zandieh**, Arizona State University  
**Chris Rasmussen**, San Diego State University

- ▶ 1:00PM *Mathematics teaching assistants learning to teach: Recasting early teaching experiences as rich learning opportunities.*  
(1847) **Natasha Speer\***, Michigan State University, and **David Kung**, St. Mary's College of Maryland (1035-U1-611)
- ▶ 1:35PM *The Development of Covariational Reasoning in a College Algebra Course.* Preliminary report.  
(1848) **Stacey A. Bowling\***, **Kevin C. Moore** and **Marilyn P. Carlson**, Arizona State University (CRESMET) (1035-U1-1675)
- ▶ 2:00PM *Exploring Rational Numbers with K-5 Mathematics Specialists: A Case for Examining the Density Property.* Preliminary report.  
(1849) **Joy W. Whitenack\***, Virginia Commonwealth University, **Laurie O. Cavey**, James Madison University, and **Aimee J. Ellington**, Virginia Commonwealth University (1035-U1-915)
- ▶ 2:25PM *An Analysis of Students' Development of Understanding of Number Systems.*  
(1850) **Joyce A. Cutler**, Framingham State College (1035-U1-1436)
- ▶ 2:50PM *Conceptual Understanding and Procedural Performance in Undergraduate Survey of Calculus.*  
(1851) **Ted R Hodgson\***, Northern Kentucky University, and **Gaye W Fearn**, Montana State University (1035-U1-176)
- ▶ 3:15PM *The Impact of an Algebra Framework on Understanding and Skill in College Algebra.*  
(1852) **Jon F Hasenbank\***, University of Wisconsin - La Crosse, and **Ted Hodgson**, Northern Kentucky University (1035-U1-373)
- ▶ 3:40PM *Measuring Mathematical Sophistication.*  
(1853) **Jennifer E. Szydlik**, University of Wisconsin Oshkosh (1035-U1-820)

- 4:05PM *Addressing Students' Misconceptions About Probability in an Introductory College Statistics Course: The Instructors' Perspectives.*  
 (1854) **Leonid Khazanov\***, Borough of Manhattan Community College of the City University of New York, **Annette F Gourgey**, City University of New York, and **Frederick Peskoff**, Borough of Manhattan Community College of the City University of New York (1035-U1-584)
- ▶ 4:30PM *Evaluating the effectiveness of remediation: Longitudinal effects of developmental coursework on mathematics achievement.*  
 (1855) **H. Smith Risser**, Texas Woman's University (1035-U1-1439)
- ▶ 4:55PM *Teaching a Beginning College Student to Read a Mathematics Textbook, a Case Study.* Preliminary report.  
 (1856) **Mary D Shepherd**, Northwest Missouri State University (1035-U1-1580)

- ▶ 3:00PM *Building a Foundation for Algebra: How Fluency with Rational Numbers and Proportionality is Key to Achievement.*  
 (1865) **Bryan Nankervis**, Texas State University-San Marcos (1035-Z1-1061)
- ▶ 3:15PM *Studying Math Anxiety: A Case Study in Cooperation Between a University and a Community College.*  
 (1866) **K. Scott Alberts\***, Truman State University, and **Jane Roads**, Moberly Area Community college (1035-Z1-523)
- ▶ 3:30PM *Spiral Knots.* Preliminary report.  
 (1867) **Leonard A. Van Wyk\*** and **Laura A. Taalman**, James Madison University (1035-Z1-1685)
- ▶ 3:45PM *NoteBlogging in the Classroom.*  
 (1868) **Beth Simon**, University of California at San Diego (1035-Z1-1856)
- ▶ 4:00PM *Improving high school geometry by carefully selecting what and how we teach prospective high school teachers.*  
 (1869) **Shlomo Libeskind**, University of Oregon (1035-Z1-1960)
- ▶ 4:15PM *Spherical Superbowl? In Search of a Round Football.*  
 (1870) **Elizabeth A. Stanhope\***, Lewis & Clark College, **Emily Dryden**, Bucknell University, **Jeanie Karns**, Lewis & Clark College, **Wai Chit Lam**, McGill University, and **Matt Lang**, Lewis & Clark College (1035-Z1-1802)
- ▶ 4:30PM *The Most Fundamental Inequality.*  
 (1871) **Anand Kumar**, Ramanujan School of Mathematics, Patna, India (1035-Z1-227)
- ▶ 4:45PM *Nonlinear filtering of random fields in the presence of long-memory noise.*  
 (1872) **Matthew Linn**, University of Michigan (1035-Z1-93)
- ▶ 5:00PM *To Infinity and Beyond.*  
 (1873) **Jeffrey M. Groah**, Montgomery College (1035-Z1-268)
- ▶ 5:15PM *Distributing Vertices on a Hamiltonian Cycle.*  
 (1874) **Ralph J. Faudree**, University of Memphis, **Ronald J. Gould**, Emory University, **Michael S. Jacobson**, University of Colorado at Denver, and **Colton R. Magnant\***, Emory University (1035-Z1-383)
- ▶ 5:30PM *Pedagogy of Arithmetic.* Preliminary report.  
 (1875) **L Franklin Kemp**, Collin County Community College (1035-Z1-847)

**MAA General Contributed Paper Session, X**

1:00 PM – 5:40 PM

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

Moderators: **Srilal Krishnan**, Iona College  
**Bryan Nankervis**, Texas State University-San Marcos  
**Maegan Bos**, St. Lawrence University  
**John Villalpando**, Gonzaga University  
**Joy L. Becker**, University of Wisconsin-Stout  
**Aldo R. Maldonado**, Park University

- ▶ 1:00PM *NIMbly Bridging the Gap.* Preliminary report.  
 (1857) **Maegan K Bos**, St. Lawrence University (1035-Z1-1590)
- ▶ 1:15PM *Irreducible no-hole colorings of grid graphs, hypercube and other bipartite graphs.*  
 (1858) **John J Villalpando\***, Gonzaga University, and **Renu C Laskar**, Clemson University (1035-Z1-1104)
- ▶ 1:30PM *An "advanced perspectives" course for prospective high school math teachers.* Preliminary report.  
 (1859) **Erica L Johnson**, St. John Fisher College (1035-Z1-1748)
- ▶ 1:45PM *A Follow-Up Investigation on the Effects of a Refocused College Algebra Course.*  
 (1860) **Erick B Hofacker**, University of Wisconsin-River Falls (1035-Z1-1854)
- ▶ 2:00PM *Engaging Students through Applications and Discussion Boards.* Preliminary report.  
 (1861) **Joy L Becker**, University of Wisconsin-Stout (1035-Z1-454)
- ▶ 2:15PM *A Conceptual Booster for Mathematically Distressed Students.* Preliminary report.  
 (1862) **C. L. Greeno**, The MALEI Mathematics Institute (1035-Z1-1175)
- ▶ 2:30PM *WeBWork to stimulate reading: Computational versus conceptual problems.* Preliminary report.  
 (1863) **George R. Exner\***, Bucknell University, and **Mary D Shepherd**, Northwest Missouri State University (1035-Z1-961)
- ▶ 2:45PM *Having fun in classroom with Mathematics from India.*  
 (1864) **Srilal N Krishnan**, Iona College (1035-Z1-329)

**SIAM Minisymposium on Graph Coloring and Partitioning, II**

1:00 PM – 5:50 PM

- Organizers: **Andre Kundgen**, California State University, San Marcos  
**Radhika Ramamurthi**, California State University, San Marcos
- ▶ 1:00PM *Circular consecutive choosability for every cycle and for  $\theta_{2,2,4}$  is 2.*  
 (1876) **Daphne Der-Fen Liu**, California State University, Los Angeles (1035-05-537)
- ▶ 1:25PM *Circular choosability of graphs.*  
 (1877) **Serguei Norine**, Princeton University (1035-05-771)
- ▶ 1:50PM *Algebraically Solvable Problems: Describing Polynomials as Equivalent to Explicit Solutions.*  
 (1878) **Uwe Schauz**, Tübingen Germany (1035-05-722)
- ▶ 2:10PM Break.
- ▶ 2:30PM *Level three graph sums.*  
 (1879) **Sam Vandervelde**, St. Lawrence University (1035-05-341)



- 2:55PM *Distinguishing Chromatic Number of Graphs.*  
 ▶ (1880) **Jeong-Ok Choi**, University of Illinois at Urbana-Champaign, **Stephen Hartke**, University of Nebraska, and **Hemanshu Kaul\***, Illinois Institute of Technology (1035-05-1155)
- 3:20PM *Degree Sequences for Edge Colored Graphs.*  
 ▶ (1881) **Garth Isaak**, Lehigh University (1035-05-947)
- 3:40PM Break.
- 4:00PM *Edge-colorings avoiding rainbow and monochromatic subgraphs.*  
 (1882) **Maria Axenovich\***, Iowa State University, and **Perry Iverson**, Louisiana State University (1035-05-1232)
- 4:30PM *Dominating Sets in Triangulations.*  
 ▶ (1883) **Erika L. C. King**, Hobart and William Smith Colleges, and **Michael J. Pelsmayer\***, Illinois Institute of Technology (1035-05-1209)
- 5:00PM *On the existence of a rainbow 1-factor in 1-factorizations of  $K_{r^n}^{(r)}$ .*  
 ▶ (1884) **Saad I. El-Zanati\***, **Michael J. Plantholt**, **Papa A. Sissokho** and **Lawrence Spence**, Illinois State University (1035-05-1949)
- 5:30PM *A new look at Szemerédi's regularization.*  
 (1885) Preliminary report.  
**Y Ishigami**, University of Electro-Communications (1035-05-1450)

**AWM Workshop Panel Discussion**

1:00 PM – 2:00 PM

*Establishing a career in mathematics.*

Moderator: **Magnhild Lien**, California State University Northridge

Panelists: **Megan M. Kerr**, Wellesley College  
**Elizabeth S. Allman**, University of Alaska, Fairbanks  
**Elana J. Fertig**, Matron, Inc.

**ASL Session for Contributed Papers, III**

2:00 PM – 5:35 PM

- 2:00PM *On maximal subgroups of the automorphism group of a countable arithmetically saturated model of PA.*  
 (1886) **Ernek S. Nurkhaidarov**, University of Montana Western
- 2:25PM *More on decidable theories of l-groups of continuous functions.*  
 (1887) **Brian Wynne**, Colgate University
- 2:50PM *Parameterization in Monadic Logic.*  
 (1888) **Grigori Mints\*** and **Tomohiro Hoshi**, Stanford University
- 3:15PM *Incompleteness Theorem and empirical stability.*  
 (1889) **Dan E. Willard**, University at Albany
- 3:40PM Break.
- 4:00PM *Results on off-branch numbers and other invariants.*  
 (1890) **John Bourke**, Dartmouth College
- 4:25PM *A model with a very good scale and a bad scale.*  
 (1891) **Dima Sinapova**, University of California at Los Angeles
- 4:50PM *Semantics for positive entailment and for entailment.*  
 (1892) **Katalin Bimbo**, Indiana University
- 5:15PM *Independence-friendly cylindric set algebras.*  
 (1893) **Allen L. Mann**, Colgate University

**AWM Workshop: Research Presentations by Recent Ph.D.'s, II**

2:30 PM – 4:20 PM

- 2:30PM *Imaginary Whittaker Modules for Affine Lie Algebras.*  
 (1894) **Konstantina Christodouloupoulou**, University of Wisconsin-Madison
- 3:00PM *Conditioning Super-Brownian Motion on its Exit Measure.*  
 (1895) **Deniz Sezer**, York University
- 3:30PM *Continuous Dependence on Modeling for Nonlinear Ill-Posed Problems.*  
 (1896) **Beth Campbell Hetrick**, Pennsylvania State University, Harrisburg
- 4:00PM *Comparison of Relative Cohomology Theories.*  
 (1897) **Diana White**, University of South Carolina

**MAA General Contributed Paper Session, XI**

2:45 PM – 5:10 PM

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

Moderators: **Firooz Khosraviyani**, Texas A&M International University  
**Andrew E. Long**, Northern Kentucky University  
**G. Alan Cannon**, Southeastern Louisiana University  
**Larry Wayne Lewis**, Spalding University

- 2:45PM *Re-thinking How We Introduce Mathematics to First Year Students.* Preliminary report.  
 ▶ (1898) **Colm Mulcahy\***, Spelman College, and **Ed Burger**, Williams College (1035-Z1-1882)
- 3:00PM *Gender Differences in Mathematics Performance—A Pilot Study.* Preliminary report.  
 ▶ (1899) **Melissa A Desjarlais**, Valparaiso University (1035-Z1-1778)
- 3:15PM *Kernels of an Integro-Differential Equation from an Initial Pulse.* Preliminary report.  
 (1900) **J. Angela Hart Murdock**, Middle Tennessee State University (1035-Z1-1986)
- 3:30PM *1. NCTM Focal Points for K-8 Avoid 2-step Arithmetic Word Problems with Math Content. 2. K-8 Math Textbooks Avoid Word Problems with Reading Content.*  
 (1901) **Jerome Dancis**, Univ. of Maryland (1035-Z1-1896)
- 3:45PM *Batteries Not Included: Using the Abacus to Motivate Liberal Arts Mathematics Students.*  
 ▶ (1902) **Sandra E. Boer**, Borough of Manhattan Community College (1035-Z1-1883)
- 4:00PM *How to Assess Effective Teaching in a Problem Solving Mathematics Curriculum.*  
 ▶ (1903) **Charles Anthony Sulewski**, United States Military Academy (1035-Z1-933)
- 4:15PM *The Central Ideas of the First-Year Calculus: Views from Calculus Textbook Authors and Other Well-Known Experts, Preliminary Report.*  
 ▶ (1904) Preliminary report.  
**Kimberly S. Sofronas\***, Emmanuel College,  
**Nicholas Gorgievski**, Nichols College, **Larissa Schroeder**, **Chris Hamelin**, **Thomas C. DeFranco** and **Charles Vinsonhaler**, University of Connecticut (1035-Z1-975)

- 4:30PM *So You Want to Be an Engineering Major but You're Afraid of Math.*  
▶ (1905) **Robert E Burks**, United States Military Academy (1035-Z1-1274)
- 4:45PM *Effective Teaching in Discrete Mathematics.*  
(1906) **Weiwei Zhang**, King's College (1035-Z1-1283)
- 5:00PM *Using Writing Techniques To Enhance Learning In The Pre-Calculus Mathematics Classroom.*  
(1907) **Jonathan P Lambright\***, Savannah State University, and **Josephine Foster**, Armstrong Atlantic State University (1035-Z1-1291)

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### 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

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### MAA Minicourse #6: Part B

3:30 PM – 5:30 PM

*Sonification for mathematics instruction.*

Organizers: **Steven M. Hetzler**, Salisbury State University  
**Robert M. Tardiff**, Salisbury State University

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### MAA General Contributed Paper Session, XII

4:00 PM – 5:40 PM

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

Moderators: **David Taylor**, Roanoke University  
**Robert D. Poodiack**, Norwich University

- 4:00PM *A Comparison of Quantitative (Aiken & Dreger's Mathematics Attitude Scale and a Semantic Differential) and Qualitative (Open-response) Methods in Measuring Student Attitudes toward Mathematics.*  
▶ (1908) **Mike J Simmers**, University of Wisconsin-Stevens Point (1035-Z1-1549)
- 4:15PM *Increasing Student Success in Engineering and Science through a Freshman Enrichment Program.*  
(1909) **Galen E. Turner III\***, **James D. Nelson**, **Kelly B. Crittenden** and **Alicia Boudreaux**, Louisiana Tech University (1035-Z1-1579)
- 4:30PM *Students' Perceptions of Partial Notes in Promoting Understanding of Calculus.*  
▶ (1910) **Larissa B. Schroeder\*** and **Thomas C. DeFranco**, Center for Research in Mathematics Education/ University of Connecticut (1035-Z1-1595)
- 4:45PM *Surreal Numbers and Combinatorial Game Theory in Undergraduate Research Projects at Penn State Erie.*  
▶ (1911) **Paul D. Olson**, Penn State Erie, the Behrend College (1035-Z1-1617)
- 5:00PM *How to help calculus students understand more and memorize less.*  
▶ (1912) **Wojciech K Kosek**, Colorado College (1035-Z1-1633)
- 5:15PM *Teaching and Learning Calculus Using Maplelets for Calculus.*  
▶ (1913) **Douglas B Meade\***, University of South Carolina, and **Philip B Yasskin**, Texas A&M University (1035-Z1-1704)
- 5:30PM *Bracelets with Magic Applications.* Preliminary report.  
▶ (1914) **Colm Mulcahy\***, Spelman College, and **Neil Calkin**, Clemson University (1035-Z1-1870)

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### AMS Banquet Reception

6:30 PM – 7:30 PM