
Program of the Sessions

Atlanta, Georgia, January 5–8, 2005

Monday, January 3

AMS Short Course: Radon Transform and Applications to Inverse Problems, I

9:00 AM – 5:00 PM

Organizers: **Gestur Olafsson**, Louisiana State University
Todd Quinto, Tufts University

- 8:00AM Registration in Hanover Hall.
10:00AM *An introduction to tomography and radon transforms.*
(1) **Todd Quinto**, Tufts University
1:30PM *Development of algorithms in CT.*
(2) **Alfred Louis**, Universitaet des Saarlandes
3:00PM Break
3:30PM *Generalized transforms of Radon type and their applications.*
(3) **Peter Kuchment**, Texas A&M University

MAA Short Course: Eight Lectures on Random Graphs, I

9:00 AM – 5:00 PM

Organizer: **Alan M. Frieze**, Carnegie Mellon University

- 8:00AM Registration in Hanover Hall.
9:00AM *Evolution of $G_{n,m}$.*
(4) **Tom Bohman**, Carnegie Mellon University
10:15AM Break.
10:45AM *Thresholds for some basic properties.*
(5) **Oleg Pikhurko**, Carnegie Mellon University
2:00PM *The probabilistic method.*
(6) **Benny Sudakov**, Princeton University
3:15PM Break.
3:45PM *Small subgraphs.*
(7) **Andrzej Ruciński**, Adam Mickiewicz University

Tuesday, January 4

MAA Board of Governors

8:30 AM – 4:00 PM

MAA Short Course: Eight Lectures on Random Graphs, II

9:00 AM – 5:00 PM

Organizer: **Alan M. Frieze**, Carnegie Mellon University

- 9:00AM *Random regular graphs.*
(8) **Nick Wormald**, University of Waterloo
10:15AM Break.
10:45AM *Independence and chromatic number: Dense case.*
(9) **Michael Molloy**, University of Toronto
2:00PM *Independence and chromatic number: Sparse case.*
(10) **Dimitris Achlioptas**, Microsoft Research
3:15PM Break.
3:45PM *Random graph models of the Web.*
(11) **Alan M. Frieze**, Carnegie Mellon University

AMS Short Course: Radon Transform and Applications to Inverse Problems, II

10:00 AM – 5:00 PM

Organizers: **Gestur Olafsson**, Louisiana State University
Todd Quinto, Tufts University

- 10:00AM *Tomography and sampling theory.*
(12) **Adel Faridani**, Oregon State University
1:30PM *Inverse problems in pipeline inspection.*
(13) **Peter Massopust**, Tuboscope Pipeline Services
3:00PM Break
3:30PM *Coherent interferometric array imaging in random media.*
(14) **Liliana Borcea**, Rice University

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

AMS Council

1:30 PM – 10:00 PM

Joint Meetings Registration

3:00 PM – 8:00 PM

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

Wednesday, January 5

Joint Meetings Registration

7:30 AM – 4:00 PM

Employment Center Registration

7:30 AM – 4:00 PM

AMS Session on Group Theory

7:45 AM – 10:55 AM

- 7:45AM (15) *Capable two generator p -groups of class two.*
Arturo Magidin, The University of Montana (1003-20-100)
- 8:00AM (16) *On the Degrees of Complex p -Solvable Linear Groups.*
Benjamin Newton, University of Wisconsin-Madison (1003-20-1292)
- 8:15AM (17) *Groups with fixed point free automorphisms of prime order.*
Pavel Shumyatsky, University of Brasilia, **Antonio Tamarozzi**, Federal University of Mato Grosso do Sul, and **Lawrence E. Wilson***, University of Florida (1003-20-319)
- 8:30AM (18) *Subnormal subgroups of finite rank.*
Youngmi Kim*, Jacksonville State University, and **Martin J. Evans**, University of Alabama (1003-20-592)
- 8:45AM (19) *Counting generators of finite groups that are generated by two groups of prime power order.*
Bret J. Benesh, University of Wisconsin-Madison (1003-20-651)
- 9:00AM (20) *G -irreducible subgroups of type A_1 .*
Bonnie R Amende, University of Oregon (1003-20-700)
- 9:15AM (21) *Properties of Subgroups of Direct Products that Satisfy the Frattini Argument.*
Joseph Evan, King's College (1003-20-783)
- 9:30AM (22) *On the Power Structure of Finite Groups.* Preliminary report.
▶ **Luise-Charlotte Kappe*** and **Gabriela A. Mendoza**, SUNY at Binghamton (1003-20-942)
- 9:45AM (23) *The Equivalence Between MV-algebras and Abelian l -groups with Strong Unit: Can It Be Extended?* Preliminary report.
Joshua B Palmatier, SUNY Binghamton (1003-20-981)
- 10:00AM (24) *On Generalizations of Groups in which Normality is a Transitive Relation.*
Matthew F. Ragland, University of Kentucky (1003-20-274)

- 10:15AM (25) *The Basic Algebra of HS in Characteristic 2.*
Thomas Rune Hoffman, Coastal Carolina University (1003-20-945)
- 10:30AM (26) *Subloops of the unit octonions.*
Stephen M Gagola III, Michigan State University (1003-20-1503)
- 10:45AM (27) *On Navarro's Conjecture For The Alternating Groups, $p=2$.*
Rishi Nath, University of Illinois-Chicago (1003-20-1657)

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

8:00 AM – 10:25 AM

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

- 8:00AM (28) *Household group theory.*
▶ **Joseph A. Gallian**, University of Minnesota Duluth (1003-00-389)
- 8:30AM (29) *Undergraduate Geometry in the Twenty-First Century.* Preliminary report.
▶ **Thomas F Banchoff**, Brown University (1003-97-1488)
- 9:00AM (30) *Linking Introductory Calculus and Statistics with Multivariate Modeling.*
▶ **Daniel T. Kaplan**, Macalester College (1003-97-636)
- 9:30AM (31) *Ideas to Enliven Liberal Arts Students.* Preliminary report.
Michael Starbird, The University of Texas at Austin (1003-97-696)
- 10:00AM (32) *Chaos in the Classroom: Exciting Students about Mathematics.*
▶ **Robert L. Devaney**, Boston University (1003-97-280)

AMS-SIAM Special Session on Dynamic Equations on Time Scales; Integer Sequences and Rational Maps, I

8:00 AM – 10:50 AM

Organizers: **Martin J. Bohner**, University of Missouri-Rolla
Marc A. Chamberland, Grinnell College
Billur Kaymakcalan, George Southern University
Allan C. Peterson, University of Nebraska-Lincoln
Diana M. Thomas, Montclair State University

- 8:00AM (33) *Fractals, Graphs, and Fields.*
▶ **Franklin Mendivil**, Acadia University (1003-12-698)
- 8:30AM (34) *Symmetry between canonical heights of dynamical systems.*
Thomas J Tucker*, University of Rochester, and **Lucien Szpiro**, City University of New York (1003-11-1298)

- 9:00AM *Dynamics of Nim Induced Difference Equations.*
 ▶ (35) **Michael A Jones*** and **Diana M Thomas**, Montclair State University (1003-37-1098)
- 9:30AM *Maximal Periods of the odd n -Number Ducci Game.*
 (36) **Neil J. Calkin***, Clemson University, **John G. Stevens** and **Diana M. Thomas**, Montclair State University (1003-12-847)
- 10:00AM *Equidistribution of small subvarieties of an abelian variety.*
 (37) **Su-ion Ih***, University of Georgia, and **Matthew Baker**, Georgia Institute of Technology (1003-11-829)
- 10:30AM *Chaotic Iterations and Normal Numbers.*
 ▶ (38) **David H Bailey**, Lawrence Berkeley Lab (1003-11-743)

- 9:00AM *Explicit inversion of attenuated Radon transforms in hyperbolic geometry.*
 (47) **Guillaume Bal**, Department of Applied Physics and Applied Mathematics, Columbia University (1003-53-888)
- 9:30AM *Developments in inverse boundary value problems for quasilinear elliptic equations.*
 (48) **Ziqi Sun**, Wichita State University (1003-35-630)
- 10:00AM *On the characterization of the kernel of the geodesic X-Ray transforms of tensor fields.*
 (49) **Eduardo E Chappa**, University of Texas A&M (1003-58-1094)
- 10:30AM *Geometric optics and the wave equation on manifolds with corners.*
 (50) **Andras Vasy**, M.I.T. and Northwestern University (1003-35-530)

AMS-SIAM Special Session on Mathematical Image Processing, I

8:00 AM – 10:50 AM

Organizers: **Jianhong Shen**, University of Minnesota, Minneapolis
Tony F. Chan, University of California Los Angeles

- 8:00AM *Exact solutions for the L^1 TV functional.*
 ▶ (39) **Selim Esedoglu**, University of California Los Angeles, and **Kevin R Vixie***, Los Alamos National Laboratory (1003-49-1374)
- 8:30AM *Scale recognition and regularization parameter selection in total variation regularization.*
 (40) **David M Strong***, Pepperdine University, and **Tony Chan**, UCLA (1003-94-852)
- 9:00AM *Computational Conformal Geometry applied in Computer Graphics, Vision and Medical Imaging.*
 ▶ (41) **Xianfeng Gu**, Stony Brook University (1003-68-1140)
- 9:30AM *Fast Algorithms for the Removal of Non-Uniform Motion Blurs.*
 (42) **Julianne Chung** and **James Nagy***, Emory University (1003-65-1108)
- 10:00AM *Conformal H^0 Metrics on the Space of Curves.*
 (43) **Anthony Yezzi***, Georgia Institute of Technology, and **Andrea Mennucci**, Scuola Normale Superiore (1003-53-1380)
- 10:30AM *Lagrangian Optimization of a Group Testing for ENO Wavelet Algorithms in Image Compression.*
 (44) **Diego Dugatkin**, Ixia, Calabasas, California, **Hao-Min Zhou***, Georgia Tech, **Tony F. Chan**, UCLA, and **Michelle Effros**, Caltech (1003-94-1142)

AMS-SIAM Special Session on Theoretical and Computational Aspects of Inverse Problems, I

8:00 AM – 10:50 AM

Organizers: **Gunther Uhlmann**, University of Washington
David L. Colton, University of Delaware

- 8:00AM *Inverse Problems for Resonances.*
 (45) **Maciej Zworski**, University of California, Berkeley (1003-35-1128)
- 8:30AM *Stable determination of generic simple metrics from the hyperbolic DN map and boundary rigidity.*
 (46) **Plamen Stefanov***, Purdue University, and **Gunther Uhlmann**, University of Washington (1003-35-844)

AMS-ASL Special Session on Reverse Mathematics, I

8:00 AM – 10:50 AM

Organizers: **Jeff L. Hirst**, Appalachian State University
Reed Solomon, University of Connecticut

- 8:00AM *An Introduction to Reverse Mathematics.*
 (51) **Douglas K. Brown**, Penn State - Altoona College (1003-03-1186)
- 9:00AM *Proof-Theoretic Strength of the Stable Marriage Theorem.*
 ▶ (52) **Douglas Cenzer***, University of Florida, and **Jeffrey B Rempel**, University of California-San Diego (1003-03-548)
- 9:30AM *Ramsey Theory on Trees.*
 (53) **Timothy H McNicholl***, University of Dallas, and **Jeff L Hirst**, Appalachian State University (1003-03-1427)
- 10:00AM *Degrees of Infinite Homogeneous Sets for Computable Stable Colorings of Pairs.* Preliminary report.
 (54) **Denis R. Hirschfeldt**, University of Chicago (1003-03-845)
- 10:30AM *The atomic model theorem.* Preliminary report.
 (55) **Barbara F. Csima**, Cornell University, **Denis R. Hirschfeldt**, University of Chicago, and **Richard A. Shore***, Cornell University (1003-03-1127)

AMS Special Session on Riemannian Geometry, I

8:00 AM – 10:40 AM

Organizers: **Igor Belegradek**, Georgia Institute of Technology
Mohammad Ghomi, Georgia Institute of Technology and Pennsylvania State University

- 8:00AM *Bernstein type theorems in higher codimension.*
 (56) **Mu-Tao Wang**, Columbia University (1003-53-943)
- 9:00AM *Ropelength and Distortion of Knots using Essential Secants.*
 ▶ (57) **John M Sullivan**, TU Berlin and UIUC (1003-57-573)
- 10:00AM Discussion

AMS Special Session on D-Modules, I

8:00 AM – 10:50 AM

Organizers: **Steven Sperber**, University of Minnesota, Minneapolis
Uli Walther, Purdue University

- 8:00AM *Hypergeometric equations and mirror symmetry.*
(58) **Sheldon H Katz**, University of Illinois at Urbana-Champaign (1003-14-1271)
- 8:30AM *GKZ-Systems and Quantum Cohomology D-Modules.*
(59) Preliminary report.
Charles F Doran*, University of Washington, and **Shinobu Hosono**, University of Tokyo (1003-14-1099)
- 9:00AM *Holonomic ranks in parametric families.*
(60) **Laura Felicia Matusevich***, University of Pennsylvania, **Ezra Miller**, University of Minnesota, and **Uli Walther**, Purdue University (1003-14-236)
- 9:30AM *A basis in the solution space of the Mellin system.*
(61) Preliminary report.
Alicia Dickenstein, University of Buenos Aires, and **Timur Sadykov***, University of Western Ontario, London, Canada (1003-35-1123)
- 10:00AM *Hodge polygons for exponential sums.* Preliminary report.
(62) **Alan C. Adolphson***, Oklahoma State University, and **Steven Sperber**, University of Minnesota (1003-11-1204)
- 10:30AM *A surprising fact about D-modules in characteristic $p > 0$.*
(63) **Josep Alvarez-Montaner**, Universitat Politècnica de Catalunya, **Gennady Lyubeznik***, University of Minnesota, and **Manuel Blickle**, Universitaet Essen (1003-13-769)

AMS Special Session on Commutative Algebra, I

8:00 AM – 10:50 AM

Organizers: **Srikanth B. Iyengar**, University of Nebraska, Lincoln
Sean M. Sather-Wagstaff, University of Nebraska, Lincoln
Anurag K. Singh, Georgia Institute of Technology
Carolyn A. Yackel, Mercer University

- 8:00AM *Graded algebras and Poincaré series associated to surface singularities.*
(64) **Steven D Cutkosky**, Univ. Missouri (1003-14-772)
- 8:30AM *3 generated ideals and the tails of their free resolutions.*
(65) **Leah H. Gold**, Texas A&M University (1003-13-725)
- 9:00AM *Artin-Rees properties for syzygies.*
(66) **Janet Striuli**, University of Kansas (1003-13-1130)
- 9:30AM *Hilbert Functions Of Subsets Of Complete Intersections.*
(67) **Susan M. Cooper**, Queen's University (1003-13-731)
- 10:00AM *Hilbert Functions and Castelnuovo-Mumford Regularity.* Preliminary report.
(68) **Brent D Strunk**, Purdue University (1003-13-774)
- 10:30AM *Hilbert Polynomials Associated to Tor and Ext for Powers of Ideals, Degree and Leading Coefficient.* Preliminary report.
(69) **Daniel L. Katz**, University of Kansas, Lawrence, and **Emanoil Theodorescu***, University of Missouri, Columbia, (1003-13-1047)

AMS Special Session on Design Theory and Graph Theory, I

8:00 AM – 10:50 AM

Organizers: **Mike Daven**, Mount Saint Mary College
Atif A. Abueida, University of Dayton

- 8:00AM *Coloring Block Designs as Mixed Hypergraphs: a survey.*
(70) **Vitaly Voloshin**, Troy University (1003-05-129)
- 8:30AM *Cycle extendability in chordal graph classes.*
▶ (71) **Atif Abueida** and **R. Sritharan***, University of Dayton (1003-05-50)
- 9:00AM *Hamiltonian Cycles with small even chords.*
▶ (72) Preliminary report.
Guantao Chen*, Georgia State University, **Katshiro Ota**, Keio University, and **Akira Saito**, Nihon University (1003-05-739)
- 9:30AM *On 2-Factor Hamiltonian Graphs.*
(73) **Ralph Faudree**, University of Memphis, **Ronald J Gould***, Emory University, and **Michael S Jacobson**, University of Colorado at Denver (1003-05-1219)
- 10:00AM *Enumerator Polynomials and Enumeration Problems on Multigraphs.*
(74) **Nathan Kahl*** and **Charles Suffel**, Stevens Institute of Technology (1003-05-70)
- 10:30AM *On Invulnerable Networks With Respect to Node Failure.*
(75) **Lawrence W. Kazmierczak**, **Francis Boesch** and **Charles L. Suffel***, Stevens Institute of Technology (1003-05-1236)

AMS Special Session on Analysis Problems in Modern Physics, I

8:00 AM – 10:50 AM

Organizer: **Steven M. Zelditch**, Johns Hopkins University

- 8:00AM *Dissipative transport and Kubo's formula in Aperiodic Solids.*
(76) **Jean V. Bellissard**, Georgia Institute of Technology, School of Mathematics & School of Physics (1003-47-1066)
- 8:30AM *Bloch Electron in a Perpendicular Magnetic Field.*
(77) **Deborah A. Koslover***, **Svetlana Ya. Jitomirskaya**, University of California, Irvine, and **Melinda S. Schulteis**, Concordia University, Irvine (1003-81-1507)
- 9:00AM *Asymptotic analysis of orthogonal polynomials by Riemann-Hilbert and d -bar techniques, and applications.*
(78) **Kenneth D. T-R. McLaughlin**, University of Arizona (1003-41-1376)
- 9:30AM *Large N asymptotics of the partition function of a random matrix model.*
(79) **Pavel M. Bleher**, Indiana University-Purdue University Indianapolis (1003-41-638)
- 10:00AM *Shapes of crystalline surfaces.*
(80) **Richard W Kenyon**, University of British Columbia (1003-82-970)
- 10:30AM *Two-dimensional polymer measure.*
(81) **Gregory F Lawler**, Cornell University (1003-82-483)

AMS Special Session on In the Wake of Jacobi and Hamilton 200 Years Later, I

8:00 AM – 10:50 AM

Organizers: **Maria-Clara Nucci**, University of Perugia
Pavel Winternitz, Centre de recherches mathématiques, Université de Montréal

- 8:00AM *The Concept of Variation in Jacobi's Writings on Analysis and Dynamics.* Preliminary report.
▶ (82) **Craig Fraser**, University of Toronto (1003-01-969)

- 9:00AM *Hamilton-Jacobi theory, phase space separation of variables and classical R-matrix theory.*
▶ (83) **John Harnad**, Centre de recherches mathématiques, Univ. de Montréal, and Concordia University (1003-34-755)
- 10:00AM *Symmetry Constraints and Liouville Integrability of Soliton Equations.*
(84) **Wen-Xiu Ma**, University of South Florida (1003-37-815)
- 10:30AM *Jacobi last multiplier and Lie symmetries: a novel application of an old relationship.*
▶ (85) **Maria-Clara Nucci**, Università di Perugia, Perugia, Italy (1003-34-704)

AMS Session on Algebra, I

8:00 AM – 10:55 AM

- 8:00AM *On some representations of the Drinfel'd Double.*
(86) **Sebastian Marius Burciu**, Syracuse University (1003-16-1010)
- 8:15AM *Semigroup Graded Rings and V-rings.* Preliminary report.
(87) **Hema Gopalakrishnan***, Sacred Heart University, and **Mark L. Teply**, University of Wisconsin, Milwaukee (1003-16-1113)
- 8:30AM *Elements of Interest in a Jacobson Radical Ring.* Preliminary report.
(88) **Jason P Huffman**, Georgia College & State University (1003-16-1277)
- 8:45AM *Generalized Grassmannians Constructed via Quasideterminants.*
(89) **Aaron Lauve**, Rutgers University–New Brunswick (1003-16-1491)
- 9:00AM *Generalized Primary Rings.* Preliminary report.
(90) **Christine E Gorton**, University of Louisiana at Lafayette (1003-16-1528)
- 9:15AM *Properties of Graph Associated Noncommutative Algebras.*
(91) **David Nacin**, Rutgers University (1003-16-1620)
- 9:30AM *Representation Theory of a Class of Quantum Projective 3-Spaces.*
(92) **Pete Goetz***, Bucknell University, and **Brad Shelton**, University of Oregon (1003-16-194)
- 9:45AM *Gauge Equivalent Twisted Quantum Doubles.*
(93) **Christopher Goff**, University of the Pacific (1003-16-745)
- 10:00AM *Centroids for Jordan Superalgebras.* Preliminary report.
(94) **Pamela A. Richardson**, University of Virginia (1003-17-1013)
- 10:15AM *Absolutely Pure Covers.*
(95) **Katherine Pinzon**, University of Kentucky (1003-18-1031)
- 10:30AM *Predicates, categorically.*
(96) **Ayalur R. Krishnan**, Kingsborough Community College (1003-18-1278)
- 10:45AM *Products of DG-injective complexes.*
(97) **Alina Iacob**, University of Kentucky (1003-18-647)

AMS Session on Analysis, I

8:00 AM – 10:25 AM

- 8:00AM *Preventing extinction in discrete Lotka-Volterra equations.* Preliminary report.
▶ (98) **Jerry J Chen**, Case Western Reserve University (1003-37-1530)

- 8:15AM *Existence of a sigma-finite invariant measure.*
(99) **S. Butler**, University of Illinois at Urbana-Champaign, **W. Kosek***, Colorado College, and **J. Rosenblatt**, University of Illinois at Urbana-Champaign (1003-37-1558)
- 8:30AM *The Dynamics of Energy Harvesting.* Preliminary report.
(100) **Carl V. Lutzer**, Rochester Institute of Technology (1003-37-176)
- 8:45AM *Grillage analysis computer modelling and analysis of structures.* Preliminary report.
(101) **Alexandros Antonioy Tasopoulos**, Athens, Greece (1003-37-202)
- 9:00AM *Bifurcation of an orbit Homoclinic to saddle-focus in piecewise-linear systems.*
(102) **Matsyshyn Oleh**, Institut Ecology Technology (1003-37-1651)
- 9:15AM *Asymptotic equivalence of dynamic equations.*
▶ (103) **Billur Kaymakcalan***, Georgia Southern University, and **Agacik Zafer**, Middle East Technical University (1003-34-1497)
- 9:30AM *Continuity of the Lyapunov exponent for analytic quasiperiodic cocycles.*
(104) **S. Jitomirskaya**, **D. A. Koslover**, University of California, Irvine, and **M. S. Schulteis***, Concordia University, Irvine (1003-37-1325)
- 9:45AM *Henstock–Kurzweil Delta and Nabla Integrals.* Preliminary report.
▶ (105) **Allan C Peterson***, University of Nebraska-Lincoln, and **Bevan Thompson**, University of Queensland (1003-39-1410)
- 10:00AM *Global Weighted $L^p(\log L)^\alpha$ -Estimates for Harmonic Forms and Operators.* Preliminary report.
(106) **Shusen Ding**, Seattle University (1003-46-916)
- 10:15AM *The characterization of Young measures arising in the asymptotic analysis of thin solid films.*
(107) **Marian Bocea**, University of Utah (1003-49-116)

MAA Session on Getting Students To Discuss and To Write About Mathematics, I

8:00 AM – 10:55 AM

- Organizer: **Sarah L. Mabrouk**, Framingham State College
- 8:00AM *Storytelling Strategies in the Calculus Classroom.* Preliminary report.
▶ (108) **Linda McGuire**, Muhlenberg College (1003-A1-1118)
- 8:15AM *The Sinusoidal Garden.* Preliminary report.
▶ (109) **Karen L. Shuman**, Grinnell College (1003-A1-832)
- 8:30AM *Encourage Student Writing, Learning, and Informed Discussion Through Judicious Problem Choice.*
▶ (110) **Joyce Faye Fischer**, Texas State University (1003-A1-357)
- 8:45AM *End of Course Projects in Calculus II.* Preliminary report.
▶ (111) **Vicky Williams**, Appalachian State University (1003-A1-664)
- 9:00AM *The Devil Is in the Directions: Substantive Discourse from Simple Questions.* Preliminary report.
▶ (112) **Mary T Treanor**, Valparaiso University (1003-A1-514)
- 9:15AM *Analysis of a Mathematics Writing Experiment.* Preliminary report.
▶ (113) **Sandra Rucker**, Clark Atlanta University (1003-A1-863)

- 9:30AM *Written Papers in a Liberal Arts Mathematics Course*. Preliminary report.
▶ (114) **Ellen F Hill**, Minnesota State University Moorhead (1003-A1-364)
- 9:45AM *Understanding Mathematical Proof in a Course for Liberal Arts Majors: Students write about teaching other students a geometric proof of the Pythagorean Theorem*.
(115) **Charlotte Knotts-Zides**, Wofford College (1003-A1-906)
- 10:00AM *Using student-designed projects in an introductory statistics course: How's, what's, and why bother?* Preliminary report.
▶ (116) **Lisa J Carnell**, High Point University (1003-A1-269)
- 10:15AM *Communicating the Problem Solving Process through Memoranda*.
▶ (117) **Elaine Thompson Hale**, The University of Texas at Austin (1003-A1-586)
- 10:30AM *Going All In—Taking a Gamble on a Poker Project in an Undergraduate Probability Course*.
▶ (118) **Christopher J Lacke**, Rowan University (1003-A1-428)
- 10:45AM *Role of Online Mentoring in Improving Students' Mathematical Communication and Understanding*. Preliminary report.
▶ (119) **Rapti M. de Silva**, California State University, Chico (1003-A1-388)

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

8:00 AM – 10:55 AM

Organizers: **David R. Hill**, Temple University
Lila F. Roberts, Georgia College and State University

- 8:00AM *Some Like It Hot*.
▶ (120) **Kerry E. Moores*** and **Howard D. McInvale**, United States Military Academy (1003-B1-419)
- 8:15AM *Calculus Demonstration: Economical Radar Guns*.
▶ (121) **Melvin G. Royer**, Indiana Wesleyan University (1003-B1-380)
- 8:30AM *The Use of Household Items as Calculus Concept Models*.
▶ (122) **B. Lynn Bodner**, Monmouth University (1003-B1-395)
- 8:45AM *Using Geometer Sketchpad in Calculus I*.
(123) **Robb Sinn**, North Georgia College & State University (1003-B1-463)
- 9:00AM *Bayes' Rule and the Monte Hall Problem*.
▶ (124) **Paul R Coe**, Dominican University (1003-B1-449)
- 9:15AM *Web Based Learning and Assessment: Using MapleTA*.
▶ (125) **Denise J LeGrand**, University of Arkansas at Little Rock (1003-B1-200)
- 9:30AM *Computational Calculus: An Electronic Text*. Preliminary report.
▶ (126) **David Betounes**, University of Southern Mississippi, and **Mylan Redfern***, Valdosta State University (1003-B1-318)
- 9:45AM *My Secret Function: A Class Activity for Teaching Operations on Functions*.
▶ (127) **Kathleen D. Lopez**, University of Louisiana at Lafayette (1003-B1-369)
- 10:00AM *Constructible Squares*.
▶ (128) **David E. Boliver**, University of Central Oklahoma (1003-B1-408)

- 10:15AM *Rocky Mountain Wildflower Fibonacci*.
▶ (129) **Jacqueline A Hall**, Longwood University (1003-B1-404)
- 10:30AM *The Power of Power Series*.
▶ (130) **Michael L. Berry**, West Virginia Wesleyan College (1003-B1-60)
- 10:45AM *A picture is worth a thousand explanations*.
▶ (131) **Melkana A Brakalova-Trevithick**, Fordham University (1003-B1-512)

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

8:00 AM – 10:50 AM

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

- 8:00AM *A Course BEFORE Calculus, but not necessarily BELOW Calculus*.
▶ (132) **Jack A Picciuto*** and **Alex Heidenberg**, United States Military Academy (1003-C1-278)
- 8:25AM *What Do the Other Disciplines Expect from College Algebra?*
▶ (133) **Florence S. Gordon**, New York Institute of Technology (1003-C1-1467)
- 8:50AM *Mathematical Requirements of Majors in the Managerial, Social and Life/Health Sciences*.
▶ (134) **Scott R Herriott**, Maharishi University of Management (1003-C1-254)
- 9:15AM *What do they Assume? An Exploration of the Assumptions about Student Learning Contained in Calls for Reform of Introductory College Mathematics Courses*.
(135) **Helen Burn**, University of Michigan, Center for the Study of Higher and Postsecondary Education (1003-C1-1242)
- 9:40AM *Teaching Finite Mathematics using Elementary Mathematical Modeling*. Preliminary report.
▶ (136) **Brian J Birgen**, Wartburg College (1003-C1-1114)
- 10:05AM *Who Takes Algebra in College and What Do They Need to Know? Case Study: Augsburg College*. Preliminary report.
▶ (137) **Suzanne I Doree**, Augsburg College (1003-C1-1149)
- 10:30AM *Introductory Mathematical Modeling and Problem Solving Courses with Interdisciplinary Applications in College Algebra as a General Education Mathematics Course*. Preliminary report.
▶ (138) **William P. Fox*** and **Richard D West**, Francis Marion University (1003-C1-251)

MAA Session on Mathematics and Sports, I

8:00 AM – 10:55 AM

Organizers: **Douglas Drinen**, University of the South
Sean L. Forman, St. Joseph's University
Howard L. Penn, US Naval Academy

- 8:00AM *Using attendance in interleague games as a classroom case study.* Preliminary report.
▶ (139) **Jeff Hildebrand**, Knox College (1003-D1-437)
- 8:20AM *Geometry of Yoga.*
▶ (140) **H Soto-Johnson**, Colorado State University-Pueblo (1003-D1-543)
- 8:40AM *Modeling World Series Outcomes via Absorbing Markov Chains.*
▶ (141) **Joan W Weiss**, Fairfield University (1003-D1-205)
- 9:05AM *Optimizing Distribution of Power During a Cycling Time Trial.*
▶ (142) **Michael Scott Gordon**, State University of West Georgia (1003-D1-188)
- 9:30AM *Who will throw the next no-hitter? Modeling rare baseball events with a Poisson Distribution.* Preliminary report.
▶ (143) **J. Scott Billie***, **Michael Huber** and **Michael Phillips**, United States Military Academy (1003-D1-307)
- 9:55AM *Using Z scores to analyze the prime-time sluggers.* Preliminary report.
▶ (144) **Stephen A Krevisky**, Middlesex Community College (1003-D1-695)
- 10:20AM *One, Two, Three... Jump: An analysis of the long jump.*
▶ (145) **Alan Levine**, Franklin and Marshall College (1003-D1-575)
- 10:40AM *The Link Between Mathematics and Sports and the Many Textbooks that Use Sports to Teach Mathematics Content.* Preliminary report.
▶ (146) **Joan Elizabeth DeBello**, St. John's University (1003-D1-1313)

SIAM Minisymposium on Error-Correcting Codes

8:00 AM – 10:55 AM

Organizer: **Vera S. Pless**, University of Illinois at Chicago

- 8:00AM *Cyclic codes over even length over the integers modulo 4.*
(147) **Steven T Dougherty***, University of Scranton, and **San Ling**, University of Singapore (1003-94-511)
- 8:30AM *Asymptotic Numbers of Non-Equivalent Codes in Three Notions of Equivalence.*
(148) **Xiang-dong Hou**, University of South Florida (1003-94-585)
- 9:00AM *Algebraic or combinatorial constructions of LDPC codes.*
(149) **Jon-Lark Kim**, University of Nebraska - Lincoln (1003-94-699)
- 9:30AM *On the Automorphism Group of a $[72, 36, 16]$ Self-Dual Code.*
(150) **Vassil Y Yorgov**, Fayetteville State University (1003-94-971)
- 10:00AM *Seventy years later, "they" are eventually discovered.* Preliminary report.
▶ (151) **Cunsheng Ding**, Hong Kong University of Science and Technology (1003-94-290)
- 10:30AM *Error-Correction for Arbitrary Two-Dimensional Errors.*
(152) **Tuvi Etzion**, Technion (1003-05-214)

AMS Session on Number Theory, I

8:15 AM – 10:55 AM

- 8:15AM *On the dual representation of a representation of $GL(n, F)$.*
(153) **Alexandru Tupan**, Michigan State University (1003-11-1222)

- 8:30AM *On approximation of real numbers by algebraic numbers of bounded degree.*
(154) **Kiryl I Tsishchanka**, Knox College (1003-11-1270)
- 8:45AM *On the Analogue of the Modular Group in Characteristic p .*
(155) **Sasa Radomirovic**, Rutgers University (1003-11-1290)
- 9:00AM *On consecutive integers with equal sums of distinct prime divisors.* Preliminary report.
▶ (156) **Douglas E Iannucci*** and **Alexia S Mintos**, University of the Virgin Islands (1003-11-130)
- 9:15AM *Finiteness theorems for positive definite regular and almost regular hermitian forms.* Preliminary report.
(157) **Anna Rokicki**, Wesleyan University (1003-11-1307)
- 9:30AM *Extending the Lucas-Lehmer test to a general class of number.* Preliminary report.
▶ (158) **John H. Jaroma**, Austin College (1003-11-137)
- 9:45AM *On Computing Satake p -parameters for Siegel Modular Forms.* Preliminary report.
▶ (159) **Nathan C Ryan**, Dartmouth College (1003-11-1462)
- 10:00AM *A Trace Formula For Finite Upper Half Planes.*
(160) **Anthony M Shaheen**, University of California, San Diego (1003-11-149)
- 10:15AM *Applications of Fibonacci Numbers and Other Recurrence Relations.*
▶ (161) **Joseph E Purdom**, Shippensburg University (1003-11-1521)
- 10:30AM *Theorems and Counterexamples Concerning the Zeta Function of a Finite Graph.*
▶ (162) **Debra Czarneski**, Louisiana State University (1003-11-1556)
- 10:45AM *Variations on a Theme of Stark.* Preliminary report.
▶ (163) **Stefan Erickson**, University of California, San Diego (1003-11-197)

AMS Special Session on Radon Transform and Inverse Problems, I

8:30 AM – 10:50 AM

Organizers: **Adel Faridani**, Oregon State University
Gestur Olafsson, Louisiana State University
Todd Quinto, Tufts University

- 8:30AM *Multiscale wavelet transforms, ridgelet transforms, and Radon transforms on the space of matrices.*
(164) **Gestur Olafsson**, Louisiana State University, **Elena Ournycheva*** and **Boris Rubin**, The Hebrew University of Jerusalem (1003-42-1037)
- 9:00AM *Microlocal analysis of the Doppler transform on \mathbb{R}^3 .*
(165) **Karthik Ramaseshan**, University of Rochester (1003-44-1079)
- 9:30AM *Support Theorems for Radon Transforms on Affine Grassmannians.*
(166) **Fulton B Gonzalez**, Tufts University (1003-44-808)
- 10:00AM *Radon Inversion on Complex Spaces.* Preliminary report.
(167) **Eric L Grinberg**, University of New Hampshire (1003-44-1632)
- 10:30AM *Ranges of tomographic transforms.* Preliminary report.
(168) **David Finch**, Oregon State University (1003-44-1027)

MAA Committee on Graduate Students Special Presentation

8:30 AM – 10:55 AM

Training T.A.s in departments and at section meetings.

Organizer: **Louise A. Raphael**, Howard University
 Presenters: **Diane L. Herrmann**, University of Chicago
Maria S. Terrell, Cornell University
Thomas W. Rishel, Cornell University

MAA Minicourse #12: Part A

9:00 AM – 11:00 AM

Getting students involved in undergraduate research.

Organizers: **Aparna W. Higgins**, University of Dayton
Joseph A. Gallian, University of Minnesota, Duluth

MAA Minicourse #1: Part A

9:00 AM – 11:00 AM

Visual linear algebra.

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

MAA Minicourse #7: Part A

9:00 AM – 11:00 AM

Developing your department's assessment plan.

Organizers: **William A. Marion**, Valparaiso University
Bonnie Gold, Monmouth University

MAA Special Presentation

9:30 AM – 10:50 AM

Doctoral programs in mathematics education: Their nature and how to find them.

Organizer: **Robert E. Reys**, University of Missouri

MAA Special Presentation

9:30 AM – 10:50 AM

A problem-based core program.

Organizer: **Donald B. Small**, U.S. Military Academy
 Presenters: **Gary W. Krahn**, U.S. Military Academy
Alex J. Heidenberg, U.S. Military Academy
Michael E. Moody, Olin University

AMS Invited Address

10:05 AM – 10:55 AM

(169) *Perelman's work on Ricci flow.*
Bruce A. Kleiner, University of Michigan, Ann Arbor (1003-53-18)

AMS-MAA Invited Address

11:10 AM – NOON

(170) *Processing images with nonlinear PDEs.*
Andrea L. Bertozzi, University of California Los Angeles (1003-35-17)

Exhibits and Book Sales

12:15 PM – 5:30 PM

Math on the Web, I

12:30 PM – 5:00 PM

12:30PM *Applications that use MathML.*
 (171) **Neil Soiffer**, Design Science Inc
 2:00PM *Authoring Web pages with MathML for Cross-browser Display.*
 (172) **Bob Mathews**, Design Science Inc
 2:45PM *Student Answers to Math Homework on the Web Using Proper Mathematical Notation: A Scalable, Universal Approach.*
 (173) **John Risley**, WebAssign
 3:45PM *Interactive Math on the Web by Maplesoft.*
 (174) **Robert Lopez**, Maplesoft
 4:30PM *Math on the Web Using techexplorer.*
 (175) **Sam Dooley**, Integre Technical Publishing

AMS Colloquium Lectures: Lecture I

1:00 PM – 2:00 PM

► (176) *How polynomials vanish: Singularities, integrals, and ideals, Part I: How many times does a polynomial vanish at a point?*
Robert K. Lazarsfeld, University of Michigan (1003-14-05)

MAA Invited Address

2:15 PM – 3:05 PM

(177) *What are p-adic numbers and what are they for?*
Fernando Q. Gouvêa, Colby College (1003-A0-12)

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

2:15 PM – 5:05 PM

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

2:15PM *Mathematical Logic in the Undergraduate Curriculum.*
 ► (178) **Martin D. Davis**, UC Berkeley (1003-97-221)
 2:45PM *Logic for undergraduates at Notre Dame.*
 (179) **Julia F. Knight**, University of Notre Dame (1003-97-289)
 3:15PM *Logic as Compass. Preliminary report.*
 ► (180) **Iraj Kalantari**, Western Illinois University (1003-03-1050)

- 3:45PM *Discovery Learning in Logic Education.*
(181) **Walker M White**, University of Dallas
(1003-97-1057)
- 4:15PM *Symbolic Logic in a Proofs Course: Finding the Right
▶ (182) Balance.* Preliminary report.
Connie M Campbell, Millsaps College
(1003-97-1133)
- 4:45PM *Teaching Logic to Prospective Elementary and
▶ (183) Middle School Mathematics Teachers.* Preliminary
report.
Gregory D. Foley, The Academy at Lyndon B.
Johnson High School (1003-97-1599)

AMS-MAA Special Session on Tropical Geometry, I

2:15 PM – 6:05 PM

- Organizers: **Michael Develin**, University of
California Berkeley
Bernd Sturmfels, University of
California Berkeley
- 2:15PM *Introduction to Tropical Mathematics.*
▶ (184) **Mike Develin**, American Institute of Mathematics
(1003-05-263)
- 2:45PM *Perturbation of matrix eigenvalues and min-plus
(185) algebra.*
Marianne Akian, INRIA, Rocquencourt, France,
Ravindra Bapat, Indian Statistical Institute,
New Delhi, and **Stephane Gaubert***, INRIA,
Rocquencourt, France (1003-15-1312)
- 3:15PM Break
- 4:15PM *On the strong regularity of matrices in
(186) max-algebra.*
Peter Butkovic, University of Birmingham (England)
(1003-15-735)
- 4:45PM *Tropical Compactifications.*
(187) **Jenia Tevelev**, University of Texas at Austin
(1003-14-1553)
- 5:15PM *Computing Groebner Fans.* Preliminary report.
(188) **Komei Fukuda**, ETH, Zurich, **Anders Jensen**,
University of Aarhus, Denmark, and **Rekha
Thomas***, University of Washington (1003-13-1285)
- 5:45PM *Computing tropical varieties.* Preliminary report.
(189) **Anders Nedergaard Jensen***, University of Aarhus,
Bernd Sturmfels, University of California, and
Rekha R. Thomas, University of Washington
(1003-52-1428)

**AMS-SIAM Special Session on Dynamic Equations on
Time Scales; Integer Sequences and Rational Maps, II**

2:15 PM – 6:05 PM

- Organizers: **Martin J. Bohner**, University of
Missouri-Rolla
Marc A. Chamberland, Grinnell
College
Billur Kaymakcalan, George Southern
University
Allan C. Peterson, University of
Nebraska-Lincoln
Diana M. Thomas, Montclair State
University
- 2:15PM *Countable Unions of Subvarieties of Varieties
(190) defined over $\overline{\mathbb{Q}}$.* Preliminary report.
Oscar G Villareal, University of California Berkeley
(1003-11-1665)

- 2:45PM *Asymptotics for some discrete Schrodinger
▶ (191) equations.* Preliminary report.
Saber N. Elaydi*, Trinity University, and **Andreas
Ruffing**, Technical University of Munich
(1003-39-613)
- 3:15PM *Nonlocal Boundary Value Problems for Second
(192) Order Dynamic Equations.*
Johnny Henderson, Baylor University
(1003-34-172)
- 3:45PM *Floquet Theory II.*
(193) **Jeffrey J. DaCunha***, United States Military
Academy, and **John M. Davis**, Baylor University
(1003-34-1068)
- 4:15PM *Comparison Theorems of Hille-Wintner Type for
(194) Dynamic Equations on Time Scales.*
Lynn H Erbe* and **Allan C Peterson**, University of
Nebraska (1003-39-1026)
- 4:45PM *First and second order dynamic equations with
(195) impulse.*
Ferhan Atici* and **Daniel C. Biles**, Western
Kentucky University (1003-34-1180)
- 5:15PM *Oscillation results for second order dynamic
▶ (196) equations.* Preliminary report.
Elvan Akin-Bohner, University of Missouri-Rolla
(1003-39-1489)
- 5:45PM *Exponential Stability of Dynamic Equations on Time
(197) Scales.*
Allan C Peterson, University of Nebraska-Lincoln,
and **Youssef Naim Raffoul***, University of Dayton
(1003-34-193)

**AMS-SIAM Special Session on Mathematical Image
Processing, II**

2:15 PM – 6:05 PM

- Organizers: **Jianhong Shen**, University of
Minnesota, Minneapolis
Tony F. Chan, University of California
Los Angeles
- 2:15PM *YAWTSI: Yet Another Way To Smooth Images (and
(198) keep edges).* Preliminary report.
Bradley J. Lucier*, Purdue University, and
Antonin Chambolle, CEREMADE, Université de
Paris-Dauphine (1003-65-1182)
- 2:45PM *Multiscale methods in imaging science.*
(199) **Xiaoming Huo**, Georgia Institute of Technology
(1003-68-1671)
- 3:15PM *Threshold Dynamics for the Piecewise Constant
(200) Mumford-Shah Functional.*
Selim Esedoglu*, University of California Los
Angeles, and **Richard Tsai**, University of Texas at
Austin (1003-49-1341)
- 3:45PM *Finding non-rigid Correspondences between Implicit
(201) curves.*
Sheshadri R Thiruvankadam*, **David Groisser** and
Yunmei Chen, University of Florida (1003-35-1440)
- 4:15PM *Analysis of the recovery of edges in images and
(202) signals by minimizing nonconvex regularized
least-squares.* Preliminary report.
Mila Nikolova, CMLA (CNRS-ENS de Cachan)
(1003-49-1015)
- 4:45PM *Interpolation with back projection algorithm for
(203) UWB SAR imaging with noise.*
Guoping Zhang, **Fengshan Liu***, **Yi Ling** and
Xiquan Shi, Applied Mathematics Research Center,
Delaware State University (1003-65-485)

- 5:15PM *Continuous and Semicontinuous Analogues of Iterative Methods of Cimmino and Kaczmarz with Applications to Moment Discretization of Inverse Problems.* Preliminary report.
M. Zuhair Nashed, University of Central Florida (1003-65-1625)
- 5:45PM *Iterative methods for Tikhonov regularization.*
 (205) **Daniela Calvetti**, Case Western Reserve University, **Bryan Lewis**, Rocketcalc, **Lothar Reichel***, Kent State University, and **Fiorella Sgallari**, University of Bologna (1003-65-1655)

AMS-SIAM Special Session on Theoretical and Computational Aspects of Inverse Problems, II

2:15 PM – 6:05 PM

Organizers: **Gunther Uhlmann**, University of Washington
David L. Colton, University of Delaware

- 2:15PM *Iterative solution of inverse boundary value problems using probing functions.* Preliminary report.
 (206) **Rainer Kress**, Universität Göttingen, Germany, and **William Rundell***, Texas A&M University (1003-35-1022)
- 2:45PM *The Hard Pulse Approximation and the Inverse Scattering Transform.*
 (207) **Charles L Epstein***, U. of PA, and **Jeremy F Magland**, LSNI/ Hospital of U. of PA (1003-65-1046)
- 3:15PM *Inverse scattering for vowel articulation with frequency-domain data.*
 (208) **Tuncay Aktosun**, Mississippi State University (1003-34-372)
- 3:45PM *Targeted grid approximations for geophysical inversion.*
 (209) **Vladimir Druskin**, Schlumberger-Doll Research, and **Shari Moskow***, University of Florida (1003-65-1181)
- 4:15PM *On the stability of the Borg-Levinson problem.* Preliminary report.
 (210) **Rudi Weikard***, University of Alabama at Birmingham, and **Marco Marletta**, Cardiff University (1003-34-752)
- 4:45PM *Impedance Imaging of Multiple Linear Cracks.*
 (211) **Kurt M. Bryan***, Rose-Hulman Institute of Technology, **Janine Haugh**, University of New Hampshire, **Rachel Krieger**, University of Michigan, Flint, **David McCune**, Baylor University, and **Nic Trainor**, Rutgers University (1003-35-243)
- 5:15PM *A numerical approach to inverse scattering on \mathbb{R} .* Preliminary report.
 (212) **Paul E. Sacks**, Iowa State University (1003-34-1196)
- 5:45PM *Complex zeros of real ergodic eigenfunctions.* Preliminary report.
 (213) **Steve Zelditch**, Johns Hopkins University (1003-35-1109)

AMS Special Session on Riemannian Geometry, II

2:15 PM – 5:55 PM

Organizers: **Igor Belegradek**, Georgia Institute of Technology
Mohammad Ghomi, Georgia Institute of Technology and Pennsylvania State University

- 2:15PM *Symmetric CMC Surfaces in the Three-sphere.* Preliminary report.
 (214) **John McCuan***, Atlanta, GA, **Ryan Hynd**, University of California, Berkeley, and **Sungho Park**, Seoul National University (1003-53-1472)
- 3:15PM *The stability of compact Ricci flat manifolds.*
 (215) **Xianzhe Dai**, UC Santa Barbara, **Xiaodong Wang**, Michigan State University, and **Guofang Wei***, UC Santa Barbara (1003-53-947)
- 4:15PM *Constructing diffeomorphisms to negatively curved spaces.* Preliminary report.
 (216) **Chris Connell**, Indiana University (1003-53-1484)
- 5:15PM *Bifurcation Phenomena for the Volume-constrained Plateau Problem.* Preliminary report.
 (217) **Henry C. Wente**, University of Toledo (1003-58-1527)

AMS Special Session on Commutative Algebra, II

2:15 PM – 6:05 PM

Organizers: **Srikanth B. Iyengar**, University of Nebraska, Lincoln
Sean M. Sather-Wagstaff, University of Nebraska, Lincoln
Anurag K. Singh, Georgia Institute of Technology
Carolyn A. Yackel, Mercer University

- 2:15PM *Intersection Multiplicity in terms of Ext-modules.*
 (218) **Izuru Mori**, SUNY College at Brockport (1003-13-508)
- 2:45PM *Intersection Multiplicity on Smooth Varieties.* Preliminary report.
 (219) **Sankar P. Dutta**, University of Illinois at Urbana-Champaign (1003-13-596)
- 3:15PM *Failure of a length condition for nonnegativity of intersection multiplicity and characterizations for modules with finite projective dimension over complete intersections.*
 (220) **Jinjia Li**, University of Illinois at Urbana-Champaign (1003-13-822)
- 3:45PM *The Frobenius map in mixed characteristic.*
 (221) **Kazuma Shimomoto**, University of Utah (1003-13-1035)
- 4:15PM *Integrally closed almost complete intersection ideals.*
 (222) **Catalin Ciuperca**, University of Missouri, Columbia (1003-13-1081)
- 4:45PM *Solid and big Cohen-Macaulay algebras in positive characteristic.*
 (223) **Geoffrey D Dietz**, University of Michigan (1003-13-1178)
- 5:15PM *Hilbert-Kunz functions of normal local rings.*
 (224) **Maira A. McDermott***, Gustavus Adolphus College, **Craig Huneke**, University of Kansas, and **Paul Monsky**, Brandeis University (1003-13-729)
- 5:45PM *A tight closure analogue of analytic spread and a "special" tight closure Briançon-Skoda theorem.*
 (225) **Neil M Epstein**, University of Kansas (1003-13-1564)

AMS Special Session on Representations of Lie Algebras, I

2:15 PM – 6:05 PM

Organizers: **Brian D. Boe**, University of Georgia
Ben L. Cox, College of Charleston
Vyacheslav M. Futorny, Universidade de Sao Paulo

William A. Graham, University of Georgia
Duncan J. Melville, St. Lawrence University
Daniel K. Nakano, University of Georgia

- 2:15PM *Representations of $1/3$ and $2/3$ of a Quantum Group.* (226)
Georgia Benkart, University of Wisconsin - Madison (1003-81-817)
- 2:45PM *Invariant Differential Operators for Quantum Symmetric Spaces.* (227)
Gail Letzter, Virginia Tech (1003-17-523)
- 3:15PM *Perfect Crystal for $U_q(D_4^{(3)})$.* Preliminary report. (228)
Kailash C. Misra, North Carolina State University (1003-17-1131)
- 3:45PM *Raising and Lowering Maps and Modules for the Quantum Affine Algebra $U_q(\widehat{sl}_2)$.* (229)
Darren R. Neubauer, University of Wisconsin-Madison (1003-16-208)
- 4:15PM *Loop Algebra Construction of Graded-Simple Algebras.* Preliminary report. (230)
Bruce N Allison, University of Alberta (1003-17-1355)
- 4:45PM *Iterated Loop Algebras.* (231)
B. Allison, U. of Alberta, **S. Berman***, U. of Saskatchewan, and **A. Pianzola**, U. of Alberta (1003-17-566)
- 5:15PM *Automorphisms and twisted loop algebras of simple Lie superalgebras.* (232)
Dimitar Grantcharov*, San Jose State University, and **Arturo Pianzola**, University of Alberta (1003-17-1288)
- 5:45PM *Twisted forms of Toroidal Lie algebras.* Preliminary report. (233)
Arturo Pianzola, University of Alberta (1003-17-880)

AMS Special Session on Design Theory and Graph Theory, II

2:15 PM – 6:05 PM

Organizers: **Mike Daven**, Mount Saint Mary College
Atif A. Abueida, University of Dayton

- 2:15PM *Some Graph, Digraph, and Mixed Graph Results Concerning Decompositions, Packings, and Coverings.* Preliminary report. (234)
Robert B. Gardner*, **Benedict B. Bobga**, East Tennessee State University, **Gary D. Coker**, Francis Marion University, and **Chau Nguyen**, East Tennessee State University (1003-05-120)
- 2:45PM *The nonorientable genus of joins of complete graphs with large edgeless graphs.* (235)
Mark Ellingham*, Vanderbilt University, and **Chris Stephens**, Middle Tennessee State University (1003-05-521)
- 3:15PM *Extending Hall's marriage Theorem to list coloring graphs.* (236)
Mathew M. Cropper, Eastern Kentucky University (1003-05-128)
- 3:45PM *Forbidden Subgraphs that Imply 2-Factors.* (237)
J. R. Faudree, University of Alasaka at Fairbanks, **R. J. Faudree***, University of Memphis, and **Z. Ryjáček**, University of West Bohemia (1003-05-654)
- 4:15PM *Excessive factorizations of class 2 cubic graphs.* Preliminary report. (238)
W. D. Wallis, Southern Illinois University, Carbondale (1003-05-535)

- 4:45PM *Perfect dextagon triple systems.* (239)
Curt Lindner, Auburn University (1003-05-754)
- 5:15PM *Resolvable 4-cycle group divisible designs with two associate classes.* (240)
Chris A Rodger*, Auburn University, and **Elizabeth Billington**, University of Queensland, Australia (1003-05-606)
- 5:45PM *$(r, r+1)$ -factorizations of $(d, d+1)$ -graphs.* (241)
Anthony J.W. Hilton, University of Reading, England (1003-05-42)

AMS Special Session on Radon Transform and Inverse Problems, II

2:15 PM – 6:05 PM

Organizers: **Adel Faridani**, Oregon State University
Gestur Olafsson, Louisiana State University
Todd Quinto, Tufts University

- 2:15PM *Electrical Impedance Tomography and Inverse Problems.* (242)
David Isaacson, Rensselaer Polytechnic Institute (1003-78-1138)
- 2:45PM *The ray transform and inverse problems for elastic media.* (243)
Lizabeth V Rachele, Rensselaer Polytechnic Institute (1003-35-1636)
- 3:15PM *Microlocal analysis of a linearized identification problem for the attenuated Radon transform.* Preliminary report. (244)
Allan Greenleaf* and **Karthik Ramaseshan**, University of Rochester (1003-44-1249)
- 3:45PM *Inversion of the 3-D exponential parallel-beam transform by reduction to a set of the 2-D Radon transforms with angle-dependent attenuation.* (245)
Leonid A Kunyansky, University of Arizona (1003-44-1302)
- 4:15PM *Sampling issues and challenges in single- and multi-slice helical CT.* Preliminary report. (246)
Patrick J. La Riviere, The University of Chicago (1003-44-1077)
- 4:45PM *Sampling conditions and efficient schemes in helical tomography.* (247)
Laurent Desbat, TIMC-IMAG, UMR CNRS 5525, UJF Grenoble (1003-65-1512)
- 5:15PM *Local reconstruction from averages and sampling theory.* Preliminary report. (248)
David Walnut, George Mason University (1003-41-1524)
- 5:45PM *High resolution reconstruction from nonuniform data sets in fan beam computed tomography.* Preliminary report. (249)
Larry A Gratton, Berea College (1003-92-1611)

AMS Special Session on Mathematics and 21st Century Biology

2:15 PM – 5:10 PM

Organizer: **Jennifer R. Slimowitz**, Board on Mathematical Sciences and Their Applications

- 2:15PM *Opportunities at the Interface between Mathematics and Biology.* (250)
Jill Mesirov, The Broad Institute of MIT and Harvard (1003-92-1633)
- 2:45PM *CyberYeast: Computational Models of Cell Cycle Regulation.* (251)
John J. Tyson, Virginia Tech (1003-92-1402)

- 3:15PM *Protein Folding: Computational Challenges and Solutions.*
(252) **Richard Friesner**, Columbia University (1003-92-1634)
- 3:45PM *Statistical Modeling of Circadian and Neuroendocrine Rhythms.*
(253) **Emery Brown**, Harvard Medical School and Massachusetts General Hospital (1003-92-1663)
- 4:15PM *What can a mathematician tell a physiologist that she doesn't already know?*
(254) **James P. Keener**, University of Utah (1003-92-1664)
- 4:45PM *Ecology: towards mathematical insights and computational understanding.*
▶ (255) **Louis J. Gross**, University of Tennessee (1003-92-1274)

MAA Minicourse #13: Part A

2:15 PM – 4:15 PM

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

MAA Minicourse #2: Part A

2:15 PM – 4:15 PM

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

MAA Minicourse #8: Part A

2:15 PM – 4:15 PM

Mathematical finance.
Organizer: **Walter R. Stromquist**, Bryn Mawr College

AMS Session on Number Theory, II

2:15 PM – 4:10 PM

- 2:15PM *Symmetry and Specializability in the Continued Fraction Expansions of some Infinite Products.*
▶ (256) **James G Mc Laughlin**, Trinity College, Hartford, CT. (1003-11-256)
- 2:30PM *Distribution of Zeros of the Ihara-Zeta Function.*
(257) **Derek B. Newland**, UCSD (1003-11-285)
- 2:45PM *Two Questions Concerning 0,1-Polynomials.*
(258) **Michael Filaseta**, **Carrie E Finch*** and **Charles Nicol**, University of South Carolina (1003-11-507)
- 3:00PM *Trace Formula and Distribution of Hecke eigenvalues.* Preliminary report.
▶ (259) **Chun Che Li**, UCLA (1003-11-53)
- 3:15PM *Explicit Galois stable sets of algebraic integers in a given set of points.*
(260) **Charles T. Pooh**, University of Georgia (1003-11-537)
- 3:30PM *Distribution of Discriminants of Cyclic Extensions.*
(261) **Behailu Mammo**, Temple University (1003-11-589)
- 3:45PM *Rings of polynomials and power series in (x/k) 's.* Preliminary report.
(262) **Todorka Nedeva Nedeva**, University of Kentucky (1003-11-742)
- 4:00PM *Computing the reciprocity law for CM points on Shimura curves.*
(263) **John Voight***, University of California, Berkeley, and **Samit Dasgupta**, Harvard University (1003-11-140)

AMS Session on Algebra, II

2:15 PM – 4:55 PM

- 2:15PM *Apolar invariants.* Preliminary report.
(264) **Joseph P Brennan**, North Dakota State University (1003-13-1360)
- 2:30PM *Serre's R_k for Affine Semigroup Rings.*
(265) **Marie A Vitulli**, University of Oregon (1003-13-571)
- 2:45PM *A Krull-Schmidt theorem for wide subcategories of modules.*
(266) **Sunil Kumar Chebolu**, University of Washington (1003-13-1337)
- 3:00PM *Chow Groups of Zero-Cycles Relative to Hyperplane Arrangements.*
(267) **Karl-Dieter Crisman**, Columbia College, Loyola University Chicago, Roosevelt University (1003-14-1308)
- 3:15PM *Gale Duality and Specializations of the A -Discriminant.* Preliminary report.
(268) **Raymond Curran**, University of Massachusetts, Amherst (1003-14-1465)
- 3:30PM *The cotangent space at a monomial ideal of the Hilbert scheme of points of an affine space.* Preliminary report.
(269) **Mark E. Huibregtse**, Skidmore College (1003-14-273)
- 3:45PM *Numerical criteria for very ampleness of vector bundles over rational ruled surfaces.* Preliminary report.
(270) **Gian Mario Besana***, CTI - DePaul University, and **Alberto Alzati**, Università degli Studi di Milano (1003-14-515)
- 4:00PM *Explicit Determination of the Picard Group of Moduli Spaces of Semi-Stable G -Bundles on Curves.*
(271) **Arzu Boysal*** and **Shrawan Kumar**, University of North Carolina at Chapel Hill (1003-14-414)
- 4:15PM *Finite representations of a quiver arising from string theory.* Preliminary report.
▶ (272) **Xinyun Zhu**, University of Illinois at Urbana-Champaign (1003-14-1032)
- 4:30PM *Genus 2 Curves that Admit a Degree 5 Map to an Elliptic Curve.*
(273) **Tanush Tony Shaska**, University of Idaho (1003-14-904)
- 4:45PM *Bands of domestic string algebras.* Preliminary report.
▶ (274) **Gennady Puninski**, Ohio State University at Lima (1003-16-674)

AMS Session on History, Logic, and Algebraic Systems

2:15 PM – 5:55 PM

- 2:15PM *Another Approach to Kashani's Fundamental Theorem.*
▶ (275) **Mohammad K. Azarian**, University of Evansville (1003-01-492)
- 2:30PM *Constructing New Simple Representable Relation Algebras with Forcing.* Preliminary report.
(276) **Jianfeng Wu**, University of South Carolina (1003-03-1234)
- 2:45PM *On the Decidability of Lattices of Finite Dimensional Steinitz Exchange Systems.* Preliminary report.
(277) **Lisa R. Galminas***, Northwestern State University of Louisiana, and **John W. Rosenthal**, Ithaca College (1003-03-1550)
- 3:00PM *H-complex tapestries.*
▶ (278) **William H Sulis**, McMaster University (1003-08-1091)

- 3:15PM *Applying Buchberger-Möller Algorithm in Time Series Modeling.*
(279) **Aihua Li***, Montclair State University, and **Serpil Saydam**, University of Louisiana at Monroe (1003-08-1334)
- 3:30PM *Structure Theorems For Matrix Rings Over Moore-Penrose Two (MP2) Rings.*
▶ (280) **Gregory Battle**, Morehouse College (1003-08-152)
- 3:45PM *Some multitudine group functions.*
(281) **Petro Glushko**, Kiev Algebraical Society (1003-08-1653)
- 4:00PM *Counting Maximal Subspaces of Zeros of a Quadratic Form Defined Over A Finite Field.*
▶ (282) **Laura Mann Schueller**, Whitman College (1003-08-432)
- 4:15PM *Another Look at McCulloch and Pitts's "Logical Calculus".* Preliminary report.
(283) **Ken Aizawa** and **Mark D. Schlatter***, Centenary College of Louisiana (1003-01-145)
- 4:30PM Break
- 4:45PM *Qin Jiushao's Formula for the Area of a Triangle.*
▶ (284) **Zengxiang Tong**, Otterbein College (1003-01-996)
- 5:00PM *The History of Sonia Kovalevsky Day and the Importance and Impact on Female Mathematicians.* Preliminary report.
▶ (285) **Joan Elizabeth DeBello**, St. John's University (1003-01-1311)
- 5:15PM *On the Historic Methods used in Approximating π .*
(286) **K Prabakaran**, Southern University (1003-01-1652)
- 5:30PM *Spatial Origin of Mathematical Metaphors.* Preliminary report.
(287) **C M Patton**, SRI International (1003-03-1658)
- 5:45PM *Asymptotic growth of free spectra of band monoids.*
(288) **Steve Seif**, University of Louisville, and **Japheth Wood***, Chatham College (1003-08-1042)

AMS Session on Analysis, I

2:15 PM – 5:55 PM

- 2:15PM *A more general Lebesgue theorem.* Preliminary report.
(289) **Javad Namazi**, Fairleigh Dickinson University (1003-28-167)
- 2:30PM *An Extremal Problem for Convex Domains.*
(290) **Roger W. Barnard**, **Casey R. Hume*** and **G. Brock Williams**, Texas Tech University (1003-30-1682)
- 2:45PM *Variational Techniques for Distortion Theorems in Hyperbolically Convex Domains.*
(291) **Roger W Barnard**, **David R. Martin*** and **G. Brock Williams**, Texas Tech University (1003-30-1683)
- 3:00PM *A Note on Kim's Conjecture.*
(292) **Yi Ling*** and **Fengshan Liu**, Delaware State University (1003-30-439)
- 3:15PM *On a refinement of Sendov's conjecture.*
(293) **Michael J. Miller**, Le Moyne College (1003-30-616)
- 3:30PM *Monodromy on the Punctured Sphere.*
(294) **David J Pinchbeck**, St. Joseph's College (Maine) (1003-30-929)
- 3:45PM *Quantitative Tauberian theorems and an extremal problem in Fourier analysis.* Preliminary report.
(295) **Friedrich Littmann**, University of British Columbia (1003-33-1065)
- 4:00PM *Hypergeometric Zeta Functions.* Preliminary report.
▶ (296) **Hieu D Nguyen**, Rowan University (1003-33-516)
- 4:15PM *A Generating function for the associated continuous q -Jacobi polynomial.* Preliminary report.
▶ (297) **Tariq Qazi**, Virginia State University (1003-33-939)

- 4:30PM *Continuity/Discontinuity on Dense Subsets of the Reals.*
(298) **Donald P. Minassian**, Butler University (1003-26-181)
- 4:45PM *Products of concave functions.* Preliminary report.
▶ (299) **Robert Kantrowitz***, Hamilton College, and **Michael M. Neumann**, Mississippi State University (1003-26-309)
- 5:00PM *Blending Functions.*
▶ (300) **David J Anderson**, TekStar International Corp. (1003-26-361)
- 5:15PM *A comparison of the interpolating theorems of Newton and Lagrange.* Preliminary report.
▶ (301) **Nasser Dastrange**, Buena Vista University (1003-26-634)
- 5:30PM *The Least-Squares Property of the Lanczos' Generalized Derivative.* Preliminary report.
▶ (302) **Paul Fishback*** and **Nathanial Burch**, Grand Valley State University (1003-26-756)
- 5:45PM *Subordinate solutions of a differential equation.*
(303) Preliminary report.
Stacey A Muir, University of Scranton (1003-30-1202)

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

2:15 PM – 3:55 PM

- Organizers: **David R. Hill**, Temple University
Lila F. Roberts, Georgia College and State University
- 2:15PM *Understanding Your Class Using a Personal Response System.*
▶ (304) **Melanie B. Butler*** and **Frederick M. Butler**, West Virginia University (1003-B1-225)
- 2:45PM *Using Simulated Roulette to Demonstrate the Different Information Given by Expected Value and Standard Deviation.*
▶ (305) **Jan O Case**, Jacksonville State University (1003-B1-375)
- 3:00PM *Picture Compression and Linear Algebra.*
▶ (306) **Brian Hopkins**, Saint Peter's College (1003-B1-292)
- 3:15PM *Magic Squares as an Introduction to an Abstract Algebra Course.*
▶ (307) **Jeffrey L. Poet**, Missouri Western State College (1003-B1-308)
- 3:30PM *Visualizing Mobius Transformations.* Preliminary report.
▶ (308) **Anne M. Burns**, Long Island University, C.W. Post Campus (1003-B1-91)

MAA Session on Mathlets for Teaching and Learning Mathematics

2:15 PM – 6:10 PM

- Organizers: **David M. Strong**, Pepperdine University
Thomas E. Leathrum, Jacksonville State University
Joe Yanik, Emporia State University
- 2:15PM *A Java Applet and Tutorial for the Jacobi, Gauss-Seidel and SOR Methods.*
▶ (309) **David M Strong**, Pepperdine University (1003-F1-850)
- 2:30PM *Tool building: Web-based linear algebra modules.*
▶ (310) **David E Meel**, Bowling Green State University (1003-F1-917)

- 2:45PM *Java Applets in Teaching Vector Calculus.*
 ▶ (311) **Diem M. Nguyen**, Bowling Green State University (1003-F1-871)
- 3:00PM *Rising to the occasion of modeling card shuffling.*
 ▶ (312) **Timothy P. Chartier***, Davidson College, and **Reuben K. Fries**, University of Washington (1003-F1-206)
- 3:15PM *Online Interactive Worksheets in Statistics and Calculus.*
 (313) **Jeff R Knisley**, East Tennessee State University (1003-F1-965)
- 3:30PM *The Synergy of Mathlets and Computer Algebra.*
 (314) **Robert J Decker**, University of Hartford (1003-F1-885)
- 3:45PM *Webmathematica in the Calculus Classroom.*
 ▶ (315) **Charles E Oelsner**, Manlius Pebble Hill School (1003-F1-325)
- 4:00PM *A Mathematical Java Toolkit Gallery.*
 ▶ (316) **Michael E. Mays**, West Virginia University (1003-F1-859)
- 4:15PM *Enabling applets usage in calculus for cautious teachers.* Preliminary report.
 ▶ (317) **Mike May**, Saint Louis University (1003-F1-436)
- 4:30PM *Making Mathematics Dance on the Web.*
 ▶ (318) **Kunio Mitsuma**, Kutztown University of Pennsylvania (1003-F1-266)
- 4:45PM *The Balance.* Preliminary report.
 ▶ (319) **Herendira Garcia-Tello***, Instituto Latinoamericano de la Comunicación Educativa, and **Maria Trigueros-Gaisman**, Instituto Tecnológico Autónomo de México (1003-F1-868)
- 5:00PM *A Geometric Proof of the Means Inequality.*
 ▶ (320) **Dennis M. Kern**, Texas A&M University-Texarkana (1003-F1-875)
- 5:15PM *Mathlet for Graphing Moebius Transformations in Complex Analysis.*
 ▶ (321) **Michael Dorff***, **Adam Rich** and **Jared Whitehead**, Brigham Young University (1003-F1-993)
- 5:30PM *Easy Applets using Geometer's Sketchpad.*
 ▶ (322) Preliminary report.
Theodore S. Erickson, Wheeling Jesuit University (1003-F1-874)
- 5:45PM *Visualizing Concepts in Group and Ring Theory.*
 ▶ (323) **Steven Schlicker**, Grand Valley State University (1003-F1-862)
- 6:00PM *The PascGalois Project.*
 (324) **Don Spickler**, Salisbury University (1003-F1-394)

MAA Session on Drawing on Our Students' Thinking to Improve the Mathematical Education of Teachers, I

2:15 PM – 5:10 PM

- Organizers: **Dale R. Oliver**, Humboldt State University
Mary Kay Abbey, Montgomery College
- 2:15PM *Evaluating Problem Solving Skills and Processes in Pre Service Teachers In Order to Inform Classroom Teaching.*
 ▶ (325) **Joyce Faye Fischer**, Texas State University (1003-G1-447)
- 2:30PM *Geometry for Future Teachers.*
 ▶ (326) **L. Christine Kinsey**, Canisius College, and **Teresa E. Moore***, Ithaca College (1003-G1-489)
- 2:45PM *Assessing Secondary Preservice Students' Understanding of Time vs. Distance Functions.*
 ▶ (327) **Jane C. Ries**, University of Texas at Austin (1003-G1-509)

- 3:00PM *Multiple Solutions/Multiple Problems.*
 (328) **Michael J. Gilbert**, Eastern Washington University (1003-G1-434)
- 3:15PM *An Experimental Class for Prospective Mathematics Educators.* Preliminary report.
 ▶ (329) **Daniel Chazan** and **Sarah Sword***, University of Maryland (1003-G1-410)
- 3:30PM Break.
- 3:45PM *Creating and "Proving" Alternate Definitions.*
 ▶ (330) Preliminary report.
Rapti M. de Silva, California State University, Chico (1003-G1-392)
- 4:00PM *Reasoning, Visualization and Investigations in Intuitive Geometry for Prospective Elementary School Teachers.* Preliminary report.
 (331) **Barbara J Pence**, San Jose State University (1003-G1-231)
- 4:15PM *Moving Theory into Practice: Using Research in Mathematics Education to Teach Mathematics Courses for Prospective Teachers.*
 ▶ (332) **Jean M McGivney-Buelle**, Millersville University (1003-G1-1206)
- 4:30PM *Effects of a Computational Skills Workshop on Preservice Elementary Teachers.* Preliminary report.
 ▶ (333) **Cheng-Yao Lin*** and **Jerry P. Becker**, Southern Illinois University at Carbondale (1003-G1-532)
- 4:45PM *Adjusting Course Content and Methodology for Pre-service Elementary Teachers.*
 ▶ (334) **Christine R Leverenz**, Georgetown College (1003-G1-986)
- 5:00PM *Using LearnStar to Gain Insight into the Thinking of Pre-Service Teachers and our Curriculum.*
 (335) Preliminary report.
G Brock Williams, Texas Tech University (1003-G1-353)

MAA General Contributed Paper Session, I

2:15 PM – 6:00 PM

- Organizers: **Daniel E. Otero**, Xavier University
Michael A. Jones, Montclair State University
Thomas A. Hern, Bowling Green State University
Janice B. Walker, Xavier University
- 2:30PM *The Slope Mean and Its Invariance Properties.*
 ▶ (336) **Charles J Kicey***, Valdosta State University, and **Jun Ji**, Kennesaw State University (1003-X1-223)
- 2:45PM *Theoretical Error Bounds for Numerical Integration.*
 ▶ (337) **Eric C Nummela**, Richmond, the American International University in London (1003-X1-248)
- 3:00PM *Binary Images in Discrete Mathematics.*
 ▶ (338) **Mohamed Allali**, Chapman University (1003-X1-341)
- 3:15PM *Ternary Strings with No Consecutive 1's.*
 ▶ (339) **Ralph P. Grimaldi**, Rose-Hulman Institute of Technology (1003-X1-860)
- 3:30PM *On an Extension of Fibonacci like Sequences and Some of Their Properties.* Preliminary report.
 ▶ (340) **Prashant S. Sansgiry**, Coastal Carolina University (1003-X1-702)
- 3:45PM *LiveMath modules for Calculus II and III.*
 ▶ (341) **Robert D Poodiack**, Norwich University (1003-X1-1679)
- 4:00PM *Solving word problems with Microsoft Excel.*
 ▶ (342) **Azar Khosravani**, Columbia College, Chicago (1003-X1-977)

- 4:15PM *An unbeatable deal in card tricks.*
 ► (343) **Colm Mulcahy**, Spelman College (1003-X1-1025)
- 4:30PM *Coincidences - A motivating Theme for an Introductory Probability Course.* Preliminary report.
 ► (344) **Behzad D Noubary** and **Reza D Noubary***, Bloomsburg University (1003-X1-691)
- 4:45PM *An Example of Applied Calculus in Behavioral Psychology.*
 ► (345) **Rachel Belinsky**, Georgia State University (1003-X1-147)
- 5:00PM *Error Bounds for Elementary Quadrature Formulae.*
 (346) **Peter R. Mercer**, SUNY College at Buffalo (1003-X1-1245)
- 5:15PM *Easy Curve-fitting Investigations in Pre-calculus Using Finite Differences and Technology.* Preliminary report.
 ► (347) **Ward E. Canfield**, National-Louis University (1003-X1-1194)
- 5:30PM *Inductive Reasoning Activities With PascGalois.* Preliminary report.
 ► (348) **Kurt E Ludwick**, Salisbury University (1003-X1-476)
- 5:45PM *Math Majors in Jeopardy!* Preliminary report.
 ► (349) **Kenneth L. Price*** and **Steve Szydluk**, UW Oshkosh (1003-X1-980)

SIAM Minisymposium on Undergraduate Linear Algebra and Differential Equations: Projects, Problems, and Issues

2:15 PM – 5:40 PM

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

- 2:15PM *Projects in a Large Lecture Format Differential Equations Course.* Preliminary report.
 ► (350) **Paul R Blanchard**, Boston University (1003-34-1188)
- 2:50PM *Differential Equations Applications for Freshmen and Sophomore Science Majors.*
 ► (351) **Angela Shiflet**, Wofford College (1003-34-1317)
- 3:25PM *Perspectives on Contemporary Trends in the Teaching of Differential Equations.*
 ► (352) **Jim Brannan**, Clemson University (1003-97-1135)
- 4:00PM *Challenging Students with Interdisciplinary Lively Applied Problems.*
 (353) **Kelly S. Cline**, Carroll College (1003-97-1020)
- 4:35PM *Teaching Differential Equations With Modeling and Without Integration.*
 ► (354) **Michael Huber***, **Steven Horton** and **Timothy Povich**, United States Military Academy (1003-34-306)
- 5:10PM *Seeing and Hearing Eigenvalues in Animation.*
 ► (355) **Gilbert Strang**, MIT, and **William Briggs***, University of Colorado at Denver (1003-15-226)

SIAM Minisymposium on Discontinuous Galerkin Methods: Theory and Applications

2:15 PM – 5:55 PM

Organizers: **Paul Castillo**, University of Puerto Rico
Chi-Wang Shu, Brown University

- 2:15PM *A mixed local discontinuous finite element method for a class of quasi-Newtonian Stokes flows.* Preliminary report.
 (356) **Rommel Bustinza*** and **Gabriel N. Gatica**, Universidad de Concepcion (1003-65-345)

- 2:35PM *An a posteriori error estimate for the LocalDiscontinuous Galerkin method.*
 (357) **Paul E Castillo**, University of Puerto Rico at Mayaguez (1003-65-1084)
- 2:55PM *Locking-Free Optimal hp-Discontinuous Galerkin Methods For Timoshenko Beams.*
 (358) **Fatih Celiker***, University of Minnesota and Army High Performance Computing and Research Center, and **Bernardo Cockburn**, University of Minnesota (1003-65-995)
- 3:15PM *Discontinuous Galerkin Methods for Singularly Perturbed Problems.* Preliminary report.
 (359) **Johnny Guzman**, Cornell University (1003-65-336)
- 3:35PM *Aposteriori error estimates and adaptive methods for a discontinuous Galerkin method for a second order elliptic problem.*
 (360) **Ohannes Karakashian**, The University of Tennessee, Knoxville (1003-65-1210)
- 3:55PM Break.
- 4:00PM *The locally divergence-free discontinuous Galerkin methods.*
 (361) **Fengyan Li***, University of South Carolina, and **Chi-Wang Shu**, Brown University (1003-65-736)
- 4:20PM *Central Schemes and Central Discontinuous Galerkin Methods on Overlapping Cells.* Preliminary report.
 (362) **Yingjie Liu**, Georgia Inst of Tech (1003-65-1557)
- 4:40PM *On the penalty parameter of the interior penalty method.*
 (363) **Khosro K. S. Shahbazi**, University of Toronto (1003-65-1580)
- 5:00PM *An Implicit Discontinuous Galerkin Finite Element Method for Non-Linear Water Waves.*
 (364) **Jacobus J. van der Vegt*** and **Satyendra K. Tomar**, University of Twente (1003-65-1038)
- 5:20PM *Two-Level Additive Schwarz Preconditioners for C^0 Interior Penalty Methods.*
 (365) **Susanne C. Brenner** and **Kening Wang***, University of South Carolina (1003-65-870)
- 5:40PM *High-order 3D turbulent flow computations using a discontinuous Galerkin parallel code.*
 (366) **F. Bassi***, Dipartimento di Ingegneria Industriale, Università di Bergamo, **A. Crivellini**, Dipartimento di Energetica, Università di Ancona, and **S. Rebay**, Dipartimento di Ingegneria Meccanica, Università di Brescia

MAA Project NExT Panel Discussion

2:15 PM – 3:45 PM

Developing undergraduate research projects that are not in discrete mathematics.

Organizer: **Edwin P. Herman**, University of Wisconsin at Stevens Point

Panelists: **Carl C. Cowen**, Indiana University-Purdue University at Indianapolis

David W. Farmer, American Institute of Mathematics

Mario U. Martelli, Claremont McKenna College

Bruce Reznick, University of Illinois at Urbana-Champaign

Patrick J. Van Fleet, University of St. Thomas

SIGMAA on RUME Guidelines Committee Panel Discussion

2:15 PM – 3:35 PM

Ph.D. programs in research in undergraduate mathematics.

Organizer: **John Selden**, New Mexico State University
 Panelists: **Shandy Hauk**, University of Northern Colorado
Michael Oehrtman, Arizona State University
Karen J. Graham, University of New Hampshire
Teri Jo Murphy, University of Oklahoma
John Selden

MAA-Young Mathematicians' Network Panel Discussion

2:15 PM – 3:35 PM

Career paths for undergraduates in mathematics.

Organizers: **James E. Hamblin**, Shippensburg University
John A. Vano, University of Wisconsin at Madison
John A. Kuchenbrod, The MITRE Corporation
 Panelists: **Linda C. Thiel**, SIAM
James W. Daniel, University of Texas at Austin
Paul D. Humke, St. Olaf College
Emil J. Volcheck, National Security Agency
Michael G. Monticino, University of North Texas

MAA Section Officers

2:30 PM – 5:00 PM

MAA Session on Mathematics in the Islamic World

2:40 PM – 5:55 PM

Organizers: **Glen R. Van Brummelen**, Bennington College
Victor J. Katz, University of the District of Columbia

2:40PM ▶ (367) *The meanings of al-jabr and al-muqābala in Arabic algebra.*
Jeffrey A Oaks, University of Indianapolis (1003-E1-262)

3:05PM ▶ (368) *Ibn Al-Haytham on geometrical analysis and synthesis.* Preliminary report.
Kenneth Manders, University of Pittsburgh (1003-E1-482)

3:30PM ▶ (369) *Al-Samaw'al's Curious Approach to Trigonometry.* Preliminary report.
Glen R. Van Brummelen, Bennington College (1003-E1-218)

3:55PM ▶ (370) *A computer-programmed version of a medieval Islamic instrument for the determination of the direction and distance to Mecca.*
Eelco A Nederkoorn* and **Jan P Hogendijk**, University of Utrecht (1003-E1-433)

4:20PM ▶ (371) *How Does the Islamic Calendar Really Work in Different Parts of the World?* Preliminary report.
Helmer Aslaksen, National Univ. of Singapore (1003-E1-446)

4:45PM ▶ (372) *Islamic Hegemony and its Influence on the Mathematical Sciences in Pre-Colonial West Africa.*
Danté A. Tawfeeq, Florida A&M University (1003-E1-527)

5:10PM ▶ (373) *An Islamic Renaissance: Mathematics in Safavid Persia.*
Lawrence D'Antonio, Ramapo College of New Jersey (1003-E1-294)

5:35PM ▶ (374) *The Islamic Revival of Latin Mathematics.*
Leigh Atkinson, University of North Carolina at Asheville (1003-E1-484)

MAA Invited Address

3:20 PM – 4:05 PM

(375) *Given four lines in space, how many other lines meet all four?: The geometry, topology, and combinatorics behind linear algebra.*
Ravi D. Vakil, Stanford University (1003-A0-14)

AWM-NAM Panel Discussion

3:20 PM – 4:20 PM

Achieving diversity in graduate programs, Part I: The challenge to retain women.

Organizers: **Suzanne M. Lenhart**, University of Tennessee
Sylvia T. Bozeman, Spelman College

MAA Committee on Graduate Students Special Presentation

3:30 PM – 4:50 PM

How to interview for your first job.

Organizer: **Louise A. Raphael**, Howard University
 Presenters: **David Manderschied**, University of Iowa
Thomas W. Rischel, Cornell University

MAA Project NEXt-Young Mathematicians' Network Panel Discussion

3:50 PM – 5:10 PM

Dealing with the two-body problem.

Organizers: **Kimberly A. Roth**, Wheeling Jesuit University
Karrollyne Fogel, California Lutheran University

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

3:50 PM – 5:10 PM

Refocused college algebra: A basis for QL programs.

Organizer: **Donald B. Small**, U.S. Military Academy
 Moderator: **Harriet S. Pollatsek**, Mount Holyoke College
 Panelists: **Norma M. Agras**, Miami-Dade College
Dora C. Ahmadi, Morehead State University
Laurette B. Foster, Prairie View A&M University

Bernard L. Madison, University of
Arkansas

AMS Panel Discussion

4:00 PM – 5:30 PM

Is it a proof yet?

Moderator: **Keith M. Devlin**, Stanford University
Panelists: **Richard DeMillo**, Georgia Institute of
Technology
Robin Wilson, The Open University
Avi Wegderson, Institute for Advanced
Study
Bruce A. Kleiner, University of
Michigan, Ann Arbor

Welcoming Reception for Undergraduate Students

4:00 PM – 5:00 PM

AWM Business Meeting

4:20 PM – 4:50 PM

MAA Minicourse #14: Part A

4:30 PM – 6:30 PM

Euler.

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

MAA Minicourse #3: Part A

4:30 PM – 6:30 PM

Creating interactive workbooks using MS Excel.

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

MAA Minicourse #9: Part A

4:30 PM – 6:30 PM

*Infusing connections into core courses for future
secondary teachers.*

Organizers: **Steve R. Benson**, Education
Development Center
Al Cuoco, Education Development
Center
Karen J. Graham, University of New
Hampshire
Neil Portnoy, Stony Brook University

AWM Focus Discussion

4:50 PM – 5:30 PM

Focus: Future.

Moderator: **Helen Moore**, American Institute of
Mathematics

Reception for First-Time Participants

5:00 PM – 6:00 PM

Graduate Student Reception

6:00 PM – 7:00 PM

AMS Josiah Willard Gibbs Lecture

8:30 PM – 9:30 PM

(376) *The interplay between analysis and algorithms.*
Ingrid Daubechies, Princeton University
(1003-94-08)

Thursday, January 6

Employment Center

7:00 AM – 7:30 PM

Joint Meetings Registration

7:30 AM – 4:00 PM

**AMS Session on Calculus of Variations and Operator
Theory, I**

7:45 AM – 11:55 AM

7:45AM *On the eigenvalues which express the
(377) antieigenvalue.*

Morteza Seddighin, Indiana University East
(1003-47-64)

8:00AM *Super-Ergodic Operators and Descriptive Set
(378) Theory.*

Mohammed Yahdi, Ursinus College (1003-47-102)

8:15AM *Spectrum of a Compact Weighted Composition
(379) Operator.* Preliminary report.

Gajath K Gunatillake, Purdue University
(1003-47-1148)

8:30AM *Weak 2-hyponormality for a weighted shift with
(380) Bergman tail.* Preliminary report.

George R. Exner*, Bucknell University, and **II
Bong Jung**, Kyungpook National University
(1003-47-1400)

8:45AM *Vector-valued norm estimates for operators on
(381) Hardy Spaces.* Preliminary report.

Beth Osikiewicz, Kent State University –
Tuscarawas Campus (1003-47-1452)

9:00AM *Generalized Cesaro operators on Hardy and
(382) Bergman spaces.*

Michael M. Neumann, Mississippi State University
(1003-47-282)

9:15AM *$F(T) = F(T^n)$.*
(383)

B. E. Rhoades*, Indiana University, and **Gwon S.
Jeong**, Suncheon National University (1003-47-58)

9:30AM *A Cayley-Hamilton Theorem for a Class of Elliptic
(384) Operators.*

Alberto Mokak Tegua*, East Tennessee State
University, and **Jeff R. Knisley**, East Tennessee
State University (1003-47-770)

9:45AM *An Interesting Problem Involving Projections in
(385) Operator Algebra.*

Jaedeok Kim, Jacksonville State University
(1003-47-797)

10:00AM *Singular quadratic functionals applied to the axially
(386) symmetric pendant and sessile drops.* Preliminary
report.

Ivie Stein, Jr., The University of Toledo
(1003-49-1386)

- 10:15AM *Optimal Control on Hybrid Systems Involving ODEs.*
(387) **Wandi Ding***, University of Tennessee-Knoxville, and **Suzanne Lenhart**, University of Tennessee-Knoxville & Oak Ridge National Laboratory (1003-49-546)
- 10:30AM *Novel variational method for solving electrochemical machining as a moving boundary problem.*
(388) **Sadia M. Makky***, Owens College, and **Saad Al-Mo'omen**, University of Baghdad (1003-49-687)
- 10:45AM *Optimal control of convective boundary condition in a thermistor problem.* Preliminary report.
(389) **Volodymyr Hryniv***, University of Tennessee, Knoxville, **Suzanne Lenhart**, University of Tennessee, and **Vladimir Protopenescu**, Oak Ridge National Laboratory (1003-49-951)
- 11:00AM *Fractional Fourier Transform of Tempered Distributions.*
(390) **Bharat Namdev Bhosale**, University of Mumbai (India) (1003-44-957)
- 11:15AM *Using Schwartz Functions in Multiresolution Analysis.*
(391) **George K. Yang**, Tennessee State University (1003-44-1253)
- 11:30AM *Adjoint For Operators in Banach Spaces.*
(392) **Tepper L. Gill***, University of Minn., and **Woodford W. Zachary**, Howard University (1003-46-524)
- 11:45AM *Infinite Toeplitz Algebras.* Preliminary report.
(393) **Efren Ruiz**, University of Oregon (1003-46-746)

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

8:00 AM – 11:50 AM

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

- 8:00AM *Developing a Capstone for Pre-service Secondary Teachers: A PMET Initiative.* Preliminary report.
▶ (394) **Cameron C. Sawyer**, Southwestern University (1003-97-104)
- 8:30AM *The Mid-Atlantic Center for Mathematics Teaching and Learning: Resources and Colleagues Coming Together to Improve the Mathematical Education of Teachers.*
(395) **Rose Mary Zbiek**, The Pennsylvania State University (1003-97-1052)
- 9:00AM *Center for the Study of Mathematics Curriculum: What does it do and why should it interest mathematicians?* Preliminary report.
(396) **Glenda Lappan***, Michigan State University, and **Robert Reys**, University of Missouri (1003-00-425)
- 9:30AM *Faculty Resources for Improving the Mathematical Education of Teachers from the Center for Proficiency in Teaching Mathematics.*
▶ (397) **Patricia S. Wilson*** and **Jeremy Kilpatrick**, University of Georgia (1003-97-1532)
- 10:00AM *Helping future elementary teachers Reconceptualize Mathematics.*
▶ (398) **Judith T. Sowder**, San Diego State University (1003-97-233)

- 10:30AM *Chicago Algebra Initiative: A Multi-University Collaboration for Middle School Teachers.*
(399) **Naomi Fisher***, University of Illinois at Chicago, **David Jabon**, **Lynn Narasimhan**, DePaul University, and **Paul Sally**, University of Chicago (1003-97-303)
- 11:20AM Discussion

AMS-SIAM Special Session on Stochastic, Large-Scale, and Hybrid Systems, I

8:00 AM – 11:50 AM

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

- 8:00AM *Stability of Discontinuous Cauchy Problems in Banach Space.*
(400) **Anthony N. Michel***, University of Notre Dame, and **Ye Sun**, Credit Suisse First Boston (1003-93-570)
- 8:30AM *Switched Linear Systems: Observers and Observability.*
(401) **Magnus Egerstedt**, Georgia Institute of Technology (1003-93-578)
- 9:00AM *On a class of abstract McKean-Vlasov stochastic evolution equations under general growth conditions.* Preliminary report.
(402) **Mark A McKibben***, Goucher College, and **David N Keck**, Ohio University (1003-34-57)
- 9:30AM *Infinite-dimensional variant of Chow-Rashevskii theorem.*
▶ (403) **Yuri S Ledyayev**, Western Michigan University (1003-34-935)
- 10:00AM *On Equipartition of Energy in Linear Compartmental Dynamical Systems with Arbitrary Time-Delay.*
(404) **VijaySekhar Chellaboina***, University of Tennessee, **Wassim M Haddad**, Georgia Institute of Technology, and **Jayanthi Ramakrishnan**, University of Missouri-Columbia (1003-93-1445)
- 10:30AM *On dynamics of correlated random systems.* Preliminary report.
(405) **A. Korzeniowski**, University of Texas at Arlington (1003-60-1324)
- 11:00AM *On optimal control of the dynamics of a model quantum mechanical system.*
(406) **N. G. Medhin**, North Carolina State University (1003-49-1185)
- 11:30AM *Estimation and Control of Large-scale Stochastic Hybrid Systems.* Preliminary report.
(407) **G S Ladde***, University of Texas at Arlington, and **J Chandra**, The George Washington University (1003-93-962)

AMS-SIAM Special Session on Dynamic Equations on Time Scales; Integer Sequences and Rational Maps, III

8:00 AM – 11:50 AM

Organizers: **Martin J. Bohner**, University of Missouri-Rolla
Marc A. Chamberland, Grinnell College
Billur Kaymakcalan, George Southern University
Allan C. Peterson, University of Nebraska-Lincoln
Diana M. Thomas, Montclair State University

- 8:00AM *Nontrivial Solutions to a Three Point Nonlinear Boundary Value Problem on a Time Scale.* Preliminary report.
Bonita A. Lawrence, Marshall University (1003-34-1509)
- 8:30AM *An Introduction to Discrete Fractional Calculus.* (409)
Paul W Eloë, University of Dayton (1003-39-994)
- 9:00AM *A numerical study of the nonlinear optical wave collapse on time scales.* Preliminary report. (410)
Qin Sheng* and **Joseph W. Haus**, University of Dayton (1003-65-348)
- 9:30AM *Dynamic Inclusions on Time Scales.* Preliminary report. (411)
Christopher C Tisdell, The University of New South Wales (1003-34-1089)
- 10:00AM *Fourier Analysis on Time Scales Closed Under Dilation.* Preliminary report. (412)
John M Davis, Baylor University (1003-42-1520)
- 10:30AM *Adjoint and Self-Adjoint Forms for Higher-Order Dynamic Equations.* (413)
Doug Anderson, Concordia College (1003-34-242)
- 11:00AM *Method of Separation of the Variables for Basic Analogs of Equations of Mathematical Physics.* (414)
Kristine Ey, **Andreas Ruffing***, Munich University of Technology, and **Sergei Suslov**, Arizona State University (1003-39-1669)
- 11:30AM *The inverse of the time scale LaPlace transform.* (415)
J Hoffacker, Clemson University (1003-34-1169)

AMS-SIAM Special Session on Orthogonal Polynomials—Random Matrices—Integrable Systems: Interdisciplinary Aspects, I

8:00 AM – 11:50 AM

Organizers: **Jinho Baik**, University of Michigan, Ann Arbor
Steven B. Damelin, Georgia Southern University
Peter D. Miller, University of Michigan, Ann Arbor

- 8:00AM *Semiclassical (zero dispersion limit) of the focusing NLS equation.* (416)
Alexander Tovbis, University of Central Florida (1003-35-1514)
- 8:30AM *Geometric aspects of isospectral flows on symmetric matrices.* (417)
Anthony M Bloch*, University of Michigan, and **Arieh Iserles**, Cambridge University (1003-34-684)
- 9:00AM *Extreme Eigenvalues of Large Dimensional Sample Covariance Matrices.* (418)
Jack W Silverstein, North Carolina State University (1003-60-1028)
- 9:30AM *A Riemann-Hilbert proof of a theorem on inverses of Toeplitz operators.* (419)
Percy A Deift* and **Jorgen Ostensson**, Courant Institute, NYU (1003-46-787)
- 10:00AM *Semiclassical orthogonal polynomials, matrix models and isomonodromic tau functions.* (420)
John Harnad, Centre de recherches mathématiques, Univ. de Montréal and Concordia University (1003-34-1029)
- 10:30AM *Orthogonal Polynomials with unbounded recurrence coefficients: Their Asymptotics and Weight functions.* (421)
Jeffrey S Geronimo, Georgia Institute of Technology (1003-43-1045)

- 11:00AM *Complete Asymptotic Expansions for q-Polynomials.* Preliminary report. (422)
Mourad E. H. Ismail, University of Central Florida (1003-33-757)
- 11:30AM *Condition Numbers of Hankel Matrices Associated with Exponential Weights.* (423)
D S Lubinsky, Georgia Institute of Technology (1003-42-331)

AMS-SIAM Special Session on Theoretical and Computational Aspects of Inverse Problems, III

8:00 AM – 11:50 AM

Organizers: **Gunther Uhlmann**, University of Washington
David L. Colton, University of Delaware

- 8:00AM *Boundary regularity for the Ricci equation, geometric convergence, and Gelfand's inverse boundary problem.* (424)
Michael Anderson, SUNY, Stony Brook, **Atsushi Katsuda**, Okayama Univ., **Yaroslav Kurylev**, Loughborough Univ., **Matti Lassas**, Rolf Nevanlinna Inst., Univ. of Helsinki, and **Michael Taylor***, UNC, Chapel Hill (1003-35-182)
- 8:30AM *Nonuniqueness for singular anisotropic conductivities in the Calderon problem.* (425)
Allan Greenleaf*, Univ. of Rochester, **Matti Lassas**, Helsinki Univ. of Tech., and **Gunther Uhlmann**, Univ. of Washington (1003-35-872)
- 9:00AM *Inverse Problems for Anisotropic Elastic Media.* (426)
Anna L Mazzucato, Penn State University, and **Lizabeth V Rachele***, Rensselaer Polytechnic Institute (1003-35-1631)
- 9:30AM *Interferometric array imaging in clutter.* Preliminary report. (427)
Chrysoula Tsogka*, University of Chicago, **George Papanicolaou**, Stanford University, and **Liliana Borcea**, Rice University (1003-65-1714)
- 10:00AM *Descent methods for inverse problems.* (428)
Ian Knowles, University of Alabama at Birmingham (1003-35-848)
- 10:30AM *Geodesic X-ray transform on manifolds with conjugate points.* (429)
Karthik Ramaseshan, University of Rochester (1003-44-1080)
- 11:00AM *Image synthesis for inverse obstacle scattering using the eigenfunction expansion theorem.* (430)
D. Russell Luke, University of Delaware (1003-45-1184)
- 11:30AM *Inverse Medium Scattering for Acoustic and Electromagnetic Wave Propagation.* (431)
Gang Bao, Michigan State University (1003-35-673)

AMS-ASL Special Session on Reverse Mathematics, II

8:00 AM – 11:50 AM

Organizers: **Jeff L. Hirst**, Appalachian State University
Reed Solomon, University of Connecticut

- 8:00AM *Defining products of L_p functions in subsystems of second-order arithmetic.* (432)
Ksenija Simic, University of Arizona (1003-03-146)

- 8:30AM *Almost everywhere domination and the reverse mathematics of measure theory.* (433)
Natasha L. Dobrinen*, Kurt Goedel Research Center for Mathematical Logic, University of Vienna, and **Stephen G. Simpson**, Pennsylvania State University (1003-03-1106)
- 9:00AM *Reverse Topology.* Preliminary report. (434)
Stephen G. Simpson, Pennsylvania State University (1003-03-973)
- 10:00AM *Representing Second Countable Topological Spaces in Second-Order Arithmetic.* Preliminary report. (435)
Carl Mummert, Penn State (1003-03-1048)
- 10:30AM Discussion

AMS Special Session on Riemannian Geometry, III

8:00 AM – 11:40 AM

- Organizers: **Igor Belegradek**, Georgia Institute of Technology
Mohammad Ghomi, Georgia Institute of Technology and Pennsylvania State University
- 8:00AM *The Calabi-Yau Conjectures for embedded surfaces.* (436)
William P. Minicozzi, JHU (1003-53-618)
- 9:00AM *Recent Progress in the Classical Theory of Minimal Surfaces.* Preliminary report. (437)
William H. Meeks, University of Massachusetts at Amherst (1003-53-356)
- 10:00AM *Open Kähler manifold with positive bi-sectional curvature is diffeomorphic to C^n .* (438)
Jianguo Cao*, University of Notre Dame, and **Hao Yin**, Peking University, (1003-58-1145)
- 11:00AM *Curvature and injectivity radius of subspaces in spaces of curvature bounded above.* Preliminary report. (439)
Stephanie B. Alexander* and **Richard L. Bishop**, U. of Illinois at Urbana-Champaign (1003-53-1474)

AMS Special Session on D-Modules, II

8:00 AM – 11:50 AM

- Organizers: **Steven Sperber**, University of Minnesota, Minneapolis
Uli Walther, Purdue University
- 8:00AM *Computing Zeta Functions of Curves over Finite Fields.* (440)
J. Denef*, **F. Vercauteren** and **W. Castryck**, KULeuven (1003-11-1129)
- 8:30AM *The p -adic Fourier transform on the affine line and the Weil Conjectures.* (441)
Kiran S. Kedlaya, Massachusetts Institute of Technology (1003-11-545)
- 9:00AM *The Borel-Serre Compactification for the Classifying Space of Hodge Structures.* (442)
John Scherk, University of Toronto (1003-14-1111)
- 9:30AM *The Logarithmic Comparison Theorem and Free Divisors.* (443)
Jose Maria Ucha* and **Francisco Jesus Castro-Jimenez**, Universidad de Sevilla (1003-14-661)
- 10:00AM Break
- 10:30AM *D-modules and singularities.* (444)
Nero Budur, Johns Hopkins University (1003-14-561)

- 11:00AM *Bernstein polynomials and invariants from positive characteristic.* Preliminary report. (445)
Mircea I Mustata*, University of Michigan, **Shunsuke Takagi**, Kyushu University, and **Kei-ichi Watanabe**, Nihon University (1003-14-891)
- 11:30AM *On computing the characteristic cycles of localizations.* (446)
Josep Àlvarez Montaner, Polytechnical University of Catalonia, and **Anton Leykin***, University of Illinois at Chicago (1003-14-795)

AMS Special Session on Quantum Topology, I

8:00 AM – NOON

- Organizers: **Stavros Garoufalidis**, Georgia Institute of Technology
T. T. Q. Le, Georgia Institute of Technology
- 8:00AM *Knots with unknotting number 1 and Conway spheres.* (447)
Cameron McA. Gordon* and **John E. Luecke**, University of Texas at Austin (1003-57-1454)
- 8:35AM *Computing Khovanov Rozansky Homology.* (448)
Preliminary report.
Charles Frohman, The University of Iowa (1003-57-911)
- 9:10AM *Categorification of the Temperley-Lieb algebra.* (449)
Preliminary report.
Marta Asaeda, University of Iowa, **Jozef Przytycki**, The George Washington Univ., and **Adam S Sikora***, SUNY Buffalo (1003-57-1659)
- 9:45AM *Link Invariants arising from Lie superalgebras.* (450)
Nathan Geer, Georgia Institute of Technology (1003-54-1155)
- 10:20AM *A TQFT for the universal quantum invariant of 3-manifolds and the induced representation of the Torelli Group.* Preliminary report. (451)
Dorin Cheptea, SUNY Buffalo (1003-57-1096)
- 10:55AM *Asymptotics of difference equations with a parameter.* (452)
Stavros Garoufalidis*, Georgia Institute of Technology, and **Ovidiu Costin**, Rutgers University (1003-57-1322)
- 11:30AM *Category of bottom tangles in handlebodies and functorial universal invariants.* (453)
Kazuo Habiro, Research Institute for Mathematical Sciences, Kyoto University (1003-57-1379)

AMS Special Session on Commutative Algebra, III

8:00 AM – 11:50 AM

- Organizers: **Srikanth B. Iyengar**, University of Nebraska, Lincoln
Sean M. Sather-Wagstaff, University of Nebraska, Lincoln
Anurag K. Singh, Georgia Institute of Technology
Carolyn A. Yackel, Mercer University
- 8:00AM *Ideals defining Gorenstein rings are (almost) never products.* Preliminary report. (454)
Craig Huneke, University of Kansas (1003-13-558)
- 8:30AM *Multiplicity of height three monomial Ideals.* (455)
Preliminary report.
Hema Srinivasan, University of Missouri (1003-13-1455)
- 9:00AM *The HomAB Problem.* (456)
Kia Dalili, NJ (1003-13-1332)

- 9:30AM (457) *Independence of the total reflexivity conditions for modules.*
Liana M Segal*, Michigan State University, and **David Jorgensen**, University of Texas at Arlington (1003-13-1321)
- 10:00AM (458) *Residual intersections in Cohen-Macaulay rings.* Preliminary report.
Christine K. Cumming, Purdue University (1003-13-941)
- 10:30AM (459) *Factoring the adjoint and maximal Cohen-Macaulay modules over the generic determinant.* Preliminary report.
Ragnar-Olaf Buchweitz, University of Toronto, and **Graham J Leuschke***, Syracuse University (1003-13-744)
- 11:00AM (460) *Extending Coherent Sheaves from Open Subschemes.* Preliminary report.
Phillip A. Griffith, University of Illinois at Urbana-Champaign (1003-13-683)
- 11:30AM (461) *One-dimensional equicharacteristic local rings of finite Cohen-Macaulay type.*
Nicholas R. Baeth, University of Nebraska-Lincoln (1003-13-467)

AMS Special Session on Representations of Lie Algebras, II

8:00 AM – 11:50 AM

Organizers: **Brian D. Boe**, University of Georgia
Ben L. Cox, College of Charleston
Vyacheslav M. Futorny, Universidade de Sao Paulo
William A. Graham, University of Georgia
Duncan J. Melville, St. Lawrence University
Daniel K. Nakano, University of Georgia

- 8:00AM (462) *Bernstein-Gelfand-Gelfand resolutions of infinite dimensional highest weight representations.* Preliminary report.
Markus Hunziker*, Baylor University, and **Thomas Enright**, University of California, San Diego (1003-22-1199)
- 8:30AM (463) *B-stable ideals in a Borel subalgebra.* Preliminary report.
Eric Sommers, University of Massachusetts, Amherst (1003-17-1014)
- 9:00AM (464) *Prehomogeneous Spaces Associated with Nilpotent Orbits of Complex Lie Groups.*
Steven Glenn Jackson and **Alfred G. Noël***, University of Massachusetts Boston (1003-16-34)
- 9:30AM (465) *Quantum Induction.*
H He, Georgia State University (1003-22-686)
- 10:00AM (466) *Borel subalgebras of $gl(\infty)$.* Preliminary report.
Ivan Dimitrov, Queen's University (1003-17-1559)
- 10:30AM (467) *On a basis presentation of simple torsion free modules.*
Daniel J. Britten*, **Frank Lemire**, University of Windsor, and **Christopher M. Tavolieri**, University of Windsor (1003-17-1439)
- 11:00AM (468) *Decomposition of Tensor Products of Torsion Free C_n -modules of finite degree and simple finite dimensional modules.* Preliminary report.
Frank W. Lemire*, **Daniel J. Britten** and **Justin Lariviere**, University of Windsor (1003-17-502)

- 11:30AM (469) *Spherical Hecke algebras over two-dimensional local fields.* Preliminary report.
Kyu-Hwan Lee* and **Henry H. Kim**, University of Toronto (1003-16-473)

AMS Special Session on Mathematical Sciences Contributions to the Biomedical Sciences, I

8:00 AM – 10:45 AM

Organizers: **Peter D. March**, Ohio State University
De Witt L. Sumners, Florida State University
John Whitmarsh, The National Institutes of Health

- 8:00AM (470) *Identifying functional elements in the human genome.*
Manolis Dermitzakis, Sanger Centre, UK, and **Lior Pachter***, U.C. Berkeley (1003-92-1531)
- 9:00AM (471) *Mathematical and experimental analysis of Xer recombination.*
Mariel Vazquez*, University of California at Berkeley, and **Jonathan N Bath**, Clarendon Laboratory, Oxford University (1003-92-813)
- 10:00AM (472) *Understanding Bistability in Complex Biochemical Reaction Networks.*
Gheorghe Craciun*, Mathematical Biosciences Institute, Ohio State University, and **Martin Feinberg**, Ohio State University (1003-92-1471)

AMS Special Session on Analysis Problems in Modern Physics, II

8:00 AM – 11:40 AM

Organizer: **Steven M. Zelditch**, Johns Hopkins University

- 8:00AM Discussion.
- 8:30AM (473) *The Yang-Mills flow on Kaehler manifolds.*
Georgios D Daskalopoulos, Brown University, and **Richard A Wentworth***, Johns Hopkins University (1003-58-1134)
- 9:00AM (474) *Chern Classes on CY moduli.*
Zhiqin Lu, UC Irvine (1003-58-299)
- 9:30AM (475) *Gromov-Witten Invariants of Toric Calabi-Yau Threefolds.*
Jun Li, Stanford University, **Chiu-Chu Melissa Liu***, Harvard University, **Kefeng Liu**, Zhejiang University & University of California at Los Angeles, and **Jian Zhou**, Tsinghua University (1003-51-327)
- 10:00AM (476) *The Virasoro conjecture, double Hurwitz numbers, and the topology of the moduli space of curves.* Preliminary report.
Ravi Vakil*, Stanford, **Ian Goulden** and **David Jackson**, University of Waterloo (1003-14-1061)
- 10:30AM (477) *Statistical Algebraic Geometry and Superstring Theory.*
Michael R Douglas, Rutgers University and I.H.E.S. (1003-81-1125)
- 11:20AM (478) *Counting vacua using methods of complex analysis and geometry.*
Michael R Douglas, Rutgers University and I.H.E.S., **Bernard Shiffman*** and **Steve Zelditch**, Johns Hopkins University (1003-32-1024)

MAA Minicourse #4: Part A

8:00 AM – 10:00 AM

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

David M. Strong, Pepperdine University

AMS Session on Analysis, III

8:00 AM – 11:40 AM

- 8:00AM *Box Spline Tight Wavelet Frames for Edge*
▶ (479) *Detections*. Preliminary report.
Kyunglim Nam, University of Georgia (1003-42-1493)
- 8:15AM *The Nyquist rate of bandpass signals*.
▶ (480) **Yan Wu**, Georgia Southern University (1003-42-560)
- 8:30AM *Radix representations of \mathbb{Z}^n , low-pass filters, and*
▶ (481) *existence of multivariable wavelets*.
Eva Curry, Dalhousie University (1003-43-1105)
- 8:45AM *Products of Generalized Convolution Systems*.
(482) **Adam W Parr**, University of the Virgin Islands (1003-43-1417)
- 9:00AM *Encoding Algebra as Affine Geometry*. Preliminary
▶ (483) report.
Patricia M. Garmirian, Denison University (1003-46-1482)
- 9:15AM *The C^* -algebra of an inverse semigroup and its*
(484) *K -theory*. Preliminary report.
Steven Haataja, University of Nebraska–Lincoln (1003-46-1522)
- 9:30AM *c_0 , ℓ^∞ , and complimented subspaces of $L(X, Y)$* .
(485) Preliminary report.
Manijeh Bahreini and **Elizabeth M Bator***, University of North Texas (1003-46-1577)
- 9:45AM *Minimal-volume projections of cubes, tilings, and*
▶ (486) *minimal-volume sufficient enlargements for normed linear spaces*. Preliminary report.
Mikhail I. Ostrovskii, The Catholic University of America (1003-46-692)
- 10:00AM *An Integral Equation for Feynman's Operational*
(487) *Calculus*. Preliminary report.
Lance W Nielsen, Creighton University (1003-46-895)
- 10:15AM *Approximations of equilibrium problems and*
(488) *complementarity problems*. Preliminary report.
Jinlu Li, Shawnee State University (1003-46-95)
- 10:30AM *Isometric Equivalence of some Matrix Operators*.
(489) Preliminary report.
Nadia J Gal* and **James Jamison**, University of Memphis (1003-46-979)
- 10:45AM *The Identity Maximizes the Chang-Marshall*
(490) *Inequality over the Beurling Functions*.
Valentin V. Andreev, Lamar University (1003-30-1276)
- 11:00AM *Generalized Nonautonomous Kato Classes and*
▶ (491) *Nonlinear Bessel Potentials*.
Rene Erlin Castillo, Ohio University (1003-31-1175)
- 11:15AM *On analytic multifunctions*. Preliminary report.
(492) **Azimbay Sadullaevich Sadullaev**, Al-Khorezmiy University (1003-32-826)
- 11:30AM *A formula for polynomials with symmetric matrix*
(493) *entries*.
Cristina Balderrama, UCV, **Piotr Graczyk**, Université d'Angers, and **Wilfredo O Urbina***, Universidad Central de Venezuela & University of Kansas (1003-43-1567)

AMS Session on Manifolds and Topology, I

8:00 AM – 11:40 AM

- 8:00AM *Cohomology of a sub-Hopf algebra of the Steenrod*
(494) *algebra*. Preliminary report.
Hayden Harker, University of Oregon (1003-55-1055)
- 8:15AM *Rigidification of algebras over multi-sorted*
(495) *algebraic theories*.
Julie Bergner, University of Notre Dame (1003-55-1275)
- 8:30AM *The configuration space and braid group of a tree*.
▶ (496) **Margaret I Doig*** and **Francis X. Connolly**, University of Notre Dame (1003-55-1287)
- 8:45AM *A Characterization of Fixed Point Sets in a Given*
(497) *Fiber-Homotopy Class*.
Christina L Soderlund, UCLA (1003-55-1511)
- 9:00AM *Filamentations for Virtual Links*.
▶ (498) **William J. Schellhorn**, Louisiana State University (1003-55-1548)
- 9:15AM *On the genus of fibrations of fibre $\prod K(\mathbb{Q}, 2k_i)$* .
(499) **Jean-Baptiste Gatsinzi**, University of Botswana (1003-55-156)
- 9:30AM *The action of $\text{Out}(P)$ on $H^*(P; \mathbb{F}_p)$* .
(500) **Ryan S. Higginbottom**, University of Virginia (1003-55-1639)
- 9:45AM *Homological algebra in Grothendieck categories*.
(501) Preliminary report.
James R. Gillespie, Penn State McKeesport (1003-55-551)
- 10:00AM *Two-Complexes with Aspherical Fundamental*
(502) *Group*. Preliminary report.
Jacqueline A Jensen*, Sam Houston State University, and **Jens Harlander**, Western Kentucky University (1003-55-565)
- 10:15AM *The 2-primary v_1 -periodic homotopy groups of*
(503) *$SU(n)$ revisited*. Preliminary report.
Donald M Davis, Lehigh University, and **Katarzyna Potocka***, Ramapo College of New Jersey (1003-55-600)
- 10:30AM *Separation in Protopological Groups*. Preliminary
(504) report.
Julie C Jones, Sam Houston State University (1003-22-1197)
- 10:45AM *Local structure of the completion of a weakened*
(505) *topology on \mathbb{Z}* .
Jon W. Short, Sam Houston State University (1003-22-1327)
- 11:00AM *T -pure and almost pure exact sequences of LCA*
(506) *groups*. Preliminary report.
Peter Loth, Sacred Heart University (1003-22-234)
- 11:15AM *Quotient Semigroups of Compact Semigroups*.
(507) **Shing S So**, Central Missouri State University (1003-22-926)
- 11:30AM *Richardson Orbits*.
(508) **Alfred G. Noël**, University of Massachusetts, Boston (1003-22-31)

AMS Session on Combinatorics, I

8:00 AM – 11:20 AM

- 8:00AM *Domination Cover Pebbling*. Preliminary report.
▶ (509) **Annalies Vuong***, University of California, Santa Barbara, **James Gardner**, **Alberto Teguia**, East Tennessee State University, **Nathaniel Watson**, Washington University, and **Carl Yerger**, Harvey Mudd College (1003-05-762)

- 8:15AM *Generalized Sewing Constructions for Polytopes.*
(510) Preliminary report.
Matthew M Menzel*, Marietta College, and **Carl W Lee**, University of Kentucky (1003-05-765)
- 8:30AM *Structural properties of Hadamard designs.*
(511) **Eric J. Merchant**, University of Oregon (1003-05-812)
- 8:45AM *Constructing Extension Configurations from ν_k Configurations.*
▶ (512) **Sharon L. Sullivan**, Catawba College (1003-05-827)
- 9:00AM *Stratified Domination in Graphs.*
▶ (513) **Raluca M. Gera*** and **Ping Zhang**, Western Michigan University (1003-05-866)
- 9:15AM *Maximal Sets of Hamilton Cycles in Complete Multipartite Graphs.* Preliminary report.
(514) **Sasha L Logan***, Coastal Carolina University, and **Chris A Rodger**, Auburn University (1003-05-889)
- 9:30AM *Investigation of (96, 20, 4) Nonabelian difference sets.*
(515) **Omar A. Abu Ghneim**, Central Michigan University (1003-05-89)
- 9:45AM *Spanning tree decompositions of K_{2n} orthogonal to one-factorizations.* Preliminary report.
▶ (516) **John S. Caughman**, Portland State University, and **John W. Krussel***, Lewis and Clark College (1003-05-897)
- 10:00AM *Constructing Complex Orthogonal Space-Time Block Codes.*
(517) **Sarah A. Spence**, Franklin W. Olin College of Engineering (1003-05-90)
- 10:15AM *On the nonexistence of a (176, 50, 14) difference set.*
▶ (518) **Oliver Gjoneski***, Bates College, and **Ken W Smith**, Central Michigan University (1003-05-97)
- 10:30AM *How the harmonic conjugate works in the algebraic matroids to construct algebraically nonrepresentable matroids.* Preliminary report.
(519) **Rigoberto Florez**, Binghamton University (1003-05-987)
- 10:45AM *Alternative multi-restricted numbers.* Preliminary report.
(520) **Ji Young Choi**, Shippensburg University of PA (1003-05-1001)
- 11:00AM *Cartesian product Cores with Mycielski construction graphs.* Preliminary report.
▶ (521) **Zhongyuan Che***, Penn State Beaver, and **Karen Collins**, Wesleyan University (1003-05-1224)
- 11:10AM *On an exhaustive search for $(2^m - 1, 2^{m-1} - 1, 2^{m-2} - 1)$ cyclic difference sets where $m = 12$.* Preliminary report.
▶ (522) **Joshua W Baron***, University of California at Berkeley, and **Jeffrey L Ginn**, Central Michigan University (1003-05-555)

MAA Session on Getting Students To Discuss and To Write About Mathematics, II

8:00 AM – 11:55 AM

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

- 8:00AM *Do Students Value the Use of Writing as a Way to Learn Mathematics?*
▶ (523) **Martha Ellen Waggoner**, Simpson College (1003-A1-896)
- 8:15AM *The Computational Fast Track.*
▶ (524) **Benjamin M Woodruff***, **Jason Grout** and **Casey Johnson**, Brigham Young University (1003-A1-640)

- 8:30AM *Conjecturing.*
▶ (525) **Robert E. Buck**, Slippery Rock University (1003-A1-831)
- 8:45AM *Communicating Mathematics through Inquiry-Guided Instruction or a Modified Moore Method.*
▶ (526) **Katherine J. Mawhinney**, Appalachian State University (1003-A1-940)
- 9:00AM *The role of 15-minute problems.*
▶ (527) **Curtis D. Bennett*** and **Jacqueline M. Dewar**, Loyola Marymount University (1003-A1-807)
- 9:15AM *Implementing Miniature “Conferences” in the Now-Standard Bridge-to-Higher-Mathematics Course.*
(528) **Damon Scott*** and **Thomas Fitzkee**, Francis Marion University (1003-A1-229)
- 9:30AM *An Exploratory Approach to Analysis.*
▶ (529) **Kirk E Weller***, University of North Texas, and **Joanne E Snow**, Saint Mary’s College (1003-A1-846)
- 10:00AM *Creating Discussions with Classroom Voting.*
(530) **Kelly S. Cline**, Carroll College (1003-A1-1023)
- 10:30AM *Using Writing to Promote Learning and Self-Assessment in a Mathematics Course for Prospective Elementary School Teachers.*
(531) **Donna Beers**, Simmons College (1003-A1-818)
- 10:45AM *The Use of Journals in Content Courses for Future Elementary Teachers.*
▶ (532) **Timothy D Comar**, Benedictine University (1003-A1-416)
- 11:00AM *Readings in Mathematics: A project-based mathematics course.*
▶ (533) **Dana P. Rowland**, Merrimack College (1003-A1-931)
- 11:15AM *Problem Analysis: An Assignment to Deepen Understanding of School Mathematics.*
▶ (534) **Mary L Garner**, Kennesaw State University (1003-A1-291)
- 11:45AM *About Us: From a Measurement Perspective.*
▶ (535) **Karen D Ivy**, Montclair State University (1003-A1-790)

MAA Session on History of Undergraduate Mathematics in America, 1900–2000

8:00 AM – 11:55 AM

Organizers: **Jack Winn**, SUNY Farmingdale
Walter J. Meyer, Adelphi University
Joseph Malkevitch, York College of CUNY
Amy Shell-Gellasch, Grafenwoehr, Germany

- 8:00AM *The History of Undergraduate Mathematics.*
(536) **Walter Meyer**, Adelphi University, **John Winn**, Farmingdale State University, and **Joseph Malkevitch***, York College (CUNY) (1003-H1-533)
- 8:20AM *Calculators for a New Century.*
▶ (537) **George M. Rosenstein**, Franklin & Marshall College (1003-H1-26)
- 8:40AM *Is There a Student Standard of Truth in Mathematics?: Early Twentieth Century Debate on Calculus Reform.*
▶ (538) **Lawrence D’Antonio**, Ramapo College of New Jersey (1003-H1-295)
- 9:00AM *Real Women Studied Real Mathematics.* Preliminary report.
▶ (539) **Agnes M. Kalemari**, SUNY Farmingdale (1003-H1-358)

- 9:20AM *Tidbits from an Oral History of Mathematics at Princeton in the 1930's.*
 ▶ (540) **Alan C Tucker**, SUNY at Stony Brook (1003-H1-43)
- 9:40AM *Evolution of the Liberal Arts Mathematics Course in the 20th Century.*
 ▶ (541) **Mark Bollman**, Albion College (1003-H1-264)
- 10:00AM *The Long Term Undergraduate Mathematics Educators: What are they thinking?* Preliminary report.
 ▶ (542) **John A Winn***, Farmingdale State Univ. of NY, **Joe Malkevitch**, York College, CUNY, and **Walter J Meyer**, Adelphi University (1003-H1-415)
- 10:20AM *What Can We Learn From the History of Enrollments.*
 ▶ (543) **Walter Meyer**, Adelphi University (1003-H1-486)
- 10:40AM *Mathematics Outside In.*
 ▶ (544) **Alphonse Buccino**, University of Georgia Emeritus (1003-H1-526)
- 11:00AM *Funding and Undergraduate Mathematics: Stories from the Field.*
 (545) **Solomon Garfunkel**, COMAP (1003-H1-304)
- 11:20AM *A story of a gate. Mathematics and art at the campus of UNAM, Mexico.* Preliminary report.
 ▶ (546) **Alejandro R. Garcadiago**, Universidad Nacional Autónoma de México (1003-H1-45)
- 11:40AM Discussion.

MAA Session on Initializing and Sustaining Undergraduate Research Projects and Programs

8:00 AM – 11:55 AM

Organizers: **Margaret M. Robinson**, Mount Holyoke College
Suzanne M. Lenhart, University of Tennessee

- 8:00AM *Formulas by Induction for Multiple Averages of the Partial Sums of Alternating Series.*
 ▶ (547) **Richard N. Barshinger***, **Joseph Dinoto**, **Uma Patel** and **Claudia Vitelli**, Penn State-Scranton (1003-H1-605)
- 8:25AM *Undergraduate Research Course Sequence at Ithaca College.*
 (548) **David A. Brown**, Ithaca College (1003-H1-314)
- 8:50AM *Research for Every Student: The Senior Study Program in Mathematics at Maryville College.* Preliminary report.
 ▶ (549) **Jennifer A. Bruce**, Maryville College (1003-H1-451)
- 9:15AM *Undergraduate Research at Rose-Hulman.*
 ▶ (550) **Kurt M Bryan**, Rose-Hulman Institute of Technology (1003-H1-559)
- 9:35AM Break
- 9:55AM *Undergraduate Research Opportunities at ULM.*
 ▶ (551) **Annela R Kelly**, University of Louisiana at Monroe (1003-H1-751)
- 10:20AM *Entering the Community of Scholars: Summer Research at Denison University.*
 ▶ (552) **Lew Ludwig**, Denison University (1003-H1-362)
- 10:45AM *Undergraduate Research at UNC-Asheville.*
 ▶ (553) **David Peifer**, University of North Carolina at Asheville (1003-H1-593)
- 11:10AM *Western Summer Research Institute: Collaborative research efforts between faculty, undergraduates, and high school students.*
 (554) **Jeffrey L. Poet**, Missouri Western State College (1003-H1-316)

- 11:35AM *Linking undergraduates in math and biology with research projects at Tennessee.*
 (555) **Rene A. Salinas**, Appalachian State University (1003-H1-693)

MAA Session on Projects and Demonstrations that Enhance a Differential Equations Course, I

8:00 AM – 11:50 AM

Organizers: **Richard J. Marchand**, Slippery Rock University
Shawnee L. McMurrin, California State University San Bernardino

- 8:00AM *Aquaculture: Does This Investment Smell Fishy? A DE Project that Offers Faculty Development.*
 ▶ (556) **Michael Huber*** and **Timothy Povich**, United States Military Academy (1003-J1-192)
- 8:15AM *A Modeling Approach to a Differential Equation Course that is Tailored by Discipline.* Preliminary report.
 ▶ (557) **William P Fox**, Francis Marion University (1003-J1-250)
- 8:30AM *Demonstrations and Applications of the Fourier Transform and DFT.*
 ▶ (558) **James Hoskin**, **Joseph D. Myers***, **Bart Stewart** and **Brian Winkel**, US Military Academy (1003-J1-1132)
- 8:45AM *Oscillation, comparison, and separation of zeros.*
 ▶ (559) **Leonard J. Lipkin**, University of North Florida (1003-J1-799)
- 9:00AM *Nonstandard Topics for Student Presentations.*
 (560) **Michelle LeMasurier**, Hamilton College (1003-J1-933)
- 9:15AM *Projects in population dynamics.* Preliminary report.
 ▶ (561) **Lora Billings**, Montclair State University (1003-J1-1082)
- 9:30AM *Modeling Differential Equations with StarLogo.*
 ▶ (562) **Michael E McDaniel**, Aquinas College (1003-J1-1174)
- 9:45AM *Bringing Desalination into the Classroom.*
 ▶ (563) **Ethan Berkove**, Lafayette College (1003-J1-1189)
- 10:00AM *Driving In The Desert.*
 ▶ (564) **Ioana Mihaila**, Cal Poly Pomona (1003-J1-320)
- 10:15AM *Foam insulation, wind resistance, and the Space Shuttle.*
 ▶ (565) **Mark McKinzie**, St. John Fisher College (1003-J1-1165)
- 10:30AM *Surprising Properties of the Pendulum Equation using Mathlets.*
 ▶ (566) **Robert J Decker**, University of Hartford (1003-J1-703)
- 11:00AM *A "Research Literature" Based Differential Equation Course.*
 ▶ (567) **Ronald Mickens**, Clark Atlanta University (1003-J1-252)
- 11:30AM *Building Differential Equations Models of HIV - Immune System Interaction.*
 ▶ (568) **Douglas E. Norton**, Villanova University (1003-J1-1238)

MAA Session on Countering "I Can't Do Math": Strategies for Teaching Under-Prepared, Math-Anxious Students

8:00 AM – 11:25 AM

Organizers: **Suzanne Doree**, Augsburg College
Bonnie Gold, Monmouth University
Richard J. Jardine, Keene State College

- 8:00AM *Bioscience Initiative at the University of Kansas: Enhancements to Required Entry Level Math Courses.*
 (569) **Estela A. Gavosto** and **Marian K. Hukle***, University of Kansas (1003-K1-1339)
- 8:15AM *Strategies for Teaching Developmental Mathematics to Under-Prepared Students at a Historically Black University.*
 ▶ (570) **Danté A. Tawfeeq**, Florida A&M University (1003-K1-1331)
- 8:30AM *A Freshman “Applications of Mathematics” Course. Preliminary report.*
 ▶ (571) **Linh Changaris***, **David Cochener**, **Shirley Hagewood** and **Nell K. Rayburn**, Austin Peay State University (1003-K1-1408)
- 8:45AM *Preparing the Under-prepared Math Students. Preliminary report.*
 ▶ (572) **Su-Chi Wen**, Monmouth University (1003-K1-1555)
- 9:00AM *Building Skills and Confidence via an Engaging Classroom Environment.*
 (573) **Louis M. Beaugris**, Kean University (1003-K1-1309)
- 9:15AM *Worksheets and Lots of Jokes.*
 (574) **Kelly S. Cline**, Carroll College (1003-K1-1021)
- 9:30AM *Changing ‘I can’t do Math’ to ‘Gee, I really can learn Math’.*
 (575) **Jean M. Horn**, Northern Virginia Community College - Woodbridge (1003-K1-376)
- 9:45AM *Thinking Mathematically (and enjoying it!). Preliminary report.*
 ▶ (576) **Heather A. Lewis**, Nazareth College (1003-K1-227)
- 10:00AM *I may not be able to do math but I certainly can play. Preliminary report.*
 ▶ (577) **Greisy Winicki Landman**, Cal Poly Pomona (1003-K1-148)
- 10:15AM *Making the connection, keeping the level of cognitive demand high.*
 (578) **Michael J. Gilbert**, Eastern Washington University (1003-K1-435)
- 10:30AM *A Look at a University Course in Overcoming Mathematics Anxiety.*
 ▶ (579) **Laura Schooler Adkins**, Missouri Southern State University (1003-K1-519)
- 10:45AM *Coping With Math Anxiety in College: Not For Students Only!*
 ▶ (580) **Fred Peskoff**, Borough of Manhattan Community College/CUNY (1003-K1-892)
- 11:00AM *Teaching and assessing introductory mathematics with explicit student learning objectives.*
 (581) **Dale Winter***, University of Michigan, and **Matt DeLong**, Taylor University (1003-K1-166)
- 11:15AM *Collaborative Effort to Address Math Anxiety. Preliminary report.*
 ▶ (582) **AbdelNaser Al-Hasan***, **Laurel End** and **Karen Friedlen**, Mount Mary College (1003-K1-681)
- 8:15AM *Advantages, Challenges, and Dividends of Online Placement. Preliminary report.*
 ▶ (584) **Derek Bruff** and **Matthew Leingang***, Harvard University (1003-X1-1500)
- 8:30AM *Washington’s Transition Math Project: Setting the Standard for Student Success.*
 (585) **Michael J. Gilbert**, Eastern Washington University (1003-X1-1033)
- 8:45AM *Increasing Flow in the Pipeline: Flaws in the Argument.*
 ▶ (586) **Abbe H. Herzig***, University at Albany, State University of New York, and **Suzanne K. Damarin**, The Ohio State University (1003-X1-910)
- 9:00AM *An Attempt at Teaching a Form of Contemporary College Algebra. Preliminary report.*
 (587) **Erick Brian Hofacker**, University of Wisconsin-River Falls (1003-X1-913)
- 9:15AM *Unifying arithmetic (algebra) and function calculations in precalculus: A tedious but worthwhile goal. Preliminary report.*
 ▶ (588) **Robert Allan Peacock**, Young Harris College (1003-X1-1315)
- 9:30AM *Throwing away the Calculator.*
 ▶ (589) **Jason E Kelly***, **Derek F Burt** and **Edgar K Rugenstein**, United States Military Academy (1003-X1-441)
- 9:45AM *Promoting and Incorporating Technology in Teaching a First Year Finite Mathematics Course.*
 ▶ (590) **Paul Kochanowski*** and **Morteza Shafii-Mousavi**, Indiana University South Bend (1003-X1-211)
- 10:00AM *Modeling, Technology, and Mathematical Understanding.*
 ▶ (591) **Susie M. Lanier*** and **Donna B. Saye**, Georgia Southern University (1003-X1-950)
- 10:15AM *A CRAFTY Approach to Mathematics for Business Management Students.*
 (592) **Kris H. Green*** and **Allen Emerson**, St. John Fisher College (1003-X1-378)
- 10:30AM *A Discrete Mathematics Course for Lower-Division Majors in Mathematics, Computer Science and Education. Preliminary report.*
 ▶ (593) **Kathleen M. Shannon*** and **Homer W. Austin**, Salisbury University (1003-X1-450)
- 10:45AM *Wrong Method, Right Answer.*
 (594) **Anand Kumar**, Ramanujan School of Mathematics (1003-X1-1622)
- 11:00AM *Teachers’ mistakes as a teaching tool.*
 ▶ (595) **Kiryl I Tsishchanka**, Knox College (1003-X1-1570)
- 11:15AM *Getting Pre-service Mathematics Teachers to Learn and Use the Vocabulary of Mathematics.*
 ▶ (596) **Cornelius Nelan**, Quinnipiac University (1003-X1-1205)
- 11:30AM *Using Problem Sets in Calculus.*
 (597) **Judith Harper Morrel**, Butler University (1003-X1-975)
- 11:45AM *Functions of Number Theory in Mathematics. Preliminary report.*
 ▶ (598) **Craig M Johnson**, Marywood University (1003-X1-1200)

MAA General Contributed Paper Session, II

8:00 AM – 11:55 AM

Organizers: **Daniel E. Otero**, Xavier University
Michael A. Jones, Montclair State University
Thomas A. Hern, Bowling Green State University
Janice B. Walker, Xavier University

- 8:00AM *On the Transition in Mathematics from High School to Michigan State University. Preliminary report.*
 ▶ (583) **Richard O. Hill**, Michigan State University (1003-X1-529)

SIGMAA Officers Meeting

8:00 AM – 10:00 AM

AMS Special Session on Radon Transform and Inverse Problems, III

8:30 AM – 11:50 AM

Organizers: **Adel Faridani**, Oregon State University

Gestur Olafsson, Louisiana State University

Todd Quinto, Tufts University

- 8:30AM *Sonar inversion strategies.*
(599) **Aleksei I Beltukov**, University of the Pacific (1003-44-747)
- 9:00AM *Numerical reconstructions in 3D thermo-acoustic tomography.* Preliminary report.
(600) **Gaik Ambartsoumian***, Texas A&M University, and **Sarah Patch**, GE Healthcare Technologies (1003-44-1281)
- 9:30AM *Thermoacoustic Tomography - Inversion of a Spherical Radon Transform with Partial Data.* Preliminary report.
(601) **S K Patch**, GE Healthcare Technologies; Applied Science Lab (1003-44-1073)
- 10:00AM *An Analysis of the Fan Beam CT Reconstruction Kernel.*
(602) **Steven H Izen**, Case Western Reserve University (1003-44-694)
- 10:30AM *A 2-step Hilbert transform method for image reconstruction in cone-beam tomography.*
(603) **Frederic Noo***, **Jed D Pack** and **Rolf Clackdoyle**, Dept of Radiology, University of Utah (1003-45-1301)
- 11:00AM *Region of Interest Reconstruction in Classical Tomography.*
(604) **Rolf Clackdoyle*** and **Frederic Noo**, University of Utah (1003-45-1306)
- 11:30AM *3D X-ray CT.*
(605) **Alfred K Louis**, Universitaet des Saarlandes (1003-92-1623)

MAA Project NExt Panel Discussion

8:30 AM – 10:00 AM

What faculty can do to promote diversity in mathematics.

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

Joseph A. Gallian, University of Minnesota Duluth

Aparna W. Higgins, University of Dayton

Panelists: **Deanna B. Haunsperger**, Carleton College

Nathaniel Dean, Texas Southern University

Robert E. Megginson, Mathematical Sciences Research Institute

Stephanie Fitchett, Florida Atlantic University

MAA Special Presentation

8:30 AM – 11:30 AM

Emerging technologies in undergraduate mathematics.

Organizer: **Jack Picciuto**, U.S. Military Academy

AWM Emmy Noether Lecture

9:00 AM – 9:50 AM

- (606) *From limit cycles to strange attractors.*
Lai-Sang Young, Courant Institute, New York University

MAA Minicourse #10: Part A

9:00 AM – 11:00 AM

Bridging the gap between mathematics and the physical sciences.

Organizer: **Tevis Dray**, Oregon State University

MAA Minicourse #15: Part A

9:00 AM – 11:00 AM

Conceptests and Peer Instruction: Active learning in the calculus classroom.

Organizers: **Deborah Hughes Hallett**, University of Arizona

David O. Lomen, University of Arizona

Maria Robinson, Seattle University

MAA Special Presentation

9:00 AM – 10:20 AM

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

Organizers: **John R. Haddock**, NSF/Division of Undergraduate Education

Elizabeth J. Teles, NSF/Division of Undergraduate Education

Lee L. Zia, NSF/Division of Undergraduate Education

John S. Bradley, NSF/Division of Elementary, Secondary and Informal Education

James H. Lightbourne, Senior Advisor for Planning, Analysis, and Policy

Lloyd E. Douglas, NSF/Division of Mathematical Sciences

Math on the Web, II

10:00 AM – 3:30 PM

10:00AM *Math-aware Web Searching.*

(607) **Robert Miner**, Design Science Inc

11:20AM *Creating Mathematical Documents for the Web with Scientific WorkPlace.*

(608) **Barry MacKichan**, MacKichan Software Inc

12:15PM *How to make your browser speak math (and why you should care).*

(609) **Neil Soiffer**, Design Science Inc

1:00PM *Bringing Interactive and MathML Content to MathWorld.*

(610) **Eric Weisstein**, Wolfram Research Inc

2:00PM *Simulating Instructor Grading in Web-based Tutoring and Assessment.*

(611) **Don DeLand**, Integre Technical Publishing

3:00PM *Writing Questions with Randomized Parameters in Proper Mathematical Notation for Online Homework Assignments.*

(612) **John Risley**, WebAssign

AMS Special Presentation

10:00 AM – 11:00 AM

Who wants to be a mathematician.

Organizers: **Michael A. Breen**, AMS

Annette W. Emerson, AMS

William T. Butterworth, Barat College of DePaul University

Exhibits and Book Sales

10:00 AM – 6:00 PM

MAA Invited Address

10:05 AM – 10:55 AM

- (613) *Origami, linkages, and polyhedra: Folding with algorithms.*
Erik D. Demaine, Massachusetts Institute of Technology (1003-A0-11)

MAA Minicourse #5: Part A

10:15 AM – 12:15 PM

Hands-on discrete mathematics with technology.
Organizers: **Douglas E. Ensley**, Shippensburg University
Katherine G. McGivney, Shippensburg University

AMS-ASL Panel Discussion

10:30 AM – NOON

The continuum hypothesis revisited: New perspectives.
Moderator: **Keith J. Devlin**, Stanford University
Panelists: **Paul J. Cohen**, Stanford University
Donald A. Martin, University of California Los Angeles
W. Hugh Woodin, University of California Berkeley

MAA Project NExT Panel Discussion

10:30 AM – NOON

Recruiting students for mathematics departments.
Organizers: **Brian Birgen**, Wartburg College
Mary D. Shepherd, Northwest Missouri State University
Panelists: **Genevieve M. Knight**, Coppin State University
Joel S. Foisy, State University of New York-College at Potsdam
Jim Lewis, University of Nebraska
Matthew P. Richey, St. Olaf College

MAA Panel Discussion

10:45 AM – 12:05 PM

Using the CUPM Curriculum Guide 2004 to get grants to facilitate change.
Organizers: **Janet L. Andersen**, Hope College
David M. Bressoud, Macalester College
Panelists: **Gregory M. Hill**, University of Portland
Rebecca Hartzler, Edmonds Community College
Eric S. Marland, Appalachian State University
Lee L. Zia, National Science Foundation

MAA Committee on Articulation and Placement Panel Discussion

10:45 AM – 12:05 PM

How changes in high school mathematics could influence collegiate mathematics.
Organizer: **Bernard L. Madison**, University of Arkansas
Panelists: **Judy E. Ackerman**, Montgomery College
Dan Kennedy, Baylor School
Cathy L. Seeley, University of Texas at Austin
Bernard L. Madison

SIAM Invited Address

11:10 AM – NOON

- (614) *Transforming men into mice (and into chimpanzees, dogs, chickens, etc.).*
Pavel Pevzner, University of California San Diego (1003-92-16)

AMS Colloquium Lectures: Lecture II

1:00 PM – 2:00 PM

- (615) *How polynomials vanish: Singularities, integrals, and ideals, Part II: The local theory of multiplier ideals.*
Robert K. Lazarsfeld, University of Michigan (1003-14-06)

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

1:00 PM – 4:00 PM

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

- 1:00PM *Understanding under-representation in mathematics using research and concepts from social science: An introduction.* Preliminary report.
▶ (616) **Cathy Kessel**, Berkeley, CA (1003-97-784)
1:30PM *Gender, Graduate Education, and Academic Careers in Science.*
▶ (617) **Mary Frank Fox**, Georgia Institute of Technology (1003-97-1617)
2:00PM *Gender Schemas and Mathematics Performance.* Preliminary report.
▶ (618) **Virginia V. Valian**, Hunter College (1003-97-1672)
2:30PM Panel Discussion

AMS-MAA Special Session on Tropical Geometry, II

1:00 PM – 3:50 PM

Organizers: **Michael Develin**, University of California Berkeley
Bernd Sturmfels, University of California Berkeley

- 1:00PM *Factorization of Polynomials over the Tropical Semiring.*
 ▶ (619) **Fred H. Roush*** and **K. H. Kim**, Alabama State University (1003-12-1723)
- 1:30PM *The Positive Bergman Complex of an Oriented Matroid.*
 (620) **Lauren K. Williams***, Massachusetts Institute of Technology, **Federico Ardila**, Microsoft Research, and **Caroline Klivans**, University of Chicago (1003-05-776)
- 2:00PM *Geometry behind the split decomposition of finite metrics.*
 (621) **Hirai Hiroshi**, Research Institute for Mathematical Sciences, Kyoto University (1003-05-816)
- 2:30PM *Tropical Linear Spaces.*
 (622) **David E Speyer**, University of California, Berkeley (1003-05-1358)
- 3:00PM *Tropical geometry for biology.*
 (623) **Lior Pachter*** and **Bernd Sturmfels**, U.C. Berkeley (1003-92-1537)
- 3:30PM *Tropical Polytopes in General Position.* Preliminary report.
 ▶ (624) **Michael Joswig**, TU-Berlin (1003-52-1715)

Billur Kaymakalan, George Southern University
Allan C. Peterson, University of Nebraska-Lincoln
Diana M. Thomas, Montclair State University

- 1:00PM *Quantum integers and cyclotomy.*
 ▶ (631) **Yang Wang**, Georgia Institute of Technology (1003-11-1581)
- 1:30PM *Counting permutations for interval maps.*
 ▶ (632) **Michał Misiurewicz**, Indiana University Purdue University Indianapolis (1003-37-629)
- 2:00PM *Approximate Squaring.*
 ▶ (633) **Jeffrey C Lagarias***, University of Michigan, and **N. J. A. Sloane**, AT&T Labs-Research (1003-11-643)
- 2:30PM *An Introduction to p -adic Dynamics.*
 (634) **Robert L Benedetto**, Amherst College (1003-11-972)
- 3:00PM *Gale-Robinson sequences and the octahedron and cube recurrences.*
 ▶ (635) **James Gary Propp**, University of Madison - Wisconsin (1003-05-1677)
- 3:30PM *Dynamics of some continued fractions originating with Ramanujan.*
 ▶ (636) **Jonathan M Borwein**, Dalhousie Faculty of Computer Science (1003-33-624)

AMS-SIAM Special Session on Stochastic, Large-Scale, and Hybrid Systems, II

1:00 PM – 3:50 PM

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

- 1:00PM *Controllability, Observability, and Realizability of Large-Scale Differential Systems.*
 (625) **Donald W Fausett***, Georgia Southern University, and **Kanuri N Murty**, Vishakhapatnam, India (1003-34-1240)
- 1:30PM *Stability of Hybrid Systems with Partially Invisible Solutions.* Preliminary report.
 (626) **S G Leela***, Emeritus, University of Geneseo, SUNY, and **V Lakshmikantham**, Florida Institute of Technology (1003-34-922)
- 2:00PM *Controllability and Observability of Difference Equations.*
 (627) **Laurene V. Fausett***, Georgia Southern University, **Kanuri N. Murty**, Statesboro, GA, and **Gulcin Tugcu**, Istanbul, Turkey (1003-93-1171)
- 2:30PM *Cone Valued Lyapunov Functions and Large Scale Systems.* Preliminary report.
 (628) **A S Vatsala***, University of Louisiana at Lafayette, and **V Lakshmikantham**, Florida Institute of Technology (1003-34-923)
- 3:00PM *Ruin Estimates Under Interest Force: A Martingale Approach.* Preliminary report.
 ▶ (629) **Kumer Pial Das**, Auburn University (1003-60-139)
- 3:30PM *On approximate controllability for delayed integrodifferential control systems.*
 (630) **Lianwen Wang**, Central Missouri State University (1003-93-656)

AMS-SIAM Special Session on Dynamic Equations on Time Scales; Integer Sequences and Rational Maps, IV

1:00 PM – 3:50 PM

Organizers: **Martin J. Bohner**, University of Missouri-Rolla
Marc A. Chamberland, Grinnell College

AMS-SIAM Special Session on Orthogonal Polynomials—Random Matrices—Integrable Systems: Interdisciplinary Aspects, II

1:00 PM – 3:20 PM

Organizers: **Jinho Baik**, University of Michigan, Ann Arbor
Steven B. Damelin, Georgia Southern University
Peter D. Miller, University of Michigan, Ann Arbor

- 1:00PM *Large N limit of Gaussian random matrices with external source.*
 (637) **Pavel M. Bleher***, Indiana University-Purdue University Indianapolis, and **Arno B.J. Kuijlaars**, Katholieke Universiteit Leuven (1003-60-390)
- 1:30PM *On the double scaling limit of the partition function of the one matrix hermitian model.* Preliminary report.
 (638) **Alexander R Its**, Indiana University Purdue University Indianapolis (IUPUI) (1003-33-734)
- 2:00PM *Random Matrices, Graphical Enumeration and the Continuum Limit of Toda Lattices I.*
 (639) **Nicholas M. Ercolani***, **Kenneth T.-R. McLaughlin**, University of Arizona, and **Virgil Pierce**, Brandeis University (1003-05-1103)
- 2:30PM *Random Matrices, Graphical Enumeration and the Continuum Limit of Toda Lattices II.*
 (640) **Nicholas M. Ercolani**, **Kenneth T.-R. McLaughlin**, University of Arizona, and **Virgil Pierce***, Brandeis University (1003-05-330)
- 3:00PM *Random Matrices, Graphical Enumeration and the Continuum Limit of Toda Lattices, III.*
 (641) **Kenneth D. T-R McLaughlin***, **Nicholas Ercolani**, University of Arizona, and **Virgil Pierce**, Brandeis University (1003-35-1375)

AMS-SIAM Special Session on Theoretical and Computational Aspects of Inverse Problems, IV

1:00 PM – 3:50 PM

Organizers: **Gunther Uhlmann**, University of Washington
David L. Colton, University of Delaware

- 1:00PM *Electrical Impedance Imaging and Inverse Problems.* (642) **David Isaacson**, Rensselaer Polytechnic Institute (1003-78-1137)
- 1:30PM *Optimal parametrizations for the numerical solution of some ill-posed inverse problems.* (643) **Liliana Borcea**, Rice University (1003-35-179)
- 2:00PM *High-order solutions of three-dimensional rough-surface scattering problems at high-frequencies.* (644) **Catalin C Turc*** and **Fernando Reitich**, University of Minnesota, Minneapolis (1003-65-549)
- 2:30PM *Imaging elastic anisotropy for tumor identification.* (645) **Jeong-Rock Yoon***, **Joyce McLaughlin** and **Daniel Renzi**, Rensselaer Polytechnic Institute (1003-35-1221)
- 3:00PM *Trace theorems for the wave equation.* (646) **Rakesh Rakesh***, University of Delaware, and **David Finch**, Oregon State University (1003-35-786)
- 3:30PM *An inverse problem in nondestructive evaluation of spotwelds.* Preliminary report. (647) **Elisa Francini**, Istituto per le Applicazioni del Calcolo, CNR, Firenze, Italy, **Thomas Hoft** and **Fadil Santosa***, University of Minnesota (1003-35-623)

AMS-ASL Special Session on Reverse Mathematics, III

1:00 PM – 3:50 PM

Organizers: **Jeff L. Hirst**, Appalachian State University
Reed Solomon, University of Connecticut

- 1:00PM *RM Coding Theory.* Preliminary report. (648) **Harvey M. Friedman**, Ohio State University (1003-03-1477)
- 2:00PM *On the proof theoretic strength of Jullien's results.* (649) **Antonio Montalbán**, Cornell University (1003-03-944)
- 2:30PM *Superatomic Boolean algebras and ATR_0 .* (650) **Noam Greenberg***, University of Notre Dame, and **Antonio Montalban**, Cornell University (1003-03-1318)
- 3:00PM *Reverse mathematics and the equivalence of definitions for well and better quasi-orders.* (651) **Peter Cholak***, University of Notre Dame, **Alberto Marcone**, Università di Udine, Italy, and **Reed Solomon**, UCONN (1003-03-177)
- 3:30PM *Finite better quasi orders.* (652) **Alberto Marcone**, Univ. di Udine (1003-03-823)

AMS Special Session on Quantum Topology, II

1:00 PM – 3:50 PM

Organizers: **Stavros Garoufalidis**, Georgia Institute of Technology
T. T. Q. Le, Georgia Institute of Technology

- 1:00PM *Integral lattices in TQFT.* Preliminary report. (653) **Patrick M. Gilmer***, Louisiana State University, and **Gregor Masbaum**, Institut de Mathématiques de Jussieu, Université Paris 7 (1003-57-690)
- 1:35PM *On a q -chromatic polynomial.* (654) **Martin Loebl**, Charles University (1003-05-1470)
- 2:10PM *The Jones polynomial and the A -polynomial of knots.* (655) **Thang Le**, Georgia Institute of Technology (1003-57-1300)
- 2:45PM *Relating categorical invariants of three-manifolds to categorical and Hopf-algebraic features of the three-manifolds themselves.* Preliminary report. (656) **Fernando J. O. Souza**, University of Iowa (1003-57-1648)
- 3:20PM *On integral formulae for the colored Jones polynomial.* Preliminary report. (657) **Ronit Kashaev**, Université de Genève (1003-57-1323)

AMS Special Session on Representations of Lie Algebras, III

1:00 PM – 3:50 PM

Organizers: **Brian D. Boe**, University of Georgia
Ben L. Cox, College of Charleston
Vyacheslav M. Futorny, Universidade de Sao Paulo
William A. Graham, University of Georgia
Duncan J. Melville, St. Lawrence University
Daniel K. Nakano, University of Georgia

- 1:00PM *On the Representation Theory of the Supergroup $GL(m, n)$.* (658) **Jonathan R Kujawa**, University of Georgia (1003-16-671)
- 1:30PM *Constructing Graded Lie Algebras.* (659) **Meighan I. Dillon**, Southern Polytechnic State University (1003-17-131)
- 2:00PM *L-Weight and L-Root Lattices for Classical and Quantum Affine Algebras.* (660) **Vyjayanthi Chari** and **Adriano Adrega de Moura***, University of California, Riverside (1003-81-1075)
- 2:30PM *Modules over Lie triple systems and Lie algebras.* Preliminary report. (661) **Oleg Smirnov**, College of Charleston (1003-17-1383)
- 3:00PM *$N=1$ superconformal characters and Weber's functions.* Preliminary report. (662) **Antun Milas**, University at Albany, SUNY (1003-17-884)
- 3:30PM *Lie conformal superalgebras.* (663) **Alexander Retakh**, MIT (1003-81-101)

AMS Special Session on Analysis Problems in Modern Physics, III

1:00 PM – 3:50 PM

Organizer: **Steven M. Zelditch**, Johns Hopkins University

- 1:00PM *The Dirichlet-to-Neumann map with partial data.* (664) **Gunther Uhlmann**, University of Washington (1003-35-1087)
- 1:30PM *Eigenfunction asymptotics for quantum integrable systems.* (665) **John A Toth**, McGill University (1003-58-858)

- 2:00PM *Scattering Theory and Conformal Geometry.*
(666) **Maciej Zworski**, University of California, Berkeley (1003-58-677)
- 2:30PM *B fields for geometers and analysts.*
(667) **Mark A Stern**, Duke University (1003-58-1458)
- 3:00PM *Existence of the D0-D4 Bound State: a Proof.*
(668) **Laszlo Erdos**, University of Munich, **David Hasler***, University of British Columbia, and **Jan Philip Solovej**, University of Copenhagen (1003-81-1264)
- 3:30PM *Coexistence of phases in the 6-vertex model.*
(669) Preliminary report.
Konstantin Palamarchuk* and **Nicolai Reshetikhin**, UC Berkeley (1003-82-887)

AMS Special Session on In the Wake of Jacobi and Hamilton 200 Years Later, II

1:00 PM – 3:50 PM

Organizers: **Maria-Clara Nucci**, University of Perugia
Pavel Winternitz, Centre de recherches mathématiques, Université de Montréal

- 1:00PM *Multiseparability and superintegrability on conformally flat spaces.*
(670) **Willard Miller**, University of Minnesota (1003-22-835)
- 2:00PM *Umbral Calculus and Continuous Symmetries of Linear Difference equations.*
(671) **Pavel Winternitz**, Centre de recherches mathématiques, Université de Montréal (1003-81-1381)
- 2:30PM *Singularity Confinement and Algebraic Integrability.*
▶ (672) **Stephane Lafortune***, Colllege of Charleston, and **Alain Goriely**, University of Arizona (1003-39-1441)
- 3:00PM *Revisiting the Pseudo-stabilization of Prolonged Group Actions.* Preliminary report.
(673) **Keshlan S Govinder**, University of KwaZulu-Natal (1003-20-1460)
- 3:30PM *A Lie symmetry connection between Jacobi modular equation and Schwarzian differential equation.*
(674) **Maria-Clara Nucci**, Università di Perugia, Italy (1003-34-1575)

AMS Special Session on Radon Transform and Inverse Problems, IV

1:00 PM – 3:50 PM

Organizers: **Adel Faridani**, Oregon State University
Gestur Olafsson, Louisiana State University
Todd Quinto, Tufts University

- 1:00PM *The Cortical Constraint Method for Diffuse Optical Tomographic Imaging.*
(675) **Misha Kilmer***, Tufts University, **Eric Miller**, Northeastern University, **Marco Enriquez**, Tufts University, and **David Boas**, Martinos Center for Biomedical Imaging, MGH and Harvard Med. School (1003-65-864)
- 1:30PM *Kronecker Approximations and Anti-Reflexive Boundary Conditions in Image Restoration.*
(676) **Lisa Perrone**, Tufts University (1003-65-1112)
- 2:00PM *Runge-Kutta integrators yield optimal regularization schemes.* Preliminary report.
(677) **Andreas Rieder**, Institut fuer Praktische Mathematik, Universitaet Karlsruhe, Germany (1003-65-480)

- 2:30PM *Exploitation of Symmetries and Rotational Invariances in Acoustic and Optical Diffraction Tomography.*
(678) **Mark A. Anastasio***, **Daxin Shi**, Illinois Institute of Technology, **Thomas Deffieux**, École Nationale Supérieure de Physique De Strasbourg, and **Yin Huang**, Illinois Institute of Technology (1003-78-949)
- 3:00PM *Reconstruction of Smooth Functions from Incomplete Information.*
▶ (679) **Peter R Massopust**, Tuboscope Pipeline Services (1003-41-562)
- 3:30PM *The role of the Radon Transform in image processing.* Preliminary report.
(680) **Carlos A. Berenstein***, **Dennis Healy**, Univ. of Maryland, College Park, and **Glenn Easley**, System Planning Corporation (1003-44-1541)

MAA Minicourse #11: Part A

1:00 PM – 3:00 PM

Fair enough? Mathematics of equity.

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

MAA Minicourse #16: Part A

1:00 PM – 3:00 PM

Music and mathematics.

Organizer: **Leon Harkleroad**, Wilton, ME

MAA Minicourse #6: Part A

1:00 PM – 3:00 PM

Webwork, an Internet-based system for generating and delivering homework problems to students.

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

AMS Session on Number Theory, III

1:00 PM – 3:40 PM

- 1:00PM *Subset sum representations of sequences of positive integers.* Preliminary report.
▶ (681) **Donald Mills**, SIU Carbondale (1003-11-779)
- 1:15PM *Factorizations of Some Periodic Linear Recurrence Systems.*
(682) **Curtis N Cooper**, Central Missouri State University (1003-11-838)
- 1:30PM *Sequences of Reducible $\{0, 1\}$ -Polynomials Modulo a Prime.* Preliminary report.
▶ (683) **Judith Canner***, **Lenny Jones** and **Joseph Purdom**, Shippensburg University (1003-11-869)
- 1:45PM *A Quaternionic Proof of the Universality of Some Quaternary Quadratic Forms.*
▶ (684) **Jesse I Deutsch**, University of Botswana (1003-11-919)
- 2:00PM *Saito-Kurokawa Lifts, L -values for GL_2 , and Congruences Between Siegel Modular Forms.*
(685) **Jim L. Brown**, University of Michigan (1003-11-964)
- 2:15PM *Lehmer's problem for Littlewood polynomials.*
(686) **Peter Borwein**, Simon Fraser University, **Edward Dobrowolski**, College of New Caledonia, **Artūras Dubickas**, Vilnius University, and **Michael J. Mossinghoff***, Davidson College (1003-11-966)

- 2:30PM *Geometric and Matrix Manifestations of Arithmetic in Real Cyclotomic Fields.*
 ▶ (687) **Susan Hurley***, Siena College, and **Anne Fontaine**, Defreestville, N.Y. (1003-00-1437)
- 2:45PM *On the rank of quadratic twists of an elliptic curve.*
 (688) **Sungkon Chang**, University of Georgia (1003-11-930)
- 3:15PM *A Converse to a Theorem of Lichtenbaum.*
 (689) Preliminary report.
Shahed Sharif, University of California-Berkeley (1003-11-115)
- 3:30PM *Associated Primes over Ore Extensions.*
 (690) **H E Nordstrom**, University of Oregon (1003-16-854)

AMS Session on Algebra, III

1:00 PM – 3:40 PM

- 1:00PM *Differentiation Algorithms for Representations of Partially Ordered Sets.* Preliminary report.
 (691) **Markus Reitenbach**, Syracuse University (1003-15-1167)
- 1:15PM *On the $2n$ conjecture for Spectrally Arbitrary Patterns.*
 (692) **In-Jae Kim*** and **Bryan L. Shader**, University of Wyoming (1003-15-1590)
- 1:30PM *Idempotents and Generalized Inverses of Nonnegative Sign Pattern Matrices.*
 (693) **Frank J Hall**, Georgia State University (1003-15-201)
- 1:45PM Break
- 2:00PM *The Algebraic Connectivity of Planar Graphs.*
 (694) Preliminary report.
Jason J Moliterno, Sacred Heart University (1003-15-315)
- 2:15PM *Hadamard Product and Tensor Product of Matrices.*
 ▶ (695) Preliminary report.
Bao Qi Feng, Kent State University, Tuscarawas Campus (1003-15-332)
- 2:30PM *Bivector Lie Algebra in (Clifford) Geometric Algebra.*
 (696) Preliminary report.
Garret E. Sobczyk, Universidad de Las Americas - Puebla, Mexico (1003-15-1569)
- 2:45PM *On models of irreducible q -representations of the Lie algebra $\mathfrak{G}(0, 1)$.*
 (697) **Meena Sahai** and **Vivek Sahai***, Department of Mathematics and Astronomy, Lucknow University (1003-17-56)
- 3:00PM *On The Classification of rank 2 rootsystems Over Fields of Low characteristics.* Preliminary report.
 (698) **Mohammad Q Hailat**, Jordan University of Science and Technology (1003-17-112)
- 3:15PM *Cayley-Dickson algebras, Lie theory and Arithmetic.*
 (699) Preliminary report.
W. Harold Davenport, Mesa State College (1003-17-178)
- 3:30PM *Maximal Subalgebras of Infinite-Dimensional Simple Lie Algebras.* Preliminary report.
 (700) **Hayk Melikyan**, North Carolina Central University (1003-17-1158)

AMS Session on Manifolds and Topology, II

1:00 PM – 3:55 PM

- 1:00PM *Large Whitney Levels and Finite Antichains.*
 (701) Preliminary report.
Elizabeth F Stepp, University of Kentucky (1003-54-1122)

- 1:15PM *Dynamics of Protein Structure.* Preliminary report.
 ▶ (702) **Okan Gurel***, IBM, and **Demet Gurel**, Touro College (1003-54-122)
- 1:30PM *A note on relative symmetrizability.*
 (703) **Elise Grabner***, **Gary Grabner**, Slippery Rock University, **Kazumi Miyazaki**, Osaka Elector-Communication University, and **Jamal Tartir**, Youngstown State University (1003-54-1227)
- 1:45PM *The Topological Version of Fodor's Theorem.*
 (704) **Istvan Juhasz**, MTA Renyi Institute of Mathematics, Budapest, Hungary, and **Andrzej Szymanski***, Slippery Rock University of Pennsylvania (1003-54-1333)
- 2:00PM *An Open C^* -filter Process Of Compactification And Its Descriptions Of Stone-Cech, Wallman Compactifications.*
Hueytzen J Wu*, Texas A&M University-Kingsville, and **Wan-Hong Wu**, University of Texas Health Sciences Center at San Antonio (1003-54-230)
- 2:15PM *Admissible semilattice structures on compact spaces.* Preliminary report.
 (706) **Minakshisundaram Rajagopalan***, Tennessee State University, **Taras Banakh**, Lviv National University, and **Oleg V Gutik**, National Academy of Science, Lviv (1003-44-501)
- 2:30PM *Subspaces of ω_n that are paracompact in a forcing extension.*
 (707) **Akira Iwasa**, University of South Carolina Beaufort (1003-54-820)
- 2:45PM *Infinite Simple Homotopy for Cell Complexes.*
 (708) Preliminary report.
Elliott S. Elliott, University of Kentucky (1003-54-837)
- 3:00PM *Can Celtic Knots Be Classified?*
 (709) **Angela M Brown**, Sam Houston State University (1003-57-1239)
- 3:15PM *The Classification of Isometry Groups of the Prism Manifolds.* Preliminary report.
 (710) **Ryo Ohashi**, Saint Louis University (1003-57-305)
- 3:30PM *Self-adjoint higher-order differential operators on manifolds of bounded geometry.*
 (711) **Ognjen B Milatovic**, University of North Florida (1003-58-466)
- 3:45PM *Hodge-DeRham Theory for non-compact Riemannian manifolds.*
 (712) **Mihail Cocos**, University of Minnesota (1003-58-150)

AMS Session on Applied Mathematics, I

1:00 PM – 4:10 PM

- 1:00PM *An algorithm to reconstruct the 3-D surface structure of intact microvessels from their confocal images.* Preliminary report.
 (713) **Yi Wang***, Fairmont State University, and **Ping He**, West Virginia University (1003-68-1335)
- 1:15PM *The Eidochromatic Transform for Color Image Coding.*
 ▶ (714) **Irina Popovici*** and **W. D. Withers**, US Naval Academy (1003-68-1496)
- 1:30PM *Unification and Matching modulo Type Isomorphism.*
 (715) **Mendez Carlos Martinez**, Wesleyan University (1003-68-1660)
- 1:45PM *Digital Image Processing in Nanoscale Materials Research.* Preliminary report.
 (716) **M. Sun***, **C. Liu**, University of Alabama, and **H. Fujiwara**, University of Alabama (1003-68-988)

- 2:00PM *Closed-form approximate solutions to nonlinear diffusion equations modeling groundwater flows.*
▶ (717) **Aleksey S Telyakovskiy**, University of Nevada, Reno (1003-76-1588)
- 2:15PM *Conformal transformation of the independent variable in the differential equation of classical instability of the asymptotic-suction boundary layer.*
(718) **John M Russell**, Florida Institute of Technology (1003-76-1688)
- 2:30PM *Implementing a Reduced Order POD Methodology with Electromagnetic NDE Techniques.*
▶ (719) **Michele L Joyner**, State University of West Georgia (1003-78-329)
- 2:45PM *Minimum orbit for the local unitary group action on state space for a system of qubits.* Preliminary report.
(720) **David W. Lyons*** and **Scott N. Walck**, Lebanon Valley College (1003-81-1518)
- 3:00PM *Bose-Einstein Condensates in Optical Lattices and Superlattices.*
(721) **Mason Alexander Porter**, Georgia Tech, School of Mathematics and Center for Nonlinear Science, School of Physics (1003-81-601)
- 3:15PM *On the asymptotics of some large Hankel determinants generated by Fisher-Hartwig symbols defined on the real line.* Preliminary report.
(722) **Timothy M. Garoni**, Institute for Mathematics and its Applications, University of Minnesota (1003-82-1515)
- 3:30PM *Modeling of Sky Brightness.* Preliminary report.
▶ (723) **Alice L Loth**, Westover (1003-85-650)
- 3:45PM *Multiscale ELLAM Methods for High Oscillatory Advection-Diffusion Equations.* Preliminary report.
▶ (724) **Yabin Ding**, University of South Carolina (1003-65-936)
- 4:00PM *Statistical Analysis of Pipe Rehabilitation Liners.*
(725) **Mahmoud Yousef***, Central Missouri State University, and **Raja Nassar**, Louisiana Tech University (1003-62-928)

SIGMAA on Environmental Mathematics Guest Lecture, Council Meeting, and Business Meeting

1:00 PM – 2:50 PM

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

- 1:00PM *Title to be announced.*
(726) **Benoit Mandelbrot**, Yale University

MAA Session on Getting Students To Discuss and To Write About Mathematics, III

1:00 PM – 4:05 PM

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

- 1:00PM *Mathematicians Are Real People, Too: Biographies in a Senior Capstone Course.*
▶ (727) **David W. Dempsey**, Jacksonville State University (1003-A1-867)
- 1:15PM *What does a mathematician do? Presenting recent articles in upper level courses.*
▶ (728) **Elyn Rykken**, Muhlenberg College (1003-A1-1054)
- 1:30PM *Introduction to Research Seminar: getting students to read, write and talk about mathematics.*
▶ (729) **Kimberly A. Roth**, Wheeling Jesuit University (1003-A1-841)

- 1:45PM *Using Letter-Writing to Enhance a Calculus Course.* Preliminary report.
▶ (730) **Russell E. Goodman**, Central College (1003-A1-1213)
- 2:00PM *Talking about Vector Calculus.* Preliminary report.
▶ (731) **Barbara Edwards*** and **Tevian Dray**, Oregon State University (1003-A1-426)
- 2:15PM *Four Revolutionaries, an Integral, and a Pizza Place, and The Midnight Trek.*
▶ (732) **Jennifer M. Switkes**, California State Polytechnic University, Pomona (1003-A1-198)
- 2:30PM *Getting Students to Discuss Mathematics.*
▶ (733) **Youyu Phillips**, Keystone College (1003-A1-902)
- 2:45PM *Creative Proof Critiques As Writing Assignments in Abstract Algebra.* Preliminary report.
(734) **Reva Kasman**, Grand Valley State University (1003-A1-796)
- 3:00PM *Getting Students to Discuss and to Write about Mathematics in a Linked Finite Math and Computer Technology Course.*
▶ (735) **Morteza Shafii-Mousavi*** and **Paul Kochanowski**, Indiana University South Bend (1003-A1-212)
- 3:30PM *Writing to Learn: Writing Across the Curriculum in Undergraduate Computer Science.*
▶ (736) **Brian C. Ladd**, St. Lawrence University (1003-A1-1536)
- 3:45PM *How Rhetoric Transformed a Business Mathematics Course.*
▶ (737) **Kris H. Green** and **Allen Emerson***, St. John Fisher College (1003-A1-377)

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

1:00 PM – 3:55 PM

Organizers: **David R. Hill**, Temple University
Lila F. Roberts, Georgia College and State University

- 1:00PM *Eigenvalues and Hammer Juggling.* Preliminary report.
▶ (738) **Carl V Lutzer**, Rochester Institute of Technology (1003-B1-175)
- 1:30PM *Interpolation Polynomials, Bezier Curves, and Cubic Splines with Excel.*
▶ (739) **Deane Eugene Arganbright**, Korea Advanced Institute of Science and Technology (1003-B1-442)
- 2:00PM *A Multifaceted Introduction to Probability.* Preliminary report.
▶ (740) **Alexander Stanoyevitch**, University of Guam (1003-B1-354)
- 2:30PM *Visualizing Vector Derivatives: The Vector Field Analyzer.* Preliminary report.
▶ (741) **Matthias Kowski**, Arizona State University, and **Tevian Dray***, Oregon State University (1003-B1-424)
- 2:45PM *Sonification to Reinforce Graphics.* Preliminary report.
▶ (742) **Steven M. Hetzler*** and **Robert M. Tardiff**, Salisbury University (1003-B1-371)
- 3:15PM *Learning spherical geometry via a new form of juggling on a sphere.*
▶ (743) **Akihiro Matsuura**, College of Science and Engineering, Tokyo Denki University (1003-B1-481)
- 3:30PM *Building Mathematical Skills with Lego Bricks.*
▶ (744) **Edward W. Welsh**, Westfield State College (1003-B1-429)
- 3:45PM *Three hands-on classroom demos: Counting, induction, and data analysis.*
▶ (745) **Norton Starr**, Amherst College (1003-B1-111)

MAA Session on Drawing on Our Students' Thinking to Improve the Mathematical Education of Teachers, II

1:00 PM – 4:05 PM

Organizers: **Dale R. Oliver**, Humboldt State University
Mary Kay Abbey, Montgomery College

- 1:00PM ▶ (746) *Developing a Deeper Understanding of K-8 Mathematics While Reviewing the Basics: How Little Our Future Teachers Know—and How Much They Can Learn.* Preliminary report.
Betsy Darken, University of Tennessee at Chattanooga (1003-G1-237)
- 1:15PM ▶ (747) *Using Large Surfaces to See Students' Understanding.*
Patricia L Hale, Cal Poly Pomona (1003-G1-333)
- 1:30PM ▶ (748) *Student Misconceptions and Learning Moments.*
Kenneth J. Bernard, Virginia State University (1003-G1-382)
- 1:45PM ▶ (749) *Using students' thinking in a capstone course for secondary preservice mathematics teachers.* Preliminary report.
Matthew S Winsor, University of Texas at El Paso (1003-G1-802)
- 2:00PM ▶ (750) *Design and Implementation of Linking Courses: Connecting College Mathematics with High School Mathematics for Pre-service Teachers.*
Paul E Kehle*, **Daniel P Maki**, **Andy Norton**, Indiana University, and **Dale Nowlin**, Columbus North High School (1003-G1-1228)
- 2:15PM ▶ (751) *Using teachers' mathematics questions as an opportunity to deepen their understanding.*
Michael Keynes*, Purdue University Calumet, and **Eileen Fernandez**, Montclair State University (1003-G1-1207)
- 2:30PM ▶ (752) *The problems of posing problems with fractions.* Preliminary report.
Cristina Gomez*, **Cecelia Laurie** and **Wei Shen Hsia**, The University of Alabama (1003-G1-363)
- 2:45PM ▶ (753) *Promoting Conceptual Understanding of Fundamental Mathematics Among Preservice Elementary Teachers.*
Judith Lynn Gieger*, **John C. Nardo**, Oglethorpe University, and **Missy Bain**, Mt. Bethel Elementary School (1003-G1-1448)
- 3:00PM ▶ (754) *A Penny for Your Thoughts: Exploring How Pre-Service Teachers Think About Elementary Mathematics.* Preliminary report.
Tracie M. McLemore-Salinas, Appalachian State University (1003-G1-728)
- 3:15PM ▶ (755) *Enhancing the Mathematical Preparation of K-6 Teachers.*
Tracy Bibelnieks* and **Matthew J Haines**, Augsburg College (1003-G1-665)
- 3:30PM ▶ (756) *A Connected Approach to Mathematics For Pre-Service Elementary Teachers.* Preliminary report.
Don D Gilmore and **Jim Loats***, Metropolitan State College of Denver (1003-G1-281)
- 3:55PM ▶ (757) *A Glimpse at Adjusting Two Mathematics Education Courses to Deepen Student Understanding at Western Oregon University.*
Maria Fung* and **Laurie Burton**, Western Oregon University (1003-G1-246)

MAA Session on Projects and Demonstrations That Enhance a Differential Equations Course, II

1:00 PM – 3:55 PM

Organizers: **Richard J. Marchand**, Slippery Rock University
Shawnee L. McMurrin, California State University San Bernardino

- 1:00PM ▶ (758) *Animating Beam Theory.*
Tim McDevitt, Laurel, MD (1003-J1-903)
- 1:30PM ▶ (759) *A Mathematical Model for a Self-Limiting Population.*
Glenn Ledder, University of Nebraska-Lincoln (1003-J1-959)
- 2:00PM ▶ (760) *Sliding along a Chord through a Rotating Earth.*
Andrew J Simoson, King College (1003-J1-168)
- 2:30PM ▶ (761) *Phase Transitions in Coupled Nonlinear Oscillators.* Preliminary report.
Tanya L. Leise, Amherst College (1003-J1-465)
- 3:00PM ▶ (762) *Solving the Linear Drag Flight Equation Analytically.*
Richard N. Barshinger, Penn State-Scranton (1003-J1-927)
- 3:30PM ▶ (763) *Differential Equations Enriched by Vector Space Concepts.*
James Hall, Westminster (1003-J1-1144)
- 3:45PM ▶ (764) *Using Inverse Problems to Twist a Traditional Course in Differential Equations.* Preliminary report.
Shawnee L. McMurrin, California State University, San Bernardino (1003-J1-1641)

MAA Session on Using Real-World Data to Illustrate Statistical Concepts, I

1:00 PM – 4:10 PM

Organizers: **Thomas L. Moore**, Grinnell College
John D. McKenzie, Jr., Babson College

- 1:00PM ▶ (765) *Data Doesn't Come from Books.* Preliminary report.
George N Bratton, University of Central Arkansas (1003-L1-598)
- 1:30PM ▶ (766) *The Stem and Tendril Project.* Preliminary report.
John A Verzani*, **Deborah Franzblau** and **Andrew Poje**, College of Staten Island (1003-L1-563)
- 1:45PM ▶ (767) *How variable are heart rates?*
Patricia Humphrey, Georgia Southern University (1003-L1-541)
- 2:00PM ▶ (768) *Psychology Data for - and from - Applied Statistics Students.*
David E. Payne, Monmouth University (1003-L1-503)
- 2:15PM ▶ (769) *Incorporating Notebook technology and data analysis into probability and statistics education at West Point.* Preliminary report.
Andrew Glen, United States Military Academy (1003-L1-468)
- 2:45PM ▶ (770) *Why Probability Reveals that Real World Data CANNOT Always be Used to Explain Some Elementary Statistical Ideas.* Preliminary report.
Michael J Bosse*, East Carolina University, and **N. R. Nandakumar**, Delaware State University (1003-L1-407)
- 3:00PM ▶ (771) *Using Real-World Data to enhance the Statistical Thinking of Students in Various Disciplines.* Preliminary report.
Barbara A. Wainwright, Salisbury University (1003-L1-343)

- 3:15PM *Statistics Class Projects Using Institutional Data.*
 ▶ (772) Preliminary report.
Thomas J Pfaff, Ithaca College (1003-L1-337)
- 3:30PM *Using A Web Tool To Collect and Analyze Survey Data.*
 ▶ (773) **Sue B Schou**, Idaho State University (1003-L1-277)
- 3:45PM *Being One's Own Experimental Unit in the Classroom.*
 ▶ (774) **Lorrie L Hoffman**, Armstrong Atlantic State University (1003-L1-260)
- 4:00PM *Nutritional Data of Crackers.*
 ▶ (775) **Carolyn K. Cuff***, Westminster College, New Wilmington, PA, and **Mary Sullivan**, Rhode Island College (1003-L1-217)

MAA General Contributed Paper Session, III

1:00 PM – 3:40 PM

Organizers: **Daniel E. Otero**, Xavier University
Michael A. Jones, Montclair State University
Thomas A. Hern, Bowling Green State University
Janice B. Walker, Xavier University

- 1:00PM *Connecting Mathematics with Other Disciplines: A Computational Science Curriculum.*
 ▶ (776) **Ignatios E Vakalis**, Executive Director, Center for Computational Studies (1003-X1-351)
- 1:15PM *Kindling Undergraduate Interest in Mathematics Research.* Preliminary report.
 (777) **Manmohan Kaur**, Benedictine University (1003-X1-453)
- 1:30PM *PowerPoint as a Presentation Tool in an Introductory Differential Equations Course.*
 ▶ (778) Preliminary report.
Phil Gustafson, Mesa State College (1003-X1-1116)
- 1:45PM *Student Presentations: Not Just a Minor Diversion.*
 ▶ (779) Preliminary report.
Gregory Mark Boudreaux, UNC – Asheville (1003-X1-1654)
- 2:00PM *Using Art to Teach Elementary Group Theory.*
 ▶ (780) **Jeffrey W. Clark**, Elon University (1003-X1-344)
- 2:15PM *Experiencing Geometry, from Concrete to Abstract.*
 ▶ (781) **Haohao Wang**, Southeast Missouri State University (1003-X1-1263)
- 2:30PM *Creating a "Primary Speaking" course in Mathematics.* Preliminary report.
 (782) **John W Thompson**, University of Pittsburgh (UPJ) (1003-X1-1267)
- 2:45PM *Undergraduate Research in the Mathematical Sciences.*
 ▶ (783) **Barbara M. Moskal***, **Graeme Fairweather**, Colorado School Mines, and **Scott Strong**, Colorado School of Mines (1003-X1-1549)
- 3:00PM *Reforming the Senior Seminar/Capstone Course for Use in Program Assessment.*
 ▶ (784) **Tom McMillan**, University of Arkansas at Little Rock (1003-X1-1226)
- 3:15PM *Assessment Central: An Online Web-based Tool for Use in Program Assessment.*
 ▶ (785) **Jim Fulmer**, University of Arkansas at Little Rock (1003-X1-1266)
- 3:30PM *Using Alumni Surveys to Strengthen the Mathematics Department.* Preliminary report.
 ▶ (786) **Lisa Elaine Marano**, West Chester University of Pennsylvania (1003-X1-411)

MAA Panel Discussion

1:00 PM – 2:20 PM

Using CUPM Curriculum Guide 2004: Assessing and improving the program for the major in mathematics.

Organizers: **William E. Haver**, Virginia Commonwealth University
Harriet S. Pollatsek, Mount Holyoke College

Moderator: **William E. Haver**

Panelists: **Richard M. Grassl**, University of Northern Colorado
Matthew P. Richey, St. Olaf College
R. Bruce Mattingly, SUNY Cortland

MAA Special Presentation

1:00 PM – 2:20 PM

Learning to prove: Strategies to improve students' proof writing skills.

Organizers: **Annie Selden**, New Mexico State University
Barbara E. Edwards, Oregon State University
Nancy L. Hagelgans, Ursinus College
Ahmed I. Zayed, DePaul University

MAA Special Presentation

1:00 PM – 4:00 PM

Undergraduate mathematics and NSDL: The National Science Technology Engineering and Mathematics Education Digital Library.

Organizer: **Franklin A. Wattenberg**, U.S. Military Academy

AMS Special Session on Mathematical Sciences Contributions to the Biomedical Sciences, II

1:30 PM – 4:15 PM

Organizers: **Peter D. March**, Ohio State University
De Witt L. Sumners, Florida State University
John Whitmarsh, The National Institutes of Health

- 1:30PM *Representations of odor mixtures and learning in insect olfactory system.*
 ▶ (787) **Alla Borisyuk***, Mathematical Biosciences Institute, OSU, and **Brian H Smith**, Ohio State University (1003-92-1256)
- 2:30PM *Mathematical Modeling of Bacterial Biofilms.*
 (788) **David Chopp***, Northwestern University, **Matthew Parsek**, University of Iowa, and **Brian Moran**, Northwestern University (1003-92-1565)
- 3:30PM *The Need for Mathematics in Biomedical Research.*
 (789) Preliminary report.
John Whitmarsh, National Institute for General Medical Sciences (1003-92-1716)

MAA Project NExT-Young Mathematicians' Network Poster Session

2:00 PM – 4:00 PM

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

Kenneth A. Ross, University of Oregon

Summer Program for Women in Mathematics

2:00 PM – 4:00 PM

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

AMS Invited Address

2:15 PM – 3:05 PM

(790) *Embedded curves and Gromov-Witten invariants.*
Eleny Ionel, University of Wisconsin (1003-53-02)

MAA Panel Discussion

2:30 PM – 3:50 PM

Speaking of mathematics.
Organizers: **Jon T. Jacobsen**, Harvey Mudd College
Lewis D. Ludwig, Denison College
Panelists: **Joseph A. Gallian**, University of Minnesota at Duluth
Jon T. Jacobsen
Lewis D. Ludwig

MAA Panel Discussion

2:30 PM – 3:50 PM

The senior seminar or “capstone” experience for undergraduate mathematics majors.
Organizer: **Pdraig M. McLoughlin**, Morehouse College
Panelists: **Colin L. Starr**, Willamette University
Xinxin Jiang, Rhodes College
John W. Emert, Ball State University
Carol S. Schumacher, Kenyon College
David Brown, Ithaca College
Abdelikrim Brania, Morehouse College
Michael Johnson, U.S. Military Academy

MAA Panel Discussion

3:00 PM – 4:20 PM

Moore method calculus by those who do it.
Organizers: **James P. Ochoa**, Hardin-Simmons University
William T. Mahavier, Lamar University
Panelists: **Charles S. Allen**, Drury University
Gregory D. Foley, Appalachian State University
Tom Ingram, Baylor University
William T. Mahavier

AMS Invited Address

3:20 PM – 4:10 PM

(791) *The power and weakness of randomness (when you are short on time).*
Avi Wigderson, Institute for Advanced Study (1003-68-03)

Joint Prize Session

4:25 PM – 5:45 PM

Joint Prize Session Reception

5:45 PM – 6:30 PM

SIGMAA on the History of Mathematics Annual Meeting and Guest Lecture

5:45 PM – 7:45 PM

Organizer: **Amy Shell-Gellasch**, Grafenwoer, Germany
▶ (792) *John Charles Fields: His Work in Mathematics and Research Organization.*
W Thomas Archibald, Acadia University and Dibner Institute, MIT (1003-A0-879)

SIGMAA on Research in Undergraduate Mathematics Education Business Meeting and Guest Lecture

5:45 PM – 7:45 PM

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

SIGMAA on Statistics Education Business Meeting

5:45 PM – 6:45 PM

Organizers: **John D. McKenzie Jr.**, Babson College
Thomas L. Moore, Grinnell College

Young Mathematicians’ Network Town Meeting

7:30 PM – 8:30 PM

Organizer: **David Kung**, St. Mary’s College of Maryland

Friday, January 7

Joint PME and MAA Student Chapter Advisors’ Breakfast

7:00 AM – 8:00 AM

Joint Meetings Registration

7:30 AM – 4:00 PM

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

8:00 AM – 11:00 AM

Organizers: **Darren A. Narayan**, Rochester Institute of Technology
Tamara A. Burton, Rochester Institute of Technology
Michael J. Fisher, California State University, Fresno
Carl V. Lutzer, Rochester Institute of Technology
8:00AM ▶ (793) *GUI Design for Self-Calibration Techniques on Interferometer Stages.* Preliminary report.
Brian K. Tagiku* and **Michael R. Raugh**, Harvey Mudd College (1003-68-1363)

- 8:30AM *An Algebraic Approach to Voting Theory.*
 ▶ (794) Preliminary report.
Zajj B Daugherty, Harvey Mudd College
 (1003-20-1286)
- 9:00AM *One-Regularity of Cayley Graphs.* Preliminary
 ▶ (795) report.
Mary Balmes*, Saint Joseph's College, and **Jackie
 Kaminski**, Xavier University (1003-05-1254)
- 9:30AM Discussion on the geometry of the Dehn complex
 for a spatial graph.
- 10:00AM Discussion on probability and a polynomial for
 rooted graphs.

**AMS-SIAM Special Session on Nonsmooth Analysis in
 Variational and Imaging Problems, I**

8:00 AM – 10:50 AM

Organizers: **M. Zuhair Nashed**, University of
 Central Florida
Otmar Scherzer, University of
 Innsbruck

- 8:00AM *Algorithms for Finding Global Minimizers of Image
 (796) Segmentation and Denoising Models.*
Selim Esedoglu*, **Tony F Chan**, University of
 California Los Angeles, and **Mila Nikolova**, Centre
 de Mathematiques et de Leurs Applications, ENS de
 Cachan (1003-49-1336)
- 8:30AM *A picture is worth a thousand words, but that
 (797) depends...*
Jackie Shen, University of Minnesota
 (1003-68-1283)
- 9:00AM *Image reconstruction for the circle and line
 (798) trajectory.*
Alexander Katsevich, University of Central Florida
 (1003-44-1450)
- 9:30AM *Variational Methods in the Study of Imaging,
 (799) Foams, Quantum Dots ... and More.*
Irene M Fonseca, Carnegie Mellon University
 (1003-49-1674)
- 10:00AM *An Iterated Regularization Method for Total
 (800) Variation Based Image Restoration.*
Stanley Osher*, UCLA, **Martin Burger**, Industrial
 Mathematics Institute, Johannes Kepler Universitat,
Donald Goldfarb, Columbia University, **Jinjun Xu**,
 UCLA, and **Wotao Yin**, Columbia University
 (1003-49-153)
- 10:30AM *Maximum Entropy Methods and (Non-)Convex
 (801) Optimization.*
Jonathan M Borwein, Dalhousie Faculty of
 Computer Science (1003-49-627)

**AMS-SIAM Special Session on Recent Advances in
 Mathematical Ecology, I**

8:00 AM – 10:50 AM

Organizers: **Semen Koksai**, Florida Institute of
 Technology
Sebastian Schreiber, The College of
 William and Mary
Robert van Woesik, Florida Institute
 of Technology

- 8:00AM *Competition Models for Juvenile/Adult Structured
 (802) Species.* Preliminary report.
J. M. Cushing* and **Sheree LeVarge**, University of
 Arizona (1003-92-1157)

- 8:30AM *Spatial coexistence mechanisms: a comparative
 (803) analysis.*
Priyanga Amarasekare, University of Chicago
 (1003-92-1412)
- 9:00AM *Discrete-state biological dynamics: Stochastic
 (804) models and deterministic skeletons.* Preliminary
 report.
Aaron A. King, University of Tennessee
 (1003-92-1395)
- 9:30AM *Collective Actions and the Evolutionary Origin of
 (805) Cooperators and Defectors.*
Timothy P Killingback, The College of William and
 Mary (1003-92-1574)
- 10:00AM *Modeling the Diurnal Distribution and Behavior of
 (806) Marine Birds and Mammals.*
Shandelle M. Henson*, **James L. Hayward**
 and **Smruti P. Damania**, Andrews University
 (1003-92-1121)
- 10:30AM *To persist or not to persist?*
 (807) **Josef Hofbauer**, University College London, and
Sebastian J. Schreiber*, The College of William and
 Mary (1003-92-1638)

**AMS-SIAM Special Session on Reaction Diffusion
 Equations and Applications, I**

8:00 AM – 10:50 AM

Organizers: **Xu-Yan Chen**, Georgia Institute of
 Technology
Yuanwei Qi, University of Central
 Florida
Junping Shi, The College of William
 and Mary
Ratnasingham Shivaji, Mississippi
 State University

- 8:00AM *Nonlinear Spectral Problems for Elliptic and
 (808) Parabolic Equations near the First Eigenvalue.*
Peter Takac, University of Rostock (1003-35-1438)
- 8:30AM *On the shape of least-energy solutions for a class of
 (809) singularly perturbed quasilinear elliptic Neumann
 problems.*
Yi Li* and **Chunshan Zhao**, University of Iowa
 (1003-35-1464)
- 9:00AM *Estimating the effectiveness of anisotropic
 (810) insulators.* Preliminary report.
Steven Rosencrans and **Xuefeng Wang***, Tulane
 University (1003-35-853)
- 9:30AM *Uniqueness of Positive Solutions for a Class of
 (811) Semipositone Elliptic Systems.*
Hai Dang and **Ratnasingham Shivaji***, Mississippi
 State University (1003-35-1265)
- 10:00AM *A variational characterization of the Fucik
 (812) spectrum.* Preliminary report.
Alfonso Castro*, Harvey Mudd College, and **Chen
 Chang**, University of Texas at San Antonio
 (1003-35-1102)
- 10:30AM *A Uniqueness Theorem for Nonlinear Reaction
 (813) Diffusion Equations.*
Xu-Yan Chen, Georgia Institute of Technology
 (1003-35-1637)

**AMS-SIAM Special Session on Integrable Systems and
 Special Functions, I**

8:00 AM – 10:50 AM

Organizers: **Andras Balogh**, University of
 Texas-Pan American

Mourad E. H. Ismail, University of Central Florida

Wen-Xiu Ma, University of South Florida

Zhijun Qiao, Los Alamos National Laboratory

8:00AM *Structure of Certain Chebyshev-type Polynomials in Onsager's Algebra Representation*. Preliminary report. (814)

Shi-shyr Roan, Academia Sinica (1003-33-821)

8:30AM *Poisson statistics for the largest eigenvalues of random matrices with heavy tails of matrix entries distributions*. (815)

Alexander Soshnikov, University of California at Davis (1003-60-22)

9:00AM *Identities for noncommutative hypergeometric series*. (816)

Michael J. Schlosser, University of Vienna (1003-33-1593)

9:30AM *Some Evolution Equations and Solitary Waves in a Beta Plane Ocean*. Preliminary report. (817)

Lokenath Debnath, The University of Texas - Pan American (1003-35-505)

10:00AM *Orthogonal and extremal polynomials on discrete sets*. (818)

Steven B Damelin, Georgia Southern University (1003-33-1326)

10:30AM *Special Functions and Semilinear Equations in Circular Domains*. (819)

Vladimir V Varlamov, University of Texas - Pan American (1003-35-475)

AMS Special Session on Arithmetic Algebraic Geometry, I

8:00 AM – 10:50 AM

Organizers: **Matthew H. Baker**, University of Georgia

Dino J. Lorenzini, University of Georgia

8:00AM *Some Local-Global Properties of Torsion Points on Abelian Varieties*. (820)

John T. Cullinan, University of Massachusetts at Amherst (1003-11-669)

8:30AM *Iwasawa theory over Kummer extensions*. Preliminary report. (821)

Romyar T. Sharifi, McMaster University (1003-11-444)

9:00AM *Towards Uniform Boundedness for Quadratic Polynomial Dynamics*. (822)

Robert L. Benedetto, Amherst College (1003-11-183)

9:30AM *p-Adic rigidity of arithmetic cohomology and associated Galois representations*. (823)

Glenn Stevens*, Boston University, **Avner Ash**, Boston College, and **David Pollack**, Wesleyan University (1003-11-1044)

10:00AM *Kida's formula and congruences*. (824)

Robert Pollack, Boston University, and **Thomas Weston***, University of Massachusetts, Amherst (1003-11-547)

10:30AM *The failure of mod-p multiplicity one*. Preliminary report. (825)

Mark Dickinson, University of Pittsburgh (1003-11-878)

AMS Special Session on Algorithmic Algebraic and Analytic Geometry, I

8:00 AM – 10:50 AM

Organizers: **Saugata Basu**, Georgia Institute of Technology

Victoria A. Powers, Emory University

Mika K. Sepälä, Florida State University

Tanush T. Shaska, University of Idaho

Emil J. Volcheck, National Security Agency

8:00AM *Linearly presented ideals and applications to embeddings of projective spaces*. (826)

David Eisenbud, MSRI (1003-14-1562)

8:30AM *Realising Endomorphisms of Jacobians using Correspondences*. Preliminary report. (827)

Benjamin A Smith, University of Sydney (1003-11-496)

9:00AM *Extension of the Fourier-Budan theorem to one-variable signomials*. Preliminary report. (828)

Charles N. Delzell, Louisiana State University (1003-26-1689)

9:30AM *Computing Hurwitz spectra in arithmetic form*. Preliminary report. (829)

Roger Vogeler, University of Helsinki (1003-30-143)

10:00AM *Trace coordinates of Teichmüller spaces of low genus*. Preliminary report. (830)

Thomas Gaughhofer and **Klaus-Dieter B. Semmler***, EPFL (1003-30-934)

10:30AM *Remarks on the uniformizing function in genus 2*. Preliminary report. (831)

Peter Buser*, EPFL, and **Robert Silhol**, University of Montpellier II (1003-30-938)

AMS Special Session on Modular Representation Theory of Finite and Algebraic Groups, I

8:00 AM – 10:50 AM

Organizers: **David J. Hemmer**, University of Toledo
Cornelius Pillen, University of South Alabama

8:00AM *Cohomology of Frobenius kernels and Lie algebras*. (832)

Christopher P Bendel*, University of Wisconsin-Stout, **Daniel K. Nakano**, University of Georgia, and **Cornelius Pillen**, University of South Alabama (1003-20-614)

8:30AM *Projective modules over Frobenius kernels and finite Chevalley groups*. Preliminary report. (833)

Zongzhu Lin, Kansas State University, and **Daniel K. Nakano***, University of Georgia (1003-20-574)

9:00AM *Extensions of modules for \mathfrak{sl}_2* . Preliminary report. (834)

Joerg Feldvoss, University of South Alabama (1003-20-1223)

9:30AM *Some results on the cohomology of algebraic groups and Hecke algebras*. (835)

Brian Parshall, University of Virginia (1003-20-1217)

10:00AM *Lusztig Polynomials for A_n* . Preliminary report. (836)

Leonard Chastkofsky, University of Georgia (1003-20-792)

10:30AM *Maximal submodules of Weyl modules*. (837)

Leonard L Scott, The University of Virginia (1003-20-1561)

AMS Session on Combinatorics, II

8:00 AM – 10:55 AM

- 8:00AM *K_{1,3}-subdivision Tolerance Representations of Cycles*. Preliminary report.
▶ (838) **Mary Ann Barbato**, Fitchburg State College (1003-05-991)
- 8:15AM *Combinatorial Deformations of the Full Transformation Semigroup*. Preliminary report.
(839) **John T Hall**, University of Minnesota (1003-05-1063)
- 8:30AM *Algorithms generating restricted permutations*.
(840) **Rebecca N. Smith**, University of Florida (1003-05-1115)
- 8:45AM *Forbidden Subgraphs and Generalized Pancyclic Properties in Graphs*. Preliminary report.
(841) **Charles Brian Crane**, Emory University (1003-05-1161)
- 9:00AM *On correlation properties of random graph homomorphisms*. Preliminary report.
▶ (842) **Nicholas B. Weininger**, Rutgers University (1003-05-117)
- 9:15AM Break
- 9:30AM *Chromatic capacity and graph operations*.
▶ (843) **Jack W Huizenga**, University of Chicago (1003-05-1255)
- 9:45AM *Inversions within restricted fillings of Young Tableaux*.
▶ (844) **Sarah E Iveson**, University of Michigan (1003-05-1259)
- 10:00AM *On Maximal Ultimately Economical Subgraphs*. Preliminary report.
▶ (845) **Curtis Clark**, Morehouse College (1003-05-1261)
- 10:15AM *Strongly (t,r)-regular graphs*.
▶ (846) **Peter D Johnson***, Auburn University, **Robert E Jamison**, Clemson University, **Lisa Markus**, De Anza College, **Evan Morgan**, Louisiana State University, and **Emine Yazici**, Auburn University (1003-05-1280)
- 10:30AM *Counting Cycle-Free Finite Functions*. Preliminary report.
▶ (847) **Dennis P Walsh**, Middle Tennessee State University (1003-05-1296)
- 10:45AM *The distinguishing number of group actions*.
▶ (848) **Melody T. Chan**, Yale University (1003-05-1320)

AMS Session on Calculus of Variations and Operator Theory, II

8:00 AM – 10:40 AM

- 8:00AM *On Non-commutative L_p-spaces for real operator algebras of type III*.
(849) **Alexander A. Katz**, St. John's University, and **Sukhrat M. Usmanov***, North Dakota State University (1003-46-1342)
- 8:15AM *Ergodic Theorems for Skew Product for Actions of Finitely-generated Semi-groups on von Neumann Algebras*.
(850) **Genady Y. Grabarnik***, IBM T.J. Watson Research Center, **Alexander A. Katz**, St. John's University, and **Laura Schwartz**, University of South Africa (1003-46-1348)
- 8:30AM *Real Partially Ordered Monotone Complete *-Algebras and their Representations*.
(851) **Alexander A. Katz**, St. John's University (1003-46-1420)

- 8:45AM *On Projective Limits of Real and Jordan Operator Algebras*. Preliminary report.
(852) **Alexander A. Katz**, St. John's University, and **Oleg Friedman***, University of South Africa (1003-46-1436)
- 9:00AM *The impedance tomography problem*.
▶ (853) **Amin Boumenir**, State University of West Georgia (1003-47-55)
- 9:15AM *On the hyperinvariant subspace problem*.
(854) **Sami M. Hamid**, Texas A&M University (1003-47-1328)
- 9:30AM *Role of A-monotone mappings in nonlinear variational inclusion systems*. Preliminary report.
(855) **Ram U. Verma**, The University of Akron (1003-49-94)
- 9:45AM *Generalized variational principle. First Noether-type theorem*.
(856) **Bogdana A Georgieva***, Pacific University, and **Ronald Guenther**, Oregon State University (1003-49-1069)
- 10:00AM *Monge-Ampère equations, design of reflector systems and min cost flow problems: Theory and numerics*.
(857) **Tilmann Glimm**, Emory University (1003-49-1329)
- 10:15AM *A restricted lower semicontinuity problem with linear constraints*.
(858) **Daniel Vasiliiu*** and **Baisheng Yan**, Michigan State University (1003-49-1447)
- 10:30AM *Coupled Singular Perturbations for Phase Transitions*.
(859) **Irene Fonseca** and **Cristina Popovici***, Carnegie Mellon University (1003-49-61)

MAA Session on Teaching Visualization Skills, I

8:00 AM – 10:35 AM

- Organizers: **Mary L. Platt**, Salem State College
Catherine A. Gorini, Maharishi University of Management
Sarah J. Greenwald, Appalachian State University
- 8:00AM *The Importance of Technology-Free Visualization Activities*.
(860) **Tevean Dray*** and **Corinne A. Manogue**, Oregon State University (1003-N1-438)
- 8:20AM *Now See 'Ems. NO No See 'Ems*.
▶ (861) **Brian John Winkel**, U.S. Military Academy (1003-N1-30)
- 8:40AM *Assessment of Pedagogy and Perceived Effectiveness of Technology Use in Calculus III*.
(862) **P Gavin LaRose*** and **Zolt Lavicza**, The University of Michigan (1003-N1-753)
- 9:00AM *Visual and Kinesthetic Reasoning in Mathematics: Current Research*. Preliminary report.
▶ (863) **Walter J. Whiteley**, York University (1003-N1-270)
- 9:20AM *Spatial Visualization: Is There a Gender Difference?*
▶ (864) **Therese L. Bennett**, Southern Connecticut State University (1003-N1-676)
- 9:40AM *Visualization Activities in College Geometry*. Preliminary report.
▶ (865) **William E. Fenton***, Bellarmine University, and **Barbara E. Reynolds**, Cardinal Stritch University (1003-N1-334)
- 10:00AM *Visualizing Linear Algebra with Geometer's Sketchpad: Linear Transformations, Determinants, Eigenvectors, and Eigenvalues*.
▶ (866) **Catherine A. Gorini**, Maharishi University of Management (1003-N1-279)

10:20AM *Visualizations in the Complex Plane with Sketchpad.*
 (867) **Nicholas R Jackiw**, KCP Technologies
 (1003-N1-663)

MAA Session on Teaching and Assessing Problem Solving

8:00 AM – 10:15 AM

Organizers: **Alex J. Heidenberg**, US Military Academy

Michael Huber, US Military Academy

8:00AM *Strategies for Designing Critical Thinking Lessons.*
 ► (868) Preliminary report.
Juli D'Ann Ratheal, West Texas A&M University
 (1003-O1-01)

8:20AM *Measuring the Process of Thinking in Problem Solving: The Use of MARC (Mathematical Reasoning and Communication) Scale.*
 (869) **Kyoko Suzuki**, The College of Engineering, Nihon University, Japan (1003-O1-1104)

8:40AM *Designing a Telescope Mirror.* Preliminary report.
 ► (870) **Richard J. Marchand***, Slippery Rock University, **Robert Rogers**, State University of New York at Fredonia, and **Andrew Parker**, University of New Hampshire (1003-O1-564)

9:00AM *Assessing the Effectiveness of a Problem-Solving Math Curriculum.*
 ► (871) **Howard D. McInvale**, U.S. Military Academy
 (1003-O1-497)

9:20AM *Beginning with a 21st Century View: Mathematical Modeling and Problem Solving with Interdisciplinary Applications in College Algebra.* Preliminary report.
 ► (872) **William P Fox*** and **Richard D West**, Francis Marion University (1003-O1-249)

9:40AM *Introducing Students to Problem Solving.*
 ► (873) Preliminary report.
Rachelle DeCoste and **Amy H. Lin***, United States Military Academy (1003-O1-689)

10:00AM *Teaching and Assessing Problem Solving in the Technology Age: A sharing of successes and failures.* Preliminary report.
 ► (874) **Alex J. Heidenberg*** and **Michael Huber**, United States Military Academy (1003-O1-1008)

MAA General Contributed Paper Session, IV

8:00 AM – 10:55 AM

Organizers: **Daniel E. Otero**, Xavier University
Michael A. Jones, Montclair State University
Thomas A. Hern, Bowling Green State University
Janice B. Walker, Xavier University

8:00AM *The National Curve Bank Project: A MATH Archive.*
 ► (875) **Shirley B. Gray***, California State University, Los Angeles, **Bill Austin**, University of Tennessee at Martin, and **Phillip E. Johnson**, Appalachian State University (1003-X1-157)

8:30AM *Egyptian Unit Fractions.*
 ► (876) **Barbara A Jur**, Macomb Community College
 (1003-X1-368)

8:45AM *Ptolemy's Construction of the Table of Chords and Its Uses in the Classroom.* Preliminary report.
 ► (877) **Semra Kilic-Bahi**, Colby-Sawyer College
 (1003-X1-620)

9:00AM *Ancient Chinese Approach to Proof in Mathematics.*
 ► (878) **Jean W Richard*** and **Nkechi M Agwu**, Borough of Manhattan Community College, City University of New York (1003-X1-346)

9:10AM Break.

9:30AM *Buzanjani: An Intriguing Person!* Preliminary report.
 ► (879) **Mohammad Moazzam**, Salisbury University
 (1003-X1-365)

9:45AM *Newton's proof that $a = v^2/r$.*
 ► (880) **Stacy G. Langton**, University of San Diego
 (1003-X1-288)

10:00AM *Believe It or Not: Some Mathematical Lies of Ripley.*
 ► (881) **Vince Schielack**, Texas A&M University
 (1003-X1-461)

10:15AM *What language of mathematical objects is most suitable for the discussion of limits: real numbers, infinitesimals, or something else?*
 (882) **Frank Swenton**, Middlebury College / Princeton University (1003-X1-1435)

10:30AM *Native American-based Materials for Undergraduate Mathematics Courses.*
 ► (883) **Charles Peter Funkhouser***, California State University Fullerton, and **A. Duane Porter**, University of Wyoming (1003-X1-209)

10:45AM *Classification of Patterns in Botswana Baskets.*
 ► (884) Preliminary report.
Douglas E. Norton, Villanova University
 (1003-X1-1251)

PME Council

8:00 AM – 10:55 AM

AMS Special Session on Dynamics of Mapping Class Groups on Moduli Spaces, I

8:10 AM – 10:50 AM

Organizer: **Richard J. Brown**, American University

8:10AM *Deformation spaces of surface group representations.*
 (885) **William M. Goldman**, University of Maryland
 (1003-22-653)

9:00AM *The pentagonal equation and representations of the mapping class group of a punctured surface.*
 (886) **R Kashaev**, Université de Genève (1003-58-1305)

9:30AM *Commensurations of the Johnson kernel.*
 (887) **Tara E. Brendle***, Cornell University, and **Dan Margalit**, University of Utah (1003-51-1162)

10:00AM *Proper actions of the mapping class group and the energy of harmonic maps.*
 (888) **William M. Goldman**, University of Maryland, and **Richard A Wentworth***, Johns Hopkins University
 (1003-57-1117)

10:30AM *Integrating on the SU(3)-character variety of a surface group.*
 (889) **Charles Frohman***, The University of Iowa, and **Kathy Zhong**, Sacramento State University
 (1003-57-909)

AMS Session on Statistics, Numerical Analysis, I

8:15 AM – 10:25 AM

8:15AM *Numerical effects in the modeling and simulation of chemotaxis in biological reaction-diffusion systems.*
 (890) **A. L. Pardhanani***, **D. Pinto**, **A. J. Staelens** and **G. F. Carey**, Institute for Computational Engr. & Sciences, The University of Texas at Austin (1003-65-138)

- 8:30AM *Operator Splitting Methods for Convection Dominated Reaction-Diffusion Equations.* Preliminary report.
▶ (891) **Jiangguo Liu***, Texas A&M University, **Juergen Geiser**, Weierstrass Institute for Applied Analysis and Stochastics, and **Richard E. Ewing**, Texas A&M University (1003-65-107)
- 8:45AM *On the Rate of Convergence of Finite-difference Approximations for Bellman Equations with Constant Coefficients.*
(892) **Hongjie Dong*** and **Nicolai V. Krylov**, University of Minnesota, Twin Cities (1003-65-631)
- 9:00AM *Numerical Approximations of Stochastic Differential Equation and its Application to Mathematical Neurosciences.*
(893) **M. Mahbubur Rahman**, Arizona State University (1003-65-748)
- 9:15AM *A high-frequency integral equation method for electromagnetic and acoustic scattering: rate of convergence of multiple-scattering iterations.*
(894) **Fatih Ecevit*** and **Fernando Reitich**, University of Minnesota (1003-65-999)
- 9:30AM *An Optimal Explicit Method for Solving Reaction-Diffusion-Chemotaxis Systems.*
▶ (895) **ChiChia Chiu** and **Jui-Ling Yu***, Michigan State University (1003-65-1262)
- 9:45AM *An Efficient High-Order Solver for Scattering by "Thin Structures".* Preliminary report.
(896) **Akash Anand**, University of Minnesota (1003-65-1468)
- 10:00AM *Level Set method for a Surfactant Problem.*
(897) **Jian-Jun Xu***, Pacific Institute of Mathematical Sciences and Simon Fraser University, **Zhilin Li**, North Carolina State University, **John Lowengrub**, University of California at Irvine, and **Hongkai Zhao**, University of California at Irvine (1003-65-1485)
- 10:15AM *Improving Regression Function Estimators.*
(898) **Ali Khoujmane**, Texas Tech University (1003-62-1687)

MAA Session on Environmental Mathematics and the Interdisciplinary

8:15 AM – 10:55 AM

Organizers: **Karen D. Bolinger**, Clarion University
Ben A. Fusaro, Florida State University
William D. Stone, New Mexico Institute of Mining & Technology

- 8:15AM *A Modified Discrete SIR Model.*
▶ (899) **Jennifer M. Switkes**, California State Polytechnic University, Pomona (1003-M1-207)
- 8:30AM *Raccoons Gone Mad! – Modeling an Epidemic of Raccoon Rabies.* Preliminary report.
▶ (900) **Andrew E. Long**, Northern Kentucky University (1003-M1-635)
- 8:45AM *Stochastic Models of Species in a Connected Three Patch System.*
▶ (901) **Boris Efroimskiy***, Boston University, and **Jennifer Hanley**, Bates College (1003-M1-359)
- 9:00AM *Problem-based Inquiry Seminar in Environmental Mathematics.* Preliminary report.
▶ (902) **Linda L Eroh*** and **Maureen Muldoon**, University of Wisconsin Oshkosh (1003-M1-626)
- 9:15AM *FAU's "Parknership" with the Florida Park Service.* Preliminary report.
▶ (903) **Stephanie Fitchett***, **Jon Moore**, Florida Atlantic University, and **Hank Smith**, Florida Park Service and Florida Atlantic University (1003-M1-621)

- 9:30AM *Connecting Current Environmental Science Research to Grade 7–14 Mathematics Classrooms.*
▶ (904) **Jane F. Schielack**, Texas A&M University (1003-M1-455)
- 9:45AM Break
- 10:00AM *Environmental Mathematics Topics for Liberal Arts Majors.*
(905) **Rene A. Salinas**, Appalachian State University (1003-M1-688)
- 10:15AM *Community-based Projects for Environmental Mathematics.*
▶ (906) **Catherine A Roberts**, College of the Holy Cross (1003-M1-51)
- 10:30AM *Use of Principal Component Analysis in Fingerprinting Ambient Air—Research with Undergraduate Students.* Preliminary report.
▶ (907) **Umesh P Nagarkatte***, Medgar Evers College (CUNY), and **Wilbert Hope**, Medgar Evers College (CUNY) (1003-M1-1377)
- 10:45AM *Limits to Growth as a Venue for Learning Modeling.*
▶ (908) Preliminary report.
Frank Wattenberg, United States Military Academy, West Point, NY (1003-M1-1220)

Employment Center

8:15 AM – 7:30 PM

AMS Special Session on Inverse Spectral Geometry, I

8:30 AM – 10:50 AM

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

- 8:30AM *Schrödinger operators with complex-valued potentials and no resonances.*
(909) **T. Christiansen**, University of Missouri (1003-35-778)
- 9:00AM *Resolvent and scattering theory on asymptotically hyperbolic manifolds.*
(910) **Colin Guillarmou**, Purdue University (1003-58-1060)
- 9:30AM *Cramer's formula on Heisenberg manifolds.*
(911) **Mahta Khosravi**, McGill University (1003-58-1166)
- 10:00AM *Spectral stability of symmetric spaces.*
(912) **Harold G. Donnelly**, Purdue University (1003-58-173)
- 10:30AM *Isospectral Metrics and Potentials on Classical Compact Simple Lie Groups.*
(913) **Emily Proctor**, Swarthmore College (1003-53-1273)

MAA Session on Using Real-World Data to Illustrate Statistical Concepts, II

8:30 AM – 10:55 AM

- Organizers: **Thomas L. Moore**, Grinnell College
John D. McKenzie, Jr., Babson College
- 8:30AM *Data Mining in the Undergraduate Curriculum.*
▶ (914) Preliminary report.
Tasha R. Inniss, Spelman College (1003-L1-1647)
- 8:45AM *Used Car Regressions.*
▶ (915) **Robin H Lock**, St. Lawrence University (1003-L1-1449)
- 9:00AM *Two Student Projects which Promote the Exploration of Experimental Design and Inference.*
▶ (916) **Daniel J. O'Loughlin**, College of St. Catherine (1003-L1-216)

- 9:15AM *Pizza and the Facts About Linear Regression.*
▶ (917) **Murray H. Siegel**, Governor's School for Science & Mathematics (1003-L1-88)
- 9:30AM *A.A. Michelson's Measurement of the Speed of Light 1879.*
(918) **Gary O. Fowler**, U.S. Naval Academy (1003-L1-1433)
- 9:45AM *An Integrated Approach to Teaching with Real Data.*
▶ (919) **Sarah Knapp Abramowitz***, Drew University, and **Sharon Lawner Weinberg**, New York University (1003-L1-1666)
- 10:00AM *Real Life and the Statistics in You.*
▶ (920) **Sarah L. Mabrouk**, Framingham State College (1003-L1-1100)
- 10:15AM *Power Outage Data for the Statistics Classroom.*
▶ (921) **Elaine Thompson Hale**, The University of Texas at Austin (1003-L1-588)
- 10:30AM *Using Bureau of Economic Analysis Data in the Statistics Classroom.*
(922) **J Travis Hale**, Lyndon Baines Johnson School of Public Affairs, University of Texas at Austin (1003-L1-1151)
- 10:45AM *Introducing Hypothesis Testing Using Employment Discrimination Cases. Preliminary report.*
▶ (923) **Suzanne E. Tourville**, Columbia College (Missouri) (1003-L1-1563)

Joseph A. Gallian, University of Minnesota, Duluth

MAA Minicourse #1: Part B

9:00 AM – 11:00 AM

Visual linear algebra.

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

MAA Minicourse #7: Part B

9:00 AM – 11:00 AM

Developing your department's assessment plan.

Organizers: **William A. Marion**, Valparaiso University
Bonnie Gold, Monmouth University

AMS Invited Address

9:00 AM – 9:50 AM

- (924) *Travel time tomography, boundary rigidity, and the Dirichlet-to-Neumann map.*
Gunther Uhlmann, University of Washington (1003-35-09)

ASL Invited Address

9:00 AM – 9:50 AM

- (925) *Partition theorems and computability theory.*
Joseph R. Mileti, University of Chicago

AMS Special Session on Spaces of Vector-Valued Functions, I

9:00 AM – 11:00 AM

Organizers: **Terje Høim**, Florida Atlantic University
David A. Robbins, Trinity College

- 9:00AM *Some problems on vector-valued functions.*
(926) Preliminary report.
Joe Diestel, Kent State University (1003-46-23)
- 10:00AM *The Radon-Nikodym property for the projective tensor product of Köthe function spaces.*
(927) **Qingying Bu***, University of Mississippi, and **Pei-Kee Lin**, University of Memphis (1003-46-99)
- 10:30AM *Tensor Products and Dunford-Pettis Sets.*
(928) **Ioana Ghenciu***, University of Wisconsin at River Falls, and **Paul Lewis**, University of North Texas (1003-46-108)

MAA Minicourse #12: Part B

9:00 AM – 11:00 AM

Getting students involved in undergraduate research.

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

AMS Session on Algebraic Structures

9:00 AM – 10:40 AM

- 9:00AM *The Fractional Weak Discrepancy of a Partially Ordered Set.*
▶ (929) **Alan Shuchat***, **Randy Shull** and **Ann N. Trenk**, Wellesley College (1003-06-1628)
- 9:15AM *Symplectic Maps and Generalizations of the Toda Lattice.*
(930) **Michelle R DeDeo***, Univ. of North Florida, and **Elinor Velasquez**, San Francisco, CA (1003-06-1662)
- 9:30AM *On Stone's Representation Theorem For Boolean Algebras.* Preliminary report.
(931) **Jason D Holland**, Abilene Christian University (1003-06-219)
- 9:45AM *Partially ordered groups acting on oriented order trees.*
(932) **Matthew E. Horak*** and **Melanie Stein**, Trinity College (1003-06-478)
- 10:00AM *Pascal's Grey Scale.*
(933) **Avery S Zoch**, Devry University (1003-06-607)
- 10:15AM *Breadth and the Classical Convexity Numbers for Two-path Convexity in Multipartite Tournaments.*
(934) **Darren B. Parker**, University of Dayton, **Randy F. Westhoff*** and **Marty J. Wolf**, Bemidji State University (1003-06-992)
- 10:30AM *Knot Invariants Derived from Yang-Baxter Operators Associated to Algebra Structures.*
(935) **Gwenael Massuyeau**, Institute of Mathematics of the Romanian Academy, and **Florin Felix Nichita***, University of Wales Swansea (1003-17-1535)

Blumenthal Session

9:00 AM – 9:45 AM

- 9:00AM *Counting field extensions of the rational numbers.*
(936) **Manjul Bhargava**, Princeton University (1003-11-1726)

MAA Committee on the Profession Panel Discussion

9:00 AM – 10:20 AM

Long-term mathematics faculty outside of the tenure track: Possibilities, pitfalls, and practicalities.

Organizer: **David J. Lutzer**, College of William and Mary
 Panelists: **Susan C. Geller**, Texas A&M University
Joel K. Haack, University of Northern Iowa
David R. Morrison, Duke University
David J. Lutzer

MAA Special Presentation

9:00 AM – 10:55 AM

Using mathematically rich activities to develop K-12 curricula: Part I.

Organizers: **Robert P. Moses**, Cambridge, MA
Robert E. Megginson, Mathematical Sciences Research Institute
Ed Dubinsky, Kent State University
 Presenters: **Gregory M. Budzban**, Southern Illinois University
Robert P. Moses
David W. Henderson, Cornell University
William G. McCallum, University of Arizona
Ed Dubinsky

MAA Special Presentation

9:00 AM – 10:20 AM

Session for Chairs: Using the CUPM Curriculum Guide 2004 curricula and pedagogy in the 'right' direction.

Organizers: **Daniel P. Maki**, Indiana University
Catherine M. Murphy, Purdue University Calumet
 Presenters: **David M. Bressound**, Macalester University
Amy Cohen, Rutgers University

MAA Special Presentation

9:00 AM – 10:20 AM

Proposal writing workshop for grant applications to the NSF division of undergraduate education.

Organizers: **John R. Haddock**, NSF/Division of Undergraduate Education
Elizabeth J. Teles, NSF/Division of Undergraduate Education
Lee L. Zia, NSF/Division of Undergraduate Education

MAA-SUMMA Panel Discussion

9:00 AM – 10:30 AM

MAA student research programs.

Organizers: **William Hawkins, Jr.**, MAA and the University of the District of Columbia
Robert E. Megginson, MSRI and the University of Michigan

Panelists: **Nathaniel Dean**, Texas Southern University
David L. Housman, Goshen College

MAA Committee on the Participation of Women—Women and Mathematics Network Poster Session

9:00 AM – 10:55 AM

Special programs and strategies to reach underrepresented populations.

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

AMS-NSF Dramatic Presentation

9:30 AM – 10:55 AM

"The Panel": A one-act play based on actual events at the NSF Division of Mathematical Sciences.

Moderator: **William Rundell**, National Science Foundation

AMS Workshop

9:30 AM – 10:55 AM

T.A. development using case studies: A workshop for faculty (Part 1).

Organizer: **Solomon Friedberg**, Boston University

Morgan Prize Session

10:00 AM – 10:55 AM

- 10:00AM *Packing densities of patterns.*
 ▶ (937) **Reid W. Barton**, Massachusetts Institute of Technology (1003-05-1016)
- 10:30AM *Random Cayley Graphs and the Second Eigenvalue Problem.*
 ▶ (938) **Po-Shen Loh***, University of Cambridge, and **Leonard J Schulman**, California Institute of Technology (1003-05-1164)

Math on the Web, III

10:00 AM – 5:00 PM

- 10:00AM *Simulating Instructor Grading in Web-based Tutoring and Assessment.*
 (939) **Don DeLand**, Integre Technical Publishing
- 12:30PM *Student Answers to Math Homework on the Web Using Proper Mathematical Notation: A Scalable, Universal Approach.*
 (940) **John Risley**, WebAssign
- 1:30PM *Math-aware Web Searching.*
 (941) **Robert Miner**, Design Science Inc
- 2:30PM *Math on the Web Using techexplorer.*
 (942) **Sam Dooley**, Integre Technical Publishing
- 3:30PM *Applications that use MathML.*
 (943) **Neil Soiffer**, Design Science Inc
- 4:30PM *Writing Questions with Randomized Parameters in Proper Mathematical Notation for Online Homework Assignments.*
 (944) **John Risley**, WebAssign

Exhibits and Book Sales

10:00 AM – 6:00 PM

AMS Invited Address

10:05 AM – 10:55 AM

- (945) *Random Complex Geometry, or How to count universes in string theory.*
Steven M. Zelditch, Johns Hopkins University (1003-32-04)

ASL Invited Address

10:05 AM – 10:55 AM

- (946) *A survey of excellence.*
Olivier Lessman, University of Oxford

AMS-MAA Invited Address

11:10 AM – NOON

- (947) *Algebraic statistics.*
Bernd Sturmfels, University of California Berkeley (1003-62-19)

AMS Colloquium Lectures: Lecture III

1:00 PM – 2:00 PM

- (948) *How polynomials vanish: Singularities, integrals, and ideals, Part III: Global applications of multiplier ideals.*
Robert K. Lazarsfeld, University of Michigan (1003-14-07)

MAA Student Lecture

1:00 PM – 1:50 PM

- (949) *Victorian combinatorics.*
Robin J. Wilson, The Open University (1003-A0-15)

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

1:00 PM – 5:50 PM

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

- 1:00PM (950) *Double Bubbles in Spheres of High Dimension.* Preliminary report.
▶ **Ivan Corwin**, **Stephanie Hurder**, Harvard University, **Vojislav Sesum*** and **Ya Xu**, Williams College (1003-53-312)
- 1:30PM (951) *Variable Surface Tension and Contact Angle in Microfluidics.*
▶ **Theodore J Dziuba*** and **David S. Ross**, Rochester Institute of Technology (1003-76-1160)
- 2:00PM (952) *Threshold and Complexity Results for Cover Pebbling.*
▶ **Nathaniel Watson***, Washington University, **Cary Yerger**, Harvey Mudd College, and **Anant Godbole**, East Tennessee State University (1003-05-1681)
- 2:30PM (953) *(p,k) and Optimal Pebbling Numbers of Diameter Three Graphs.*
▶ **Kelly J VanOchten**, Central Michigan University (1003-00-103)

- 3:00PM (954) *Conditions for weighted cover pebbling of graphs.* Preliminary report.
▶ **Annalies Vuong***, University of California, Santa Barbara, and **Ian Wyckoff**, Arizona State University (1003-05-724)
- 3:30PM (955) *Model Development and Analysis of the 2001 Meningococcal Meningitis Disease Epidemic of the African Meningitis Belt.*
▶ **Julia Bethel*** and **Patricia Clark**, Rochester Institute of Technology (1003-92-985)
- 4:00PM (956) *Minimum Rank of Positive Semi-Definite Matrices with a Prescribed Graph.*
▶ **Margaret Lay***, Grinnell College, **Amanda M Pascoe**, Furman University, and **Ben Harris**, Brown University (1003-15-69)
- 4:30PM (957) *Stoichiometric Tumor Model: Phosphorus Flow.*
▶ **Bo Deng**, University of Nebraska at Lincoln, **Vladimir V Ufimtsev**, University of Nebraska at Omaha, and **Melissa Wilson***, Creighton University (1003-92-187)
- 5:00PM (958) *What's a quasi π -group?*
▶ **Jesse M. Pratt**, Northern Kentucky University (1003-20-85)
- 5:30PM (959) *Tornado sequences and $\Delta u = u^{-\alpha}$ for $0 < \alpha$.*
▶ **Peter M Luthy***, Connecticut College, **Alex Meadows**, Cornell University, **Phillip Whitman**, University of Texas, Austin, and **Frances Hammock**, University of California, Berkeley (1003-35-110)

AMS-MAA Special Session on History of Mathematics, I

1:00 PM – 5:50 PM

Organizers: **Joseph W. Dauben**, Lehman College (CUNY)
Patti Hunter, Westmont College
Karen H. Parshall, University of Virginia

- 1:00PM (960) *Hard mathematics in the medieval Islamic tradition: al-Mahani's treatise on ratio theory.*
▶ **Jan P Hogendijk**, Universities of Utrecht and Leiden, Netherlands (1003-01-920)
- 1:30PM (961) *The Latin tradition of Thabit ibn Qurrah's Treatise on the secant figure.*
▶ **Eberhard Heinrich Knobloch**, Berlin University of Technology (1003-01-313)
- 2:00PM (962) *Transmission and impact of mathematical tables.*
▶ **Kim Plofker**, University of Utrecht, IIAS Leiden, Netherlands (1003-01-1005)
- 2:30PM (963) *European Mathematics in the New Spain, 1521–1821: A survey conducted in the Biblioteca Cervantina (Monterrey, Mexico).*
Jose A. Cervera, Instituto Tecnológico y de Estudios Superiores de Monterrey, Campus Monterrey (1003-01-1459)
- 3:00PM (964) *Mathematical Instrumentalism in Pre-Copernican Astronomy.* Preliminary report.
▶ **Craig Graham Fraser**, University of Toronto (1003-01-701)
- 3:30PM (965) *Matrices without numbers.*
▶ **Anthony J. Crilly**, Middlesex University (1003-01-900)
- 4:00PM (966) *The Weierstrass-Schwarz Correspondence.* Preliminary report.
▶ **Ruediger Thiele**, University of Leipzig (1003-01-1119)

- 4:30PM *Georg Cantor, the founder of set theory, in contact with Catholic theologians of his time.*
 ▶ (967) **Christian Tapp**, Lehrstuhl fuer Geschichte der Naturwissenschaften, Munich University, Germany (1003-01-557)
- 5:00PM *Aspects of the Reception of Fredholm's Work on Integral Equations in France and Italy.* Preliminary report.
 ▶ (968) **Thomas Archibald***, Acadia University and Dibner Institute, MIT, and **Rossana Tazzioli**, University of Catania, Italy (1003-01-342)
- 5:30PM *"The dramatic episode of Sundman": the changing fortunes of a mathematical result.* Preliminary report.
 ▶ (969) **June Barrow-Green**, The Open University, UK (1003-01-213)

AMS-SIAM Special Session on Recent Advances in Mathematical Ecology, II

1:00 PM – 5:50 PM

Organizers: **Semen Koksai**, Florida Institute of Technology
Sebastian Schreiber, The College of William and Mary
Robert van Woesik, Florida Institute of Technology

- 1:00PM *Appropriate Models for the Management of Infectious Diseases.*
 (970) **Pej Rohani*** and **Helen Wearing**, Institute of Ecology, University of Georgia (1003-92-1260)
- 1:30PM *Thermal stress, coral-bleaching susceptibility, and modeling population response.*
 (971) **Robert van Woesik** and **Semen Koksai***, Florida Institute of Technology (1003-92-1640)
- 2:00PM *Optimal Control of a Metapopulation Model for Bears.*
 (972) **Suzanne Lenhart***, University of Tennessee, **Rene Salinas**, Appalachian State University, and **Louis Gross**, University of Tennessee (1003-49-500)
- 2:30PM *Mixed dispersal strategies and spatial structure.* Preliminary report.
 ▶ (973) **Jeffrey D Achter*** and **Colleen T Webb**, Colorado State University (1003-92-125)
- 3:00PM *Optimal Control of an Integro-difference Model for Gypsy Moths.*
 ▶ (974) **Andrew J Whittle***, **Suzanne Lenhart**, University of Tennessee, and **K. A.J. White**, University of Bath (1003-92-1183)
- 3:30PM *Coevolutionary arms races between bacteria and bacteriophage.*
 ▶ (975) **Joshua S Weitz***, Department of Ecology and Evolutionary Biology, Princeton University, **Hyman Hartman**, Department of Biology, Massachusetts Institute of Technology, and **Simon A Levin**, Department of Ecology and Evolutionary Biology, Princeton University (1003-92-1523)
- 4:00PM *Valuing the Agricultural Pest Control Service Provided by Brazilian Free-tailed Bats (*Tadarida brasiliensis*) in South Texas through mathematical models.* Preliminary report.
 ▶ (976) **Paula Federico***, University of Tennessee, **A. Nelly Correa-Sandoval**, ITESM, Monterrey, Mexico, **William E. Grant**, Texas A&M University, College Station, TX, and **Thomas G. Hallam**, University of Tennessee, Knoxville, TN (1003-92-1193)
- 4:30PM *Modelling morphogenesis of a branching coral.*
 (977) **Jaap A. Kaandorp**, Section Computational Science, University of Amsterdam (1003-92-1378)

- 5:00PM *The role of interactions between nonlinearities and fluctuations in population and community dynamics.*
 ▶ (978) **Peter Chesson**, University of California (1003-92-1007)
- 5:30PM *How the diversity of seed dormancy cycles contributes to the coexistence of desert winter annuals.*
 ▶ (979) **Andrea Mathias*** and **Peter Chesson**, University of California, Davis (1003-92-1661)

AMS-SIAM Special Session on Reaction Diffusion Equations and Applications, II

1:00 PM – 5:50 PM

Organizers: **Xu-Yan Chen**, Georgia Institute of Technology
Yuanwei Qi, University of Central Florida
Junping Shi, The College of William and Mary
Ratnasingham Shivaji, Mississippi State University

- 1:00PM *On A Nonlocal Phase-Field System.*
 (980) **Peter W Bates***, **Jianlong Han** and **Guangyu Zhao**, Michigan State University (1003-35-1235)
- 1:30PM *The Neumann boundary problem for a Nonlocal Cahn-Hilliard equation.*
 (981) **Peter W. Bates**, Michigan State University, and **Jianlong Han***, Michigan State University (1003-35-968)
- 2:00PM *Thermodynamic Stability of Closed and Open Reaction Diffusion Systems of Turing.*
 (982) **Hong Qian**, University of Washington (1003-35-1297)
- 2:30PM *Pattern formation in nonlinear chemical reaction systems.*
 (983) **Wei-Ming Ni**, University of Minnesota, and **Moxun Tang***, Michigan State University (1003-92-1473)
- 3:00PM *Coexistence and stability of solutions for a class of reaction-diffusion equations.*
 (984) **Zhenbu Zhang**, Jackson State University (1003-35-901)
- 3:30PM *A Nonstandard Finite Difference Scheme for Coupled Nonlinear PDE's Modeling Heat Transport.*
 (985) **Ronald E Mickens**, Clark Atlanta University (1003-35-253)
- 4:00PM *Mathematical Analysis for a Problem from Stress Driven Diffusion.* Preliminary report.
 (986) **W Xie**, Cal Poly Pomona (1003-35-1649)
- 4:30PM *The Universality of Chemical Reaction Systems with Critical Nonlinearity.*
 (987) **Yuanwei Qi**, University of Central Florida (1003-35-883)
- 5:00PM *Isothermal Balls in an autocatalytic chemical reaction.* Preliminary report.
 (988) **Junping Shi***, College of William and Mary, and **Xuefeng Wang**, Tulane University (1003-35-1424)
- 5:30PM *Periodic Pattern formation in the Gray-Scott model.*
 (989) **Jin-guo Lian**, University of Alabama at Birmingham (1003-35-1694)

AMS Special Session on Algebraic Geometry Codes

1:00 PM – 5:50 PM

Organizers: **Shuhong Gao**, Clemson University
Gretchen L. Matthews, Clemson University

- 1:00PM *Pseudo-codewords of cycle codes via zeta functions.*
(990) **Ralf Koetter**, Coordinated Science Lab, University of Illinois, Urbana, **Wen-Ching Winnie Li***, Penn State University, University Park, **Pascal O. Vontobel**, University of Wisconsin, Madison, and **Judy L. Walker**, University of Nebraska, Lincoln (1003-94-738)
- 1:30PM *New (Explicit) Constructions of Asymptotic Families of Constant Degree Expander Graphs from Algebraic Geometric (AG) Codes and Their Applications to Tanner Codes.*
(991) **Heeralal Janwa**, Courant Institute/University of Puerto Rico (1003-94-1248)
- 2:00PM *Interplay between moduli theory and algebraic geometry codes.* Preliminary report.
(992) **Vinay K Deolalikar**, Hewlett Packard Labs (1003-14-865)
- 2:30PM *A Generalized Floor Bound on the Minimum Distance of Geometric Goppa Codes.* Preliminary report.
(993) **Jason G McCullough*** and **Benjamin Lundell**, University of Illinois at Urbana-Champaign (1003-14-1319)
- 3:00PM *Explicit constructions of algebraic geometric codes.*
(994) **Hiren Maharaj**, Clemson University (1003-14-1152)
- 3:30PM *Automorphism groups of some AG codes and curves.*
(995) **D Joyner***, US Naval Academy, and **A Ksir**, US Naval Academy (1003-14-758)
- 4:00PM *Using vector bundles to investigate limits on the list decodability of AG codes.* Preliminary report.
(996) **Drue Coles**, Bloomsburg University (1003-14-1218)
- 4:30PM *Affine Variety Codes from Generalized C_{ab} Curves.* Preliminary report.
(997) **Gary L. Salazar**, Trinity University (1003-14-267)
- 5:00PM *Error-correcting codes on low rank surfaces.*
(998) **Marcos Zarzar**, University of Texas at Austin (1003-11-1492)
- 5:30PM *A Polynomial Method for Algebraic Geometry Codes.*
(999) **Jeffrey B. Farr***, Simon Fraser University, **Shuhong Gao** and **Daniel L. Noneaker**, Clemson University (1003-94-1349)

AMS Special Session on Mathematicians' Work on Mathematics Education

1:00 PM – 5:55 PM

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

- 1:00PM *Teaching 6th Grade Mathematics.* Preliminary report.
(1000) **Sybilla Beckmann**, University of Georgia (1003-97-1074)
- ▶ (1001) *Elementary Measurement and Geometry for Teachers.* Preliminary report.
Scott Baldrige*, Louisiana State University, and **Thomas H Parker**, Michigan State University (1003-97-766)
- ▶ (1002) *Focus on Mathematics.*
Glenn Stevens, Boston University (1003-97-1576)
- ▶ (1003) *Professional development programs for elementary mathematics teachers—a content perspective.* Preliminary report.
Harvey B Keynes*, Univ of Minnesota, and **Michael S Keynes**, Purdue University Calumet (1003-97-302)
- ▶ (1004) *The challenges in designing of a good school mathematics curriculum.* Preliminary report.
Alan C Tucker, SUNY-Stony Brook (1003-97-275)

- ▶ (1005) *Japanese lesson study.*
Maria S. Nogin, California State University, Fresno (1003-K1-1543)
- ▶ (1006) *Studies of Math College Admission Criteria and College Credit for High School Calculus.*
Estela A. Gavosto, University of Kansas (1003-97-1340)
- ▶ (1007) *The effect of mathematics for general education on student attitudes towards math.* Preliminary report.
Tim Hsu, San Jose State University (1003-97-180)
- ▶ (1008) *Surviving the Bridge Project.* Preliminary report.
Tevian Dray*, Oregon State University, and **Corinne A Manogue**, Oregon State University (1003-97-1476)
- ▶ (1009) *An Undergraduate Course in Symmetry and Finite Groups.* Preliminary report.
Lisa A Mantini, Oklahoma State University (1003-20-1177)
- ▶ (1010) *Motivating Undergraduates with Different Backgrounds to do Mathematics Research.* Preliminary report.
Manmohan Kaur, Benedictine University (1003-97-459)
- ▶ (1011) *Building WeBWork.* Preliminary report.
Michael E. Gage, University of Rochester (1003-97-1393)
- ▶ (1012) *Computer-based learning in the Virginia Tech Math Emporium.*
Frank S. Quinn, Virginia Tech (1003-97-190)
- ▶ (1013) *Teaching mathematics backwards.* Preliminary report.
J. Jerry Uhl, Univ of Illinois at Urbana-Champaign (1003-97-265)
- ▶ (1014) *Case studies for mathematics graduate students: Development, Evaluation, and Dissemination.*
Solomon Friedberg, Boston College (1003-97-155)

AMS Special Session on Current Events

1:00 PM – 5:45 PM

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

Each talk will be presented in two twenty-minute parts with a five-minute break.

- ▶ (1015) *The Green-Tao Theorem on primes in arithmetic progression: a dynamical point of view.*
Bryna Kra, Northwestern University (1003-11-1422)
- ▶ (1016) *Achieving the Shannon Limit: A Progress Report.*
Robert McEliece, California Institute of Technology (1003-94-1721)
- ▶ (1017) *Floer Theory and Low Dimensional Topology.*
Dusa McDuff, SUNY at Stony Brook (1003-57-1692)
- ▶ (1018) *New Methods in Celestial Mechanics and Mission Design.*
Jerrold E. Marsden* and **Shane D Ross**, California Institute of Technology (1003-37-1230)
- ▶ (1019) *Graph Minors and the proof of Wagner's Conjecture.*
László Lovász, Microsoft Corporation (1003-05-1691)

AMS Special Session on Mathematics and Mathematics Education in Fiber Arts

1:00 PM – 5:50 PM

Organizers: **Sarah-Marie Belcastro**, Xavier University

Carolyn A. Yackel, Mercer University

- ▶ 1:00PM (1020) *An Overview of Mathematics in Fiber Arts, with an Attempt to Answer an Age-Old Question.*
Sarah-Marie Belcastro, Xavier University (1003-00-1284)
- ▶ 1:30PM (1021) *Symmetries in Cross-Stitch.*
Mary D Shepherd, Northwest Missouri State University (1003-00-840)
- ▶ 2:00PM (1022) *The graph theory of Blackwork embroidery.*
Joshua Holden*, Rose-Hulman Institute of Technology, and **Lana Holden**, Brazil, IN (1003-00-517)
- ▶ 2:30PM (1023) *Experiencing and Learning Hyperbolic Geometry from Crocheted Models.*
Daina Taimina, Cornell University (1003-97-520)
- ▶ 3:00PM (1024) *Quilts in the Classroom.* Preliminary report.
Amy F. Szczepański, University of Tennessee, Knoxville (1003-97-387)
- ▶ 3:15PM (1025) *Fortunatus's Purse.*
Susan Goldstine, St. Mary's College of Maryland (1003-00-1279)
- ▶ 3:30PM (1026) *The Sierpinski Variations: Self-Similar Crochet.* Preliminary report.
D. Jacob Wildstrom, University of California, San Diego (1003-37-773)
- ▶ 4:15PM (1027) *Cable patterns in Aran knitting, and braid groups.* Preliminary report.
Sharon M Frechette, College of the Holy Cross (1003-20-1345)
- ▶ 4:30PM (1028) *Picking up stitches.*
Lana Holden*, Brazil, IN, and **Joshua Holden**, Rose-Hulman Institute of Technology (1003-00-518)
- ▶ 5:00PM (1029) *Braid groups and knitting.*
Daniel C Isaksen, Wayne State University (1003-55-577)
- ▶ 5:30PM (1030) *Realizing Algebraic Structures Through Knitting.* Preliminary report.
Carolyn A. Yackel, Mercer University (1003-08-954)

AMS Special Session on Spaces of Vector-Valued Functions, II

1:00 PM – 4:20 PM

Organizers: **Terje Høim**, Florida Atlantic University
David A. Robbins, Trinity College

- ▶ 1:00PM (1031) *Isomorphic Embeddings and Strongly Additive Measures.*
Paul Lewis, University of North Texas, and **Kimberly Muller***, Lake Superior State University (1003-46-105)
- ▶ 1:30PM (1032) *Extreme operators on continuous vector-valued function spaces (preliminary report).* Preliminary report.
Hasan Al-Halees, Saginaw Valley State University, and **Richard J. Fleming***, Central Michigan University (1003-46-114)
- ▶ 2:00PM (1033) *Embedding ℓ_∞ into the Space of all Operators on Certain Banach Spaces.* Preliminary report.
G. Androulakis, **K. Beanland**, **F. Sanacory*** and **S. J. Dilworth**, University of South Carolina (1003-46-948)
- ▶ 2:30PM (1034) *Embedding ℓ_∞ into the Dual Space of Nuclear Operators on Certain Banach Spaces.* Preliminary report.
G. Androulakis, **K. Beanland***, **S. J. Dilworth** and **F. Sanacory**, University of South Carolina (1003-46-952)

- ▶ 3:00PM (1035) *Some remarks about the invariant subspace problem.* Preliminary report.
George Androulakis, University of South Carolina (1003-47-1430)
- ▶ 3:30PM (1036) *Nuclear operators: Grothendieck's theorem revisited.*
Eve Oja, University of Tartu (1003-46-113)
- ▶ 4:00PM (1037) *Analogues between $C(X, E)$ and section spaces of Banach bundles.*
Terje Hoim, Honors College, Florida Atlantic University, and **D. A. Robbins***, Trinity College (1003-46-340)

AMS Special Session on Topics in Geometric Function Theory, I

1:00 PM – 5:50 PM

Organizers: **Abdelkrim Farouk Brania**, Morehouse College
David A. Herron, University of Cincinnati
Shanshuang Yang, Emory University

- ▶ 1:00PM (1038) *On the dimension of p harmonic measure.*
John L Lewis* and **Bjorn Bennowitz**, University of Kentucky (1003-30-464)
- ▶ 1:30PM (1039) *L^p -Averaging Domains in Homogeneous Spaces.*
Susan G Staples, Texas Christian University (1003-30-580)
- ▶ 2:00PM (1040) *Boundary limits for bounded quasiregular mappings.*
Bao Qin Li and **Enrique Villamor***, Florida International University (1003-31-594)
- ▶ 2:30PM (1041) *Quasiregular gradient mappings and uniformly elliptic equations in the plane.* Preliminary report.
Albert Baernstein and **Leonid V. Kovalev***, Washington University in St. Louis (1003-30-628)
- ▶ 3:00PM (1042) *Smooth Quasiregular Maps with Branching in R^4 .*
Jang-Mei Wu*, **Robert Kaufman** and **Jeremy Tyson**, University of Illinois, Urbana (1003-30-961)
- ▶ 3:30PM (1043) *The quasiconformal homogeneity of hyperbolic manifolds.*
Petra Bonfert-Taylor*, Wesleyan University, **Richard Canary**, University of Michigan, **Gaven Martin**, University of Auckland, and **Edward C Taylor**, Wesleyan University (1003-30-960)
- ▶ 4:00PM (1044) *Bi-Lipschitz and quasisymmetric embeddings of hyperspaces.*
Jeremy T. Tyson, University of Illinois (1003-54-857)
- ▶ 4:30PM (1045) *Continuity of modulus and compactness of quasiconformal mappings in metric measure spaces.*
Xiaosheng Li, University of Minnesota, Morris (1003-30-855)
- ▶ 5:00PM (1046) *Metric properties of hyperbolic polar coordinates.* Preliminary report.
William Ma*, Pennsylvania College of Technology, and **David Minda**, University of Cincinnati (1003-30-215)
- ▶ 5:30PM (1047) *Geometry of Möbius-Invariant Metrics.*
Zair Ibragimov, University of Cincinnati (1003-30-804)

MAA Minicourse #16: Part B

1:00 PM – 3:00 PM

Music and mathematics.
Organizer: **Leon Harkleroad**, Wilton, ME

MAA Minicourse #2: Part B

1:00 PM – 3:00 PM

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

MAA Minicourse #8: Part B

1:00 PM – 3:00 PM

Mathematical finance.
Organizer: **Walter R. Stromquist**, Bryn Mawr College

AMS Session on Partial Differential Equations, I

1:00 PM – 5:55 PM

- 1:00PM (1048) *Forced Two Layer Beta-Plane Quasi-Geostrophic Flow Part I: Long-time Existence and Existence of Weak Solutions. Part II: Time and Space Analyticity.* **Constantin Onica**, Texas A&M University (1003-35-1272)
- ▶ 1:15PM (1049) *First order compatibility for reaction-diffusion equations.* **Danny Arrigo**, University of Central Arkansas (1003-35-1391)
- 1:30PM (1050) *Saddle point solutions of an Allen-Cahn type equation: a numerical investigation.* Preliminary report. **Regina Speicher**, University of Connecticut (1003-35-1456)
- 1:45PM (1051) *Mathematical Description of Multilayer Relaxation and Point Defects in Solids.* **Taras Odushkin*** and **Janos Turi**, University of Texas at Dallas (1003-35-224)
- 2:00PM (1052) *Mild Periodic Solutions for Evolutionary Type Equations.* Preliminary report. **Mircea Dan Voisei**, Tri-State University (1003-35-349)
- 2:15PM (1053) *Local Smoothing Property of Solutions for Nonlinear Schrödinger Equations with Potentials Superquadratic at Infinity.* Preliminary report. **Guoping Zhang*** and **Fengshan Liu**, Applied Mathematics Research Center, Delaware State University (1003-35-477)
- 2:30PM (1054) *On Transient Development of Water Waves over a Viscoelastic Ocean Bed.* **Dambaru D Bhatta*** and **Lokenath Debnath**, University of Texas-Pan American (1003-35-490)
- ▶ 2:45PM (1055) *Introduction to Partial Differential-Algebraic Equations.* Preliminary report. **Mark A. Pierson**, Virginia Tech (1003-35-539)
- 3:00PM (1056) *$W^{2,p}$ estimates of the heat equation in a domain $\bar{\Omega} \subset \mathbb{R}^n$ and their requirements on the regularity of $\partial\Omega$.* **Gavin J Waters**, University of Delaware (1003-35-540)
- 3:15PM (1057) *Generalized Quasilinearization Method with Numerical Application for Reaction Diffusion System.* Preliminary report. **Aghalaya S Vatsala** and **Jie Yang***, University of Louisiana at Lafayette (1003-35-660)
- 3:30PM (1058) *Analysis of the Paraxial Wave Equation: Part II.* Preliminary report. **Pete A McCoy*** and **Reza Malek-Madani**, U.S. Naval Academy (1003-35-836)

- 3:45PM (1059) *Some Eigenvalue Results for Certain Matrices Associated with Graphs.* **Kinnari R. Patel**, Georgia State University (1003-15-1244)
- 4:00PM (1060) *A parabolic-elliptic system with a variational inequality.* **Ming Fang***, Norfolk State University, and **Robert P Gilbert**, University of Delaware (1003-35-48)
- 4:15PM (1061) *Nonlinear Eigenvalue Problems.* **An H. Le**, University of Utah (1003-35-59)
- 4:30PM (1062) *Littlewood-Paley theory, Atomic decomposition and Schrödinger operators.* **Shijun Zheng**, Louisiana State University (1003-35-98)
- 4:45PM (1063) *Inverse Scattering Problem for the Schrödinger Operator with External Yang-Mills Potentials in Two Dimensions.* **Xiaosheng Li**, UCLA (1003-35-126)
- ▶ 5:00PM (1064) *N-pulses and an instability criterion in a class of nonlinearly coupled Schrödinger equations.* **Russell K. Jackson**, Boston University (1003-35-132)
- 5:15PM (1065) *Constraint-Preserving Boundary Conditions for Some Hyperbolic Systems of Differential Equations.* **Nicolae Tarfulea**, University of Minnesota - Purdue University Calumet (1003-35-133)
- ▶ 5:30PM (1066) *Estimation of blood alcohol concentration using skin vapor alcohol measurements: a nonlinear model.* Preliminary report. **Miguel A. Dumett***, **Gary Rosen**, University of Southern California, and **Robert Swift**, Brown University (1003-49-1587)
- 5:45PM (1067) *Harmonic map problems for a nematic liquid crystal in polyhedral cells.* **A Majumdar**, University of Bristol, and Hewlett-Packard Laboratories, Bristol, **J M Robbins** and **M Zyskin***, University of Bristol (1003-35-127)

AMS Session on Ordinary Differential Equations

1:00 PM – 5:25 PM

- 1:00PM (1068) *Andronov-Hopf Bifurcations in the Quaternions.* **Fernanda Botelho**, **James E. Jamison** and **J. Angela Murdock***, University of Memphis (1003-34-1120)
- ▶ 1:15PM (1069) *Nonlinear Limit-Point/Limit-Circle Results for Half-Linear Equations.* **Miroslav Bartusek**, Masaryk University Brno, and **John R. Graef***, University of Tennessee at Chattanooga (1003-34-1192)
- 1:30PM (1070) *Fixed Points and Stability of a Volterra Equation with Variable Delay.* **Leigh C Becker***, Christian Brothers University, and **T A Burton**, Northwest Research Institute (1003-34-1418)
- ▶ 1:45PM (1071) *Changing Time Scales: Bifurcations in Second Degree Equations.* Preliminary report. **Kelli J. Hall***, **Elizabeth R. Duke** and **Ralph W. Oberste-Vorth**, Marshall University (1003-34-1525)
- ▶ 2:00PM (1072) *Changing Time Scales: The Continuous Case as a Limit.* Preliminary report. **Elizabeth R Duke***, **Kelli J Hall**, **Bonita A Lawrence** and **Ralph W Oberste-Vorth**, Marshall University (1003-34-1533)
- 2:15PM (1073) *Uniqueness and existence for boundary value problems via variational equations.* **Jeffrey A. Ehme**, Spelman College (1003-34-1568)

- 2:30PM *Exact Finite Difference Scheme for Second-Order, Linear ODE's Having Constant Coefficients.* (1074)
Kale Oyedeji*, Morehouse College, **Sandra Rucker** and **Ronald Mickens**, Clark Atlanta University (1003-34-1619)
- 2:45PM *Impulsive Super Hybrid Differential Equations at Variable Times.* Preliminary report. (1075)
S. G. Hristova, Denison University (1003-34-195)
- 3:00PM *Nonlocal Boundary Value Problems on Time Scales at Resonance.* (1076)
Nickolai Kosmatov, University of Arkansas at Little Rock (1003-34-350)
- ▶ 3:15PM *Periodic solutions for neutral nonlinear dynamical system on a time scale.* (1077)
Eric R. Kaufmann*, University of Arkansas at Little Rock, and **Youssef N. Raffoul**, University of Dayton (1003-34-469)
- 3:30PM *Existence, selection and stability of needle crystals.* (1078)
Xuming Xie, Morgan State University (1003-34-510)
- 3:45PM *Impulsive hybrid nonlinear boundary value problems and iterative scheme.* (1079)
Seenith Sivasundaram, Embry-Riddle Aeronautical University (1003-34-525)
- ▶ 4:00PM *On the compactness of the set of bounded orbits for a differential system.* Preliminary report. (1080)
Shu-Xiang Yu, Academia Sinica (1003-34-538)
- 4:15PM *An Application of Higher Order Tangent Cones to Flow-invariance.* Preliminary report. (1081)
Elena Constantin, Ohio University (1003-34-937)
- 4:30PM *Existence and Uniqueness of p -Almost Automorphic Solutions to Differential Equations.* (1082)
Toka Diagana, Howard University (1003-34-32)
- 4:45PM *Existence of Pulse and Spikes in Standing Waves of a Reaction-Diffusion System.* (1083)
Fu Zhang, Tennessee Tech University (1003-34-1053)
- 5:00PM *Imaging and inverting for vertically and laterally varying media using an inverse scattering series method.* (1084)
Bogdan G. Nita*, **Fang Liu** and **Arthur B. Weglein**, University of Houston (1003-86-67)
- 5:15PM *Extending Lanchester's Equations to the Time-Space Domain.* Preliminary report. (1085)
Greg S Spradlin*, Embry-Riddle University, and **Christina D. Spradlin**, University of Central Florida (1003-90-1407)
- 1:45PM *Limit-Point Conditions for a Second-Order Formally Self-Adjoint Dynamic Equation on a Time Scale.* Preliminary report. (1089)
Jacob J Weiss, University of Nebraska-Lincoln (1003-39-1444)
- ▶ 2:00PM *On the Trichotomy Behavior of the Difference Equation $x(n+1) = [q(n)x(n) + r(n)x(n-1)]/[1+x(n)]$, $n = 1, 2, \dots$* Preliminary report. (1090)
Carol H Gibbons*, Salve Regina University, and **Carol B Overdeep**, Western Oregon University (1003-39-1542)
- ▶ 2:15PM *Global Attractivity of $x_{n+1} = \frac{x_n + \alpha x_{n-1} + \beta}{x_n + \gamma x_{n-1} + \eta}$.* (1091)
Piyapong Niamsup*, Chiang Mai University, and **Yongwimon Lenbury**, Mahidol University (1003-39-25)
- ▶ 2:30PM *Explicit Bounds for Second Order Difference Equations.* (1092)
Eva G. Goedhart*, Wake Forest University, and **Kenneth S. Berenhaut**, Wake Forest University (1003-39-646)
- ▶ 2:45PM *Some Integer Valued Recursive Equations with Eventually Periodic Solutions.* (1093)
Jeff Feuer, Dowling College (1003-39-785)
- 3:00PM *Minimum Degrees of Polynomial Models on Time Series.* (1094)
Chuang Peng, Morehouse College (1003-39-789)
- 3:15PM *Almost Periodic Difference Equations.* Preliminary report. (1095)
Zhivko S. Athanassov, Bulgarian Academy of Sciences (1003-39-921)
- 3:30PM *Summability methods and Burmann-series expansions.* (1096)
Jerry P. King, Lehigh University (1003-40-1229)
- ▶ 3:45PM *Infinite Spirals and Polygonal Paths.* Preliminary report. (1097)
Aaron C. Cinzori*, Hope College, **Thomas Scofield**, Calvin College, **Andrew Craker**, University of Notre Dame, and **Erin Wicker**, Alma College (1003-40-1237)
- ▶ 4:00PM *Zeros of a Fourth Degree Linear Recurrence Relation.* Preliminary report. (1098)
Thomas R Hagedorn, The College of New Jersey (1003-40-412)
- ▶ 4:15PM *The general Vieta-Wallis product for π .* (1099)
Thomas J Osler, Rowan University (1003-40-662)
- 4:30PM *Laplace Transforms in Risk Theory.* (1100)
Corina D. Constantinescu* and **Enrique A. Thomann**, Oregon State University (1003-41-1294)
- 4:45PM *Bivariate n -term rational approximation.* (1101)
Kyungwon Park, University of South Carolina (1003-41-1583)
- 5:00PM *Norms of Interpolation Operators.* (1102)
Natacha C. Fontes-Merz, Westminster College (1003-41-983)
- ▶ 5:15PM *A non-differentiable function that is L^p differentiable.* (1103)
J. Marshall Ash, DePaul University (1003-26-550)
- 5:30PM *Summability of λ -rearrangement for double sequences.* (1104)
Richard F. Patterson, University of North Florida (1003-40-1426)
- 5:45PM *Forward scattering series and Padé approximants for 1D wavefield propagation in an acoustic medium.* (1105)
Bogdan G. Nita, University of Houston (1003-41-66)

AMS Session on Analysis, IV

1:00 PM – 5:55 PM

- 1:00PM *Stability of the k -th order Lyness' Equation with a Period- k Coefficient.* (1086)
Ed Janowski, **M. R. S. Kulenovic***, University of Rhode Island, and **Z. Nurkanovic**, University of Tuzla (1003-39-1176)
- 1:15PM *Asymptotic Behavior of a Perturbed Linear Dynamic Equation on a Time Scale.* Preliminary report. (1087)
Jennifer L Langdon, University of Nebraska-Lincoln (1003-39-1225)
- ▶ 1:30PM *On the recursive sequence $x_{n+1} = \frac{\gamma x_{n-1} + \delta x_{n-2}}{x_n + x_{n-2}}$.* Preliminary report. (1088)
Richard DeVault*, Northwestern State University of Louisiana, **E. Camouzis**, The American College of Greece, and **G. Papschinopoulos**, Democritus University of Thrace (1003-39-1241)

AMS Session on Combinatorics, III

1:00 PM – 5:55 PM

- ▶ 1:00PM *Minimum fractional dominating and maximum fractional packing functions.*
Robert R Rubalcaba*, Auburn University, and **Matt Walsh**, Indiana University/Purdue University at Fort Wayne (1003-05-1353)
- ▶ 1:15PM *Fire containment in grids of dimension three and higher.* Preliminary report.
Stephen G. Hartke*, University of Illinois, and **Mike Develin**, American Institute of Mathematics (1003-05-1365)
- 1:30PM *Contracting graphs to squares.*
(1108) **Richard Hammack**, Randolph-Macon College (1003-05-1389)
- ▶ 1:45PM *Classifying pebble sets in convex polygons.* Preliminary report.
(1109) **Randy Maddox**, Pepperdine University (1003-05-1443)
- ▶ 2:00PM *The semigroup of equitable distributions of points in a convex polygon.* Preliminary report.
(1110) **Kevin Iga**, Pepperdine University (1003-05-1446)
- ▶ 2:15PM *Presburger arithmetic, rational generating functions, and the two stamp Frobenius problem.*
(1111) **Kevin M Woods**, University of California, Berkeley (1003-05-1453)
- 2:30PM *Obstructions for cubic outerplanar graphs.* Preliminary report.
(1112) **Joshua D. Hughes*** and **Galen E. Turner III**, Louisiana Tech University (1003-05-1466)
- 2:45PM *A Rook Theory Model for p, q -Analogues of Hsu and Shiue's Generalized Stirling Numbers.* Preliminary report.
(1113) **Karen S. Briggs*** and **Jeffrey B. Remmel**, University of California, San Diego (1003-05-1498)
- ▶ 3:00PM *Permutations and ordinals: Wilf equivalence extended.*
(1114) **Gregory N. Price**, Harvard University (1003-05-1502)
- ▶ 3:15PM *When Can You Pack a Box With Translates of Two Bricks?*
(1115) **T. S. Michael***, U.S. Naval Academy, and **Richard J. Bower**, United States Marine Corps (1003-05-1505)
- ▶ 3:30PM *On computing the linear complexity of certain classes of graphs.* Preliminary report.
(1116) **David L. Neel***, Seattle University, and **Michael Orrison**, Harvey Mudd College (1003-05-1566)
- ▶ 3:45PM *Counting subrings of \mathbb{Z}^n of index k .*
(1117) **Ricky Ini Liu**, Harvard University (1003-05-1584)
- ▶ 4:00PM *Real Number Radio Channel Assignment for the Triangular Lattice and the Square Lattice.* Preliminary report.
(1118) **Xiaohua Teresa Jin*** and **Jerrold R. Griggs**, University of South Carolina (1003-05-258)
- ▶ 4:15PM *The Rényi-Ulam pathological liar game with a fixed number of lies.*
(1119) **Robert B. Ellis***, Texas A&M University, **Vadim Ponomarenko**, Trinity University, and **Catherine H. Yan**, Texas A&M University (1003-05-301)
- 4:30PM *Splitter theorems for 4-regular graphs.*
(1120) **Guoli Ding**, Louisiana State University, and **Jinko Kanno***, Louisiana Tech University (1003-05-355)
- ▶ 4:45PM *Potentially K_5^t -graphic degree sequences.*
(1121) **John Roger Schmitt***, **Ronald J Gould** and **Michael Ferrara**, Emory University (1003-05-418)
- ▶ 5:00PM *Longest Induced Cycles on Cayley Graphs.*
(1122) **Elena D Fuchs**, University of California, Berkeley (1003-05-456)

- ▶ 5:15PM *Ordered Achromatic Numbers of Paths, Cycles, and Trees.*
(1123) **Michael J. Fisher**, California State University, Fresno, **Victor Kostyuk** and **Darren A. Narayan***, Rochester Institute of Technology (1003-05-471)
- ▶ 5:30PM *On a generalization of the Oberwolfach Problem.*
(1124) **Nick Cavenagh**, The University of Queensland, **Abdollah Khodkar***, State University of West Georgia, **Saad El-Zanati** and **Charles Vanden Eynden**, Illinois State University (1003-05-472)
- ▶ 5:45PM *Complement-Regular Gray Codes.*
(1125) **Matthew T Elder**, University of South Carolina (1003-05-498)

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

1:00 PM – 5:00 PM

- Organizers: **Mary Robinson**, University of New Mexico-Valencia Campus
Laurette B. Foster, Prairie View A & M University
Arlene H. Kleinstein, Farmingdale State University of New York
Norma M. Agras, Miami Dade Community College
Linda Martin, Albuquerque Technical Vocational Institute
Florence S. Gordon, New York Institute of Technology
- ▶ 1:00PM *What's Wrong with College Algebra?*
(1126) **Sheldon P. Gordon**, Farmingdale State University of New York (1003-C1-1469)
 - ▶ 1:25PM *A Vision Becomes Reality.*
(1127) **Norma M Agras**, Miami Dade College (1003-C1-1146)
 - ▶ 1:50PM *Financial Survival and College Algebra Applications.*
(1128) **Ronald J Harshbarger***, University of South Carolina Beaufort, and **Lisa S Yocco**, Georgia Southern University (1003-C1-649)
 - ▶ 2:15PM *A Quantitative Reasoning Course using Activities with Real Data.*
(1129) **Alicia Sevilla*** and **Kay Somers**, Moravian College (1003-C1-721)
 - ▶ 2:40PM *Virtual Discussion Board: A Way to Enhance Conceptual Understanding in a Mathematics Class.* Preliminary report.
(1130) **Saburo Matsumoto**, The Master's College, Santa Clarita, CA (1003-C1-235)
 - 3:05PM *Making Mathematics Relevant.* Preliminary report.
(1131) **Laurie Johnson**, Trinity College (1003-C1-569)
 - ▶ 3:30PM *When General Education Meets Mathematics: Designing a New Quantitative Literacy Course.*
(1132) **Fred Peskoff**, Borough of Manhattan Community College/CUNY (1003-C1-1004)
 - ▶ 3:55PM *Stressing the Underlying Structure When Teaching College Algebra.*
(1133) **Pat Shure**, University of Michigan (1003-C1-978)
 - ▶ 4:20PM *A Final Course in Mathematics for Humanities Majors.*
(1134) **Brian P. Kelly**, University of Louisiana at Monroe (1003-C1-582)
 - ▶ 4:45PM *Perceptions of Mathematics: Replacing Fear and Loathing with Appreciation and Understanding.*
(1135) **Mary R. Robinson**, University of New Mexico-Valencia Campus (1003-C1-1645)

MAA Session on Mathematics and Sports, II

1:00 PM – 3:40 PM

Organizers: **Douglas Drinen**, University of the South
Sean L. Forman, St. Joseph's University
Howard L. Penn, US Naval Academy

- ▶ 1:00PM *Using Non-technical NFL Data in Interesting Classroom Regression Examples.*
Vince Schielack, Texas A&M University (1003-D1-460)
- ▶ 1:20PM *Protection in the batting order: does it matter who hits behind Barry Bonds? Preliminary report.*
John-Charles Bradbury and **Doug Drinen***, The University of the South (1003-D1-707)
- ▶ 1:45PM *Some Sports-Related Election Methods and Ranking Procedures.* Preliminary report.
Richard E. Klima, Appalachian State University (1003-D1-158)
- ▶ 2:10PM *Some Elementary Mathematics of Major League Baseball Scheduling.*
Mike Pinter, Belmont University (1003-D1-839)
- ▶ 2:35PM *Soccer, Cubic Functions and the Inflection Point.*
Murray H. Siegel, Governor's School for Science & Mathematics (1003-D1-86)
- ▶ 3:00PM *Models for Playing Technique in Baseball.*
G. Edgar Parker, Jame Madison University (1003-D1-542)
- ▶ 3:25PM *Why so many World Series Go Seven Games.*
Joseph Evan* and **Daniel Ghezzi**, King's College (1003-D1-788)

MAA Session on Philosophy of Mathematics

1:00 PM – 6:30 PM

Organizers: **Charles R. Hampton**, The College of Wooster
Bonnie Gold, Monmouth University

- ▶ 1:00PM *What Is Mathematics II: A Possible Answer.* Preliminary report.
Bonnie Gold, Monmouth University (1003-P1-488)
- ▶ 1:25PM *Strands in the history of geometry and how they affect our views as to what geometry is.*
David W Henderson* and **Daina Taimina**, Cornell University (1003-P1-652)
- ▶ 1:50PM *Object and Attribute: the case of Curves and Equations.*
Robert E Bradley, Adelphi University (1003-P1-830)
- ▶ 2:15PM *Philosophy of Mathematics in Classical India: an Overview.* Preliminary report.
Homer S. White, Georgetown College, KY (1003-P1-522)
- ▶ 2:40PM *Realism and Mathematics: Peirce and Infinitesimals.* Preliminary report.
Daniel C. Sloughter, Furman University (1003-P1-655)
- ▶ 3:05PM *Fictionalism and the interpretation of mathematical discourse.*
Thomas Drucker, University of Wisconsin-Whitewater (1003-P1-405)
- ▶ 3:30PM *Linguistic Relativity in Applied Mathematics.*
Troy D. Riggs, Union University (1003-P1-409)
- ▶ 3:55PM *Applied Mathematics—A Philosophical Problem.*
Charles R. Hampton, The College of Wooster (1003-P1-708)

4:20PM *Generalised likelihoods, ideals and infinitesimal chances - how to approach the "zero-fit problem".*
Frederik S Herzberg, University of Oxford (1003-P1-597)

5:00PM Please see the separate listing for the SIGMAA on the Philosophy of Mathematics at 5:00 p.m.

MAA Session on Using Handheld Technology to Facilitate Student-Centered Teaching/Learning Activities at the Developmental Algebra Level

1:00 PM – 4:50 PM

Organizers: **Edward D. Laughbaum**, The Ohio State University
Maria DeLucia, Middlesex County College

- ▶ 1:00PM *Utilizing the Graphing Calculator to Identify and Build on Students' Prior Experiences.*
Mercedes A McGowen, William Rainey Harper College (1003-Q1-1034)
- ▶ 1:30PM *Incorporating Graphing Calculators and Explorations to Encourage Students' Understanding and Use of Multiple Representations in Elementary and Intermediate Algebra.*
Janet E. Teeguarden, Ivy Tech State College, Indianapolis, IN (1003-Q1-719)
- ▶ 2:00PM *Graphing Calculator Apps as Teaching Tools in Remedial Algebra.*
Ed D Laughbaum, The Ohio State University (1003-Q1-668)
- ▶ 2:30PM *Focusing on Functions: Using activities, modeling, and graphing calculators to enhance Intermediate Algebra.* Preliminary report.
Robert Mann, Western Illinois University (1003-Q1-946)
- ▶ 3:00PM *Making Sense of Functions Using Graphing Calculators and Calculator Based Rangers.*
Tom Ottinger, Reinhardt College (1003-Q1-953)
- ▶ 3:30PM *Enhancing the Teaching and Learning of Quadratic Equations by Using Handheld Technology.*
Kathleen Cage Mittag*, The University of Texas at San Antonio, and **Sharon E. Taylor**, Georgia Southern University (1003-Q1-793)
- ▶ 4:00PM *Analyzing fluid-flow to understand non-linear functions in developmental algebra.*
June I Decker, Three Rivers Community College (1003-Q1-393)
- ▶ 4:30PM *Calculator Activities that Enhance Developmental Mathematics.*
Tonya C. Jones*, **Robert Birrell** and **Pinder Naidu**, Kennesaw State University (1003-Q1-1673)

MAA General Contributed Paper Session, V

1:00 PM – 5:55 PM

Organizers: **Daniel E. Otero**, Xavier University
Michael A. Jones, Montclair State University
Thomas A. Hern, Bowling Green State University
Janice B. Walker, Xavier University

- ▶ 1:00PM *Serving Brownies Instead of Pie: An Alternative to Visualizing Fraction Operations for Elementary Teachers.*
Richard H. Stout, Gordon College (1003-X1-406)
- ▶ 1:15PM *Visual and dynamic experience in math.*
Melkana A Brakalova-Trevithick, Fordham University (1003-X1-513)

- 1:30PM ▶ (1162) *Oh, I SEE! Visual Models for Calculus*. Preliminary report.
Trisha Moller*, DeSales University, and **Melinda Schulteis**, Concordia University Irvine (1003-X1-399)
- 1:45PM Break
- 2:00PM ▶ (1163) *Experiential Learning and Mind Maps*.
Bathi Kasturiarachi, Kent State University, Stark Campus (1003-X1-1350)
- 2:15PM (1164) *Party Favors of Revolution: A calculus visualization technique*. Preliminary report.
Laurie Johnson, Trinity College (1003-X1-568)
- 2:30PM ▶ (1165) *Roof Ridgelines and Medial Axes*.
Bruno Guerrieri, Florida A&M University (1003-X1-1432)
- 2:45PM ▶ (1166) *Math Research for Freshmen: Applications in Image Restoration*.
Katrina M Palmer*, Appalachian State University, and **Lisa C Perrone**, Tufts University (1003-X1-625)
- 3:00PM ▶ (1167) *Incorporating Software Tools into a Linear Algebra Course*.
Karen Clark* and **Thomas Hagedorn**, The College of New Jersey (1003-X1-1434)
- 3:15PM ▶ (1168) *Cellular Automata Based Computation of Discrete Voronoi Diagrams*.
Albert W Schueller, Whitman College (1003-X1-374)
- 3:30PM ▶ (1169) *Infinite Polite Speeches, Konig's Lemma, and Aperiodicity*.
Carol S. Schumacher, Kenyon College (1003-X1-834)
- 3:45PM ▶ (1170) *Euler's proof of his polyhedral formula*.
David Richeson* and **Christopher Francese**, Dickinson College (1003-X1-1143)
- 4:00PM ▶ (1171) *How Google Relies on Discrete Mathematics*. Preliminary report.
Gerald W. Kruse, Juniata College (1003-X1-255)
- 4:15PM ▶ (1172) *The Last Round Matching Problem*.
Paul F Gibson*, Delaware State University, **Wenbo Li**, University of Delaware, **Fengshan Liu** and **Xiquan Shi**, Delaware State University (1003-X1-672)
- 4:30PM ▶ (1173) *A Characterization of the Tough Sets for the Generalized Petersen Graphs $G(n, 2)$* .
Kevin K Ferland*, Bloomsburg University, and **Megan L Holben**, Syracuse University (1003-X1-185)
- 4:45PM ▶ (1174) *Some non-existence results on Leech trees*.
L A Szekely, Univ. of South Carolina, **H Wang***, Department of Mathematics, Univ. of South Carolina, and **Y Zhang**, University of South Carolina (1003-X1-257)
- 5:00PM (1175) *Parameters of $L(2, 1)$ -colorings*.
R Laskar*, Clemson University, **P Fishburn**, Florham Park, New Jersey, **F Roberts**, Rutgers University, and **J Villalpando**, Gonzaga University (1003-X1-421)
- 5:15PM (1176) *Irreducibility of $L(2, 1)$ -coloring*.
J Villalpando*, Gonzaga University, and **R Laskar**, Clemson University (1003-X1-422)
- 5:30PM ▶ (1177) *Yet Another Proof that $C_n = \frac{1}{n+1} \binom{2n}{n}$, and a Generalization of the Catalan Sequence Using Lattice Paths*.
Marc S Renault, Shippensburg University (1003-X1-806)
- 5:45PM ▶ (1178) *Teaching a power of randomization - innovative approach*. Preliminary report.
Yana Kortsarts, Widener University (1003-X1-1076)

MAA Invited Paper Session on Modeling Problems of the Environment

1:00 PM – 2:55 PM

- Organizer: **Ben Fusaro**, Florida State University
- 1:00PM ▶ (1179) *Using Energy System Diagrams to Simulate a Complex Biological Model*.
Sherry Brandt-Williams, EPA Atlantic Ecology Division, RI (1003-Y1-1479)
- 1:30PM ▶ (1180) *Stability and Renewal in Heavily Exploited Populations*.
Daniel E. Campbell, EPA Atlantic Ecology Division, RI (1003-Y1-1480)
- 2:00PM ▶ (1181) *A Cooperative Modeling Initiative between Industry and Academia*.
Lothar A. Dohse, UNC, Asheville, NC (1003-Y1-1483)
- 2:30PM ▶ (1182) *Modeling the Spread and the Control of Oil Spills*.
Donald E. Miller, Saint Mary's College (1003-Y1-1487)

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

1:00 PM – 3:00 PM

- Organizer: **Jon W. Scott**, Montgomery College
- 1:00PM (1183) *Workshop Precalculus: Developing Pedagogically Powerful Instructional Materials for an Integrated Course in Functions, Data Analysis and Modeling*.
Nancy Baxter Hastings, Dickinson College, **David Hastings***, Shippensburg University, **Kevin Callahan**, California State University Hayward, and **Allan Rossman**, CalPoly San Luis Obispo
- 1:00PM (1184) *Improving Calculus: Developing Concepts Through Good Questions*.
Maria Terrell* and **Robert Connelly**, Cornell University
- 1:00PM (1185) *webODEs: A web site devoted to the teaching of ordinary differential equations*.
Paul Blanchard, Boston University
- 1:00PM (1186) *Technical Mathematics for Tomorrow: Recommendations and Exemplary Programs*.
Mary Ann Hovis*, Rhodes State College, and **Robert Kimball**, Wake Technical Community College
- 1:00PM (1187) *Making Math Meaningful Through Workplace Research*.
Robert Kimball, Wake Technical Community College
- 1:00PM (1188) *Biomathematics in the Undergraduate Curriculum*.
Raina Robeva, Sweet Briar College
- 1:00PM (1189) *Teaching Biomathematics: An Unconventional Textbook for Introductory Courses in Mathematical Biology*.
Raina Robeva, Sweet Briar College
- 1:00PM (1190) *Knot Theory for Preservice and Practicing Secondary Mathematics Teachers*.
Neil Portnoy*, Stony Brook University, and **Thomas Mattman**, California State University, Chico
- 1:00PM (1191) *Discovery-Based Science and Mathematics in an Environmental Context*.
Stephanie Fitchett, Florida Atlantic University
- 1:00PM (1192) *The Probability/Statistics Object Library*.
Kyle Siegrist, University of Alabama in Huntsville
- 1:00PM (1193) *Connecting Mathematics for Elementary Teachers*.
Keith Schwingendorf* and **David Feikes**, Purdue University North Central

- 1:00PM *Seeing the Connections: Promoting Profound Understanding of Secondary Mathematics.*
(1194) **Steve Benson***, **Al Cuoco**, Education Development Center, **Karen Graham**, University of New Hampshire, and **Neil Portnoy**, Stony Brook University
- 1:00PM *Collaborative Research: A Problem Based Calculus Sequence.*
(1195) **Charles Allen*** and **Carol Browning**, Drury University
- 1:00PM *Collaborative Research: A Problem Based Calculus Sequence.*
(1196) **Dale Daniel*** and **Ted Mahavier**, Lamar University
- 1:00PM *Collaborative Research: A Problem Based Calculus Sequence.*
(1197) **Shing So**, Central Missouri State University
- 1:00PM *A Course in Scientific Simulation.*
(1198) **Mike O’Leary**, Towson University
- 1:00PM *A prototype online hint system for teaching introductory combinatorics by guided discovery.*
(1199) **Ken Bogart**, Dartmouth College
- 1:00PM *Phaser: A Universal Simulator for Dynamical Systems.*
(1200) **Huseyin Kocak*** and **Brian Coomes**, University of Miami
- 1:00PM *Teaching Discrete Mathematics via Original Historical Sources.*
(1201) **Jerry Lodder*** and **David Pengelley**, New Mexico State University
- 1:00PM *Implementation of WeBWork Delivering Internet-Based Homework In College Algebra Classes.*
(1202) **Neil Sigmon*** and **Coreen Mett**, Radford University
- 1:00PM *The Hydrogen Atom: An Introduction to Group and Representation Theory.*
(1203) **Stephanie Frank Singer**, formerly of Haverford College
- 1:00PM *CAUSEweb: A Digital Library for Undergraduate Statistics Education.*
(1204) **Ginger Holmes Rowell***, **Scott McDaniel**, Middle Tennessee State University, **Dennis Pearl**, The Ohio State University, **Roger Woodard**, North Carolina State University, **Megan Duffey** and **Ileah McKee**, Middle Tennessee State University
- 1:00PM *Demos with Positive Impact.*
(1205) **Lila Roberts***, Georgia College & State University, and **David Hill**, Temple University
- 1:00PM *Integrating Computer Explorations into College Geometry.*
(1206) **William Fenton***, Bellarmine University, and **Sr. Barbara Reynolds**, Cardinal Stritch University
- 1:00PM *Adapting WeBWork Internet-Based Gateway Exams and Maple PowerTools to Introduce Appropriate Use of Technology in the First Two Semesters of Calculus.*
(1207) **Daniel Heath**, Pacific Lutheran University
- 1:00PM *Collaborative Research: Training Environmental Statisticians Using Complicated Data Sets to Make More Informed Environmental Decisions.*
(1208) **William Hunt*** and **Kimberly Weems**, North Carolina State University
- 1:00PM *Collaborative Research: Training Environmental Statisticians Using Complicated Data Sets to Make More Informed Environmental Decisions.*
(1209) **Nagambal Shah*** and **Monica Stephens**, Spelman College
- 1:00PM *Mathematics for Future Secondary Teachers: A Collection of Curriculum Models and Ideas.*
(1210) **James Madden**, Louisiana State University
- 1:00PM *Diffraction for Undergraduates.*
(1211) **David Kammler**, Southern Illinois University
- 1:00PM *Writing to Learn Mathematics—No Instructor Grading.*
(1212) **Mary Kay Abbey*** and **Bette Daudu**, Montgomery College
- 1:00PM *WeBWork in the Mathematics Curriculum.*
(1213) **Jeff Holt**, University of Virginia
- 1:00PM *Web-Based Math Homework.*
(1214) **John Jones**, Arizona State University
- 1:00PM *Improving Mathematical Skill and Attitudes of Under-prepared College Freshmen.*
(1215) **Rosalie Dance**, University of the Virgin Islands
- 1:00PM *Core Mathematics.*
(1216) **Gary Krahn*** and **Don Small**, United States Military Academy
- 1:00PM *The National Curve Bank Project: A MATH Archive.*
(1217) **Shirley Gray***, California State University Los Angeles, **Bill Austin**, University of Tennessee at Martin, and **Phillip Johnson**, Appalachian State University
- 1:00PM *Improving Preservice Mathematics Teachers’ Understanding of Fundamental Concepts in the Secondary Mathematics Curriculum.*
(1218) **John Lorch***, **Ralph Bremigan** and **Elizabeth Bremigan**, Ball State University
- 1:00PM *Quantitative Methods for Public Policy.*
(1219) **David Bressoud*** and **Daniel Kaplan**, Macalester College
- 1:00PM *The PascGalois Project: Visualizing Abstract Algebra.*
(1220) **Michael Bardzell*** and **Kathleen Shannon**, Salisbury University
- 1:00PM *A Motivational Course in Cryptology and Coding Theory to Reveal the Excitement and Relevance of Mathematics to the Early Undergraduate.*
(1221) **Sarah Spence***, Franklin W. Olin College of Engineering, and **Gordon Prichett**, Babson College
- 1:00PM *Exploring Geometry: Integrated Textbook and Software for College Geometry.*
(1222) **Mike Hvidsten**, Gustavus Adolphus College
- 1:00PM *The Vector Calculus Bridge Project.*
(1223) **Tevian Dray**, Oregon State University
- 1:00PM *Implementing Activity-based Cooperative Learning and Technology (ACT Curriculum) in Statistics Courses for Non-majors and K-12 Preservice Teachers.*
(1224) **Carl Lee**, Central Michigan University
- 1:00PM *Collaborative Development of Java Laboratories for College Algebra and Trigonometry.*
(1225) **Michael Mays**, West Virginia University
- 1:00PM *Native American-based Materials for Integration into Undergraduate Mathematics Education.*
(1226) **Charles Funkhouser**, California State University Fullerton
- 1:00PM *Pathways Through Algebra Project.*
(1227) **Terrie Teegarden**, San Diego Mesa College
- 1:00PM *Enhancing the Mathematical Foundation of Students through Online Course Modules.*
(1228) **Beth Klingner**, Pace University
- 1:00PM *Discrete Mathematics for Prospective K-8 Teachers.*
(1229) **Valerie DeBellis**, Shodor Education Foundation

AMS Workshop

1:00 PM – 2:30 PM

T.A. development using case studies: A workshop for faculty (Part 2).

Organizer: **Solomon Friedberg**, Boston University

MAA Project NExT Panel Discussion

1:00 PM – 2:30 PM

Planning a sabbatical.

Organizers: **Jeffrey T. Barton**, Birmingham-Southern College
Bernadette Mullins, Birmingham-Southern College
Barry S. Spieler, Birmingham-Southern College

Panelists: **William A. Marion**, Valparaiso University
Neil Portnoy, Stony Brook University
Barbara Reynolds, Cardinal Stritch University

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

1:00 PM – 2:20 PM

Just the facts: Profiles and inferences from data on permanently temporary faculty.

Organizers: **Kevin Charlwood**, Wabash University
Judy L. Baxter, University of Illinois-Chicago
Bettye Anne Case, Florida State University

Moderator: **Kevin Charlwood**
Panelists: **Mary W. Gray**, American University
Pat Shure, University of Michigan
Stephen B. Rodi, Austin Community College
James W. Maxwell, AMS
Bettye Anne Case

MAA Committee on Articulation and Placement Panel Discussion

1:00 PM – 2:20 PM

The great divide: Graphing calculators in secondary and college education.

Organizer: **Thomas W. Tucker**, Colgate University
Panelists: **Gail F. Burrill**, Michigan State University
Raymond J. Cannon, Baylor University
Richard H. Escobales, Canisius College
Thomas Tucker

ASL Invited Address

1:20 PM – 2:10 PM

- (1230) *Structural equivalences for the determinacy of real games.*
W. Hugh Woodin, University of California Berkeley

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

2:15 PM – 4:00 PM

RMMC Board of Directors

2:15 PM – 4:10 PM

MAA Presentations by Teaching Award Recipients

2:30 PM – 4:00 PM

- (1231) *Title to be announced.*
Deborah Hughes Hallett, University of Arizona
(1232) *Teaching mathematics in the classroom and beyond.*
Aparna Higgins, University of Dayton
(1233) *What secrets? Confessions of a curmudgeon.*
Gerald Alexanderson, Santa Clara University

ASL Session for Contributed Papers

2:30 PM – 5:45 PM

- 2:30PM *Description and Comparison of Computable Structures.*
(1234) **Wesley Calvert***, University of Notre Dame, **Valentina Harizanov**, George Washington University, **Julia F Knight** and **Sara Miller**, University of Notre Dame
2:55PM *Lusin sets, free abelian groups, and homeomorphisms of the Baer-Specker group.*
(1235) **Moses Klein**, Ohio University
3:20PM *Closed Subsets of stationary Sets in P omega-one omega-two.*
(1236) **Robert Mignone**, The College of Charleston
3:45PM *Results in geometry of D -semianalytic and subanalytic sets over Non-Archimedean fields.*
(1237) **Y. Firat Celikler**, Purdue University
4:10PM *CZF + Full Separation is equiconsistent with Second Order Arithmetic.*
(1238) **Robert Lubarsky**, Florida Atlantic University
4:35PM *The Gardenfors Impossibility Theorem does not show that genuine belief-revision functions cannot be monotonic.*
(1239) **Neil Tennant**, Ohio State University
5:00PM *On the existence of a single axiom for implicational R -mingle.*
(1240) **Dolph Ulrich**, Purdue University
5:25PM *Sensitivity and Specificity of the Genetic Code.*
(1241) **Dennis F Cudia**, Rockford, Illinois

AMS Committee on Science Policy Panel Discussion

2:30 PM – 4:00 PM

Advances in biomedical research will depend on help from the mathematical sciences.

Presenters: **Jeremy Berg**, National Institute of General Medical Sciences
Adam Paul Arkin, University of California Berkeley

MAA Panel Discussion

2:30 PM – 3:50 PM

Classroom networks for developing mathematical understanding.

Organizers: **Franklin D. Demana**, The Ohio State University

Panelists: **Jeremy Roschelle**, SRI International
James J. Kaput, University of Massachusetts, Dartmouth
Walter Stroup, University of Texas, Austin
Louis Abrahamson, Better Education, Inc.

Sarah J. Greenwald, Appalachian State University

3:20PM *Visualizing Soap Film Minimal Surfaces on Knots.*
 ▶ (1242) **Nathaniel A. Friedman**, Univ. at Albany (1003-N1-284)

3:40PM *Teaching Students to Illustrate Border and Wallpaper Patterns.* Preliminary report.
 ▶ (1243) **Gwen L Fisher**, California Polytechnic State University, San Luis Obispo (1003-N1-685)

4:00PM *Visualization on Pool Tables and Cones using Geometer's Sketchpad.* Preliminary report.
 ▶ (1244) **Nathaniel Miller**, University of Northern Colorado (1003-N1-396)

4:20PM *Hands-on Visualization in Preparation for Computer Graphics.* Preliminary report.
 ▶ (1245) **Julie Barnes*** and **Kathy Ivey**, Western Carolina University (1003-N1-730)

4:40PM *Teaching Visualization Skills in a Geometry course for pre-service Elementary School Teachers.* Preliminary report.
 ▶ (1246) **Cecelia Laurie***, **Cristina Gomez** and **Wei Shen Hsia**, University of Alabama (1003-N1-474)

5:00PM *Visual College Algebra for Teachers.*
 (1247) **Laurie Burton*** and **Maria G. Fung**, Western Oregon University (1003-N1-247)

MAA Special Presentation

2:45 PM – 4:45 PM

Information session on actuarial education.

Organizers: **Bettye Anne Case**, Florida State University
Steve Paris, Florida State University
Matthew J. Hassett, Arizona State University
Krzysztof M. Ostaszewski, Illinois State University

Presenter: **Richard London**, University of Connecticut

MAA Minicourse #14: Part B

3:15 PM – 5:15 PM

Euler.

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

MAA Minicourse #3: Part B

3:15 PM – 5:15 PM

Creating interactive workbooks using MS Excel.

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

MAA Minicourse #9: Part B

3:15 PM – 5:15 PM

Infusing connections into core courses for future secondary teachers.

Organizers: **Steve R. Benson**, Education Development Center
Al Cuoco, Education Development Center
Karen J. Graham, University of New Hampshire
Neil Portnoy, Stony Brook University

MAA Session on Teaching Visualization Skills, II

3:20 PM – 5:15 PM

Organizers: **Mary L. Platt**, Salem State College
Catherine A. Gorini, Maharishi University of Management

MAA Committee on Undergraduate Student Activities and Chapters (CUSAC) Poster Session

4:00 PM – 6:30 PM

Undergraduate student poster session.

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

SIGMAA for Quantitative Literacy Panel Discussion

4:00 PM – 5:15 PM

System-wide quantitative literacy initiatives.

Organizers: **Judith F. Moran**, Trinity College
Caren L. Diefenderfer, Hollins University

Panelists: **Linda R. Sons**, Northern Illinois University
Kathleen B. Burk, Pensacola Junior College
Kimberly M. Vincent, Washington State University
Bernard L. Madison, University of Arkansas

WEB SIGMAA Business Meeting

4:00 PM – 5:00 PM

Organizer: **Kirby A. Baker**, University of California Los Angeles

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

5:00 PM – 7:00 PM

Organizers: **Bonnie Gold**, Monmouth University
Satish Bhatnagar, University of Nevada, Las Vegas

(1248) *Philosophical implications of experimental mathematics.*
Jonathan Borwein, Dalhousie University

SIGMAA on Quantitative Literacy Business Meeting and Reception

5:15 PM – 7:00 PM

NAM Reception, Banquet, and Cox-Talbot Address

5:30 PM – 8:40 PM

- (1249) *Intrinsically interesting mathematical intrigue (Why I love mathematics).*
John W. Alexander Jr., Miami-Dade College

Mathematical Reviews Reception

6:00 PM – 7:00 PM

Saturday, January 8

Joint Meetings Registration

7:30 AM – 2:00 PM

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

8:00 AM – 10:50 AM

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

- 8:00AM ▶ (1250) *Using Scale Mixtures of Normals to Model Continuously Compounded.*
Kristen Dardia, James Madison University, **Melanie Wilson***, Allegheny College, and **Hamdan Hasan**, James Madison University (1003-62-1578)
- 8:30AM ▶ (1251) *Tracking Motions of Cellular Leaves.* Preliminary report.
Sandra Gregov*, **Walter Whiteley**, York University, and **Joseph Aiken**, Toronto, Ontario, Canada (1003-52-1039)
- 9:00AM ▶ (1252) *Properties of a family of generalized Fibonacci type polynomials.* Preliminary report.
Lisa L. Lackney, The University of Akron (1003-11-974)
- 9:30AM ▶ (1253) *Roots and matrix representations of generalized Fibonacci polynomials.* Preliminary report.
Lori A. McDonnell, The University of Akron (1003-11-963)
- 10:00AM ▶ (1254) *An Improved Algorithm to Search for Quasi-Twisted Error Correcting Codes.* Preliminary report.
Benjamin T Johnson* and **Nuh Aydin**, Kenyon College (1003-05-1516)
- 10:30AM ▶ (1255) *The n-cubed cubes problem.*
Ethan Berkove, Lafayette College, **Jenna Hammang***, Valparaiso University, **Ben Hummon**, Vassar College, and **Joy Kogut**, Simmons College (1003-05-1519)

AMS-MAA Special Session on History of Mathematics, II

8:00 AM – 10:50 AM

Organizers: **Joseph W. Dauben**, Lehman College (CUNY)
Patti Hunter, Westmont College
Karen H. Parshall, University of Virginia

- 8:00AM ▶ (1256) *Does the Chinese Term “mian” Really Equate with the Concept of Irrational Number?*
Yibao Xu, Borough of Manhattan Community College/CUNY (1003-01-645)
- 8:30AM ▶ (1257) *Papyrus versus Bamboo: A comparative study of ancient Egyptian and Chinese mathematical texts.*
Wann-Sheng Horng, National Taiwan Normal University (1003-01-1011)
- 9:00AM ▶ (1258) *Spherical Trigonometry in 17-18th Century China after Euclid’s Elements.* Preliminary report.
J.-P. Jeff Chen, St. Cloud State University (1003-01-584)
- 9:30AM ▶ (1259) *Galileo 1633 and Florensky 1933. The uses of mathematics, science and cosmology in the conflict between the medieval and progressive world views.*
Charles E. Ford, Saint Louis University (1003-01-1338)
- 10:00AM ▶ (1260) *A One-Man Show: James Whitbread Lee Glaisher, the “Messenger of Mathematics,” and the “Quarterly Journal of Pure and Applied Mathematics”.*
Sloan Evans Despeaux, Western Carolina University (1003-01-276)
- 10:30AM ▶ (1261) *It’s All for the Best: Looking for Perfection with Mathematical Models.*
Judith V. Grabiner, Pitzer College (1003-01-572)

AMS-SIAM Special Session on Nonsmooth Analysis in Variational and Imaging Problems, II

8:00 AM – 10:50 AM

Organizers: **M. Zuhair Nashed**, University of Central Florida
Otmar Scherzer, University of Innsbruck

- 8:00AM (1262) *Penalizing total variation in statistics: triograms and beyond.*
Ivan Mizera, University of Alberta (1003-62-1036)
- 8:30AM (1263) *Reproducing kernel Banach spaces and total-variation regularization of compact operator equations.*
P. P. B. Eggermont, University of Delaware (1003-45-1314)
- 9:00AM (1264) *Total Bounded Variation Regularization as a Bilaterally Constrained Optimization Problem.*
Michael Hintermueller, University of Graz (1003-49-1107)
- 9:30AM (1265) *Image decomposition into cartoon and texture using total variation and div(BMO).* Preliminary report.
Luminita A Vese* and **Triet Le**, UCLA (1003-35-1368)
- 10:00AM ▶ (1266) *Identifying the discontinuous points of the solutions for ill-posed problems.* Preliminary report.
Jin Cheng, Fudan University (1003-45-1154)
- 10:30AM (1267) *Total Variation Wavelet Inpainting.*
Tony F Chan*, UCLA, **Jackie Shen**, Univ. of Minnesota, and **Haomin Zhou**, Georgia Tech (1003-94-1330)

AMS-SIAM Special Session on Analysis and Applications in Nonlinear Partial Differential Equations, I

8:00 AM – 10:45 AM

Organizers: **Michael T. Lacey**, Georgia Institute of Technology
Jason L. Metcalfe, Georgia Institute of Technology
Gerd Mockenhaupt, Georgia Institute of Technology
Ronghua Pan, Georgia Institute of Technology
Andrzej J. Swiech, Georgia Institute of Technology

- 8:00AM *Particle-size segregation and inverse-grading in granular avalanches.*
 (1268) **Michael Shearer**, NC State University (1003-35-771)
- 8:30AM *Rotating Fluids with Self-Gravitation in Bounded Domains.*
 (1269) **Tao Luo***, Georgetown University, and **Joel Smoller**, University of Michigan (1003-35-637)
- 9:00AM *On multilinear oscillatory integrals.*
 (1270) **Xiaochun Li**, Institute for Advanced Study (1003-42-615)
- 9:30AM *Global solutions of multi-dimensional Euler equations and related problems.*
 (1271) **Dehua Wang**, University of Pittsburgh (1003-35-1150)
- 10:00AM *Boundary behavior of solutions to second order elliptic and parabolic equations.*
 (1272) **Mikhail V Safonov**, University of Minnesota (1003-35-1676)

AMS-SIAM Special Session on Integrable Systems and Special Functions, II

8:00 AM – 10:50 AM

Organizers: **Andras Balogh**, University of Texas-Pan American
Mourad E. H. Ismail, University of Central Florida
Wen-Xiu Ma, University of South Florida
Zhijun Qiao, Los Alamos National Laboratory

- 8:00AM *On the asymptotic analysis of Toeplitz determinants via the Riemann-Hilbert method.* Preliminary report.
 (1273) **Alexander R Its**, Indiana University Purdue University Indianapolis (IUPUI) (1003-33-238)
- 8:30AM *Orthogonal Polynomials with Discontinuous Weights: An Example on Painlevé IV.*
 (1274) **Yang Chen**, Imperial College London (1003-33-154)
- 9:00AM *Special functions arising from discrete Painlevé equations.*
 (1275) **Masatoshi Noumi**, Kobe University, Japan (1003-33-1072)
- 9:30AM *Soliton Ensembles and Semiclassical Asymptotics.*
 (1276) **Peter D Miller**, University of Michigan (1003-35-811)
- 10:00AM *On Slepian series expansion.*
 (1277) **Xiaoping Shen***, Ohio University, and **Naoki Saito**, University of California - Davis (1003-33-136)
- 10:30AM *The Sharpening of WZ Theory.*
 (1278) **Mohamud Mohammed*** and **Doron Zeilberger**, Rutgers University, The State University of New Jersey (1003-33-328)

AMS Special Session on Complex and Functional Analysis, I

8:00 AM – 10:50 AM

Organizers: **Mihaly Bakonyi**, Georgia State University
Imre Patyi, University of California San Diego

- 8:00AM Discussion.
- 8:30AM *Function theory on varieties.*
 (1279) **John E. McCarthy***, Washington University, and **Jim Agler**, UC San Diego (1003-30-591)
- 9:00AM *On a Maximal Number of Zeros of Rational Harmonic Functions.* Preliminary report.
 (1280) **Dmitry Khavinson***, University of Arkansas, and **Genevra Neumann**, Kansas State University (1003-30-544)
- 9:30AM *Zero sets and interpolating sets in Fock spaces.*
 (1281) **James Tung**, University of Michigan (1003-30-491)
- 10:00AM *Interpolation and Sampling hypersurfaces for Generalized Bergman Spaces On the Unit Ball.*
 (1282) **Dror Varolin*** and **Tamas Forgacs**, University of Illinois (1003-32-782)
- 10:30AM *Noncommutative Inequalities.* Preliminary report.
 (1283) **J. William Helton**, UC San Diego (1003-47-493)

AMS Special Session on Topics in Geometric Function Theory, II

8:00 AM – 10:50 AM

Organizers: **Abdelkrim Farouk Brania**, Morehouse College
David A. Herron, University of Cincinnati
Shanshuang Yang, Emory University

- 8:00AM *The Carleman function of one problem for the statics equations of elastic-deformed porous media in a half-plane.*
 (1284) **Kholmatzhon Imomnazarov***, Institute of Computational Mathematics and Mathematical Geophysics, Russia, **Evgenij Grachev**, Nikolaev Institute of Inorganic Chemistry Siberian Branch, Russian Academy of Sciences, and **Nasridin Zhabborov**, National University of Uzbekistan (1003-30-1043)
- 8:30AM *Dynamics and Structure of Julia sets of polynomial semigroups with bounded finite postcritical set.*
 (1285) **Rich L Stankewitz***, Ball State University, and **Hiroki Sumi**, Tokyo Institute of Technology (1003-30-843)
- 9:00AM *Holomorphic family and Bers fiber space.*
 (1286) **Chaohui Zhang**, Morehouse College (1003-30-1442)
- 9:30AM *Applications of Potential Theory to problems in numerical linear algebra.* Preliminary report.
 (1287) **John F Rossi**, Virginia Tech (1003-31-803)
- 10:00AM *β -bounded/compact and Hilbert-Schmidt Composition operators.* Preliminary report.
 (1288) **Abebaw Tadesse**, University of Pittsburgh (1003-30-798)
- 10:30AM *On holomorphic continuation of functions.*
 (1289) **Sevdiyor Akramovich Imomkulov**, Al-Khorezmiiy University (1003-32-828)

AMS Special Session on Algorithmic Algebraic and Analytic Geometry, II

8:00 AM – 10:50 AM

Organizers: **Saugata Basu**, Georgia Institute of Technology
Victoria A. Powers, Emory University
Mika K. Sepälä, Florida State University
Tanush T. Shaska, University of Idaho
Emil J. Volcheck, National Security Agency

- 8:00AM (1290) *Hilbert’s wonderful eight-point construction.* Preliminary report.
Bruce Reznick, University of Illinois (1003-14-1258)
- 8:30AM (1291) *Fields of moduli of hyperelliptic curves.* Preliminary report.
Bonnie Sakura Huggins, U.C. Berkeley (1003-14-587)
- 9:00AM (1292) *Modular representations on some Riemann-Roch spaces of modular curves $X(N)$.*
David Joyner* and **Amy Ksir**, US Naval Academy (1003-14-1463)
- 9:30AM (1293) *Counting zeros in complex domains: average numbers and standard deviations.*
Bernard Shiffman* and **Steve Zelditch**, Johns Hopkins University (1003-32-1501)
- 10:00AM (1294) *Counting Belyı Surfaces with many Automorphisms.*
Aaron D Wootton, University of Arizona (1003-14-124)
- 10:30AM (1295) *Large Sections of Nonnegative Polynomials and Sums of Squares.*
Grigoriy Blekherman, University of Michigan (1003-14-777)

AMS Special Session on Modular Representation Theory of Finite and Algebraic Groups, II

8:00 AM – 10:50 AM

Organizers: **David J. Hemmer**, University of Toledo
Cornelius Pillen, University of South Alabama

- 8:00AM (1296) *On Some Transfer Results for Algebraic Groups with Involutions.* Preliminary report.
Terrell L. Hodge, Western Michigan University (1003-20-1212)
- 8:30AM (1297) *A Classification of Nilpotent Orbits in Infinitesimal Symmetric Spaces.* Preliminary report.
Joseph A. Fox, Western Michigan University (1003-22-1504)
- 9:00AM (1298) *Two approaches to modular representations of symmetric groups.* Preliminary report.
Aaron M Phillips, University of Virginia (1003-20-1510)
- 9:30AM (1299) *Completely Splittable Representations of Symmetric Groups.*
Oliver Ruff, University of Oregon (1003-20-697)
- 10:00AM (1300) *Branching rules for Specht modules.* Preliminary report.
Harald Ellers*, Allegheny College, and **John Murray**, National University of Ireland - Maynooth (1003-20-1071)
- 10:30AM (1301) *The square root of the centre of a Hecke algebra of type A.*
Andrew R Francis*, University of Western Sydney, and **Lenny K Jones**, Shippensburg University (1003-20-907)

AMS Session on Partial Differential Equations, II

8:00 AM – 10:25 AM

- 8:00AM (1302) *Wu’s Mass Postulate and Approximate Solutions of the $fKdV$ Equation.*
Samuel Shen, University of Alberta (1003-35-244)
- 8:15AM (1303) *On Monge-Ampère Type Equations Arising In Optimal Transportation Problems.*
Truyen Van Nguyen, Temple University (1003-35-599)
- 8:30AM (1304) *Direct approach for $C^{1,\alpha}$ -regularity of solutions to the Monge-Ampere equation.*
Diego M. Maldonado*, University of Kansas, and **L. Forzani**, UNL-IMAL Conicet (Argentina) and School of Statistics, University of Minnesota (1003-35-791)
- 8:45AM (1305) *Lie Symmetry Method for A Reaction-Diffusion Equation.*
Zhaosheng Feng, University of Texas-Pan American (1003-35-898)
- 9:00AM (1306) *Long-time Limit For The Ginzburg-Landau System With Pinning.*
Jianzhong Sun*, U. North Carolina at Wilmington, and **Patricia Bauman**, Purdue University (1003-35-915)
- 9:15AM (1307) *Asymptotic behavior for the evolution of spinodal decomposition with elastic deformation.* Preliminary report.
M. Affouf, Kean University (1003-35-1097)
- 9:30AM (1308) *On Boundary Problems of Hamilton-Jacobi Equation.* Preliminary report.
Yudi Soeharyadi, Institut Teknologi Bandung, Indonesia (1003-35-1394)
- 9:45AM (1309) *Characterization of entire solutions to Burger’s equation.* Preliminary report.
Upali P Karunathilake, University of Minnesota (1003-35-1513)
- 10:00AM (1310) *Global existence and uniqueness of solutions to nonlinear equations modeling the low-speed flow of an incompressible, barotropic fluid.* Preliminary report.
Diane L Denny, University of Wyoming (1003-35-1539)
- 10:15AM (1311) *Reaction-Diffusion models for epitaxial growth: scaling laws in step flow.*
Cameron R Connell, New Jersey Institute of Technology (1003-35-1656)

AMS Session on Probability

8:00 AM – 10:55 AM

- 8:00AM (1312) *Free Stochastic Music.* Preliminary report.
Wai Chan* and **Michael Green**, Cal Poly Pomona (1003-60-1006)
- 8:15AM (1313) *Kendall Distribution Functions.*
Roger B. Nelsen*, Lewis & Clark College, **José Juan Quesada Molina**, Universidad de Granada (Spain), **José Antonio Rodríguez Lallena** and **Manuel Úbeda Flores**, Universidad de Almería (Spain) (1003-60-1198)
- 8:30AM (1314) *Almost periodicity in probability and neutral stochastic functional differential equations with causal operators.* Preliminary report.
Zephyrinus C. Okonkwo, Albany State University (1003-60-1269)
- 8:45AM (1315) *Almost sure invariance principles for random walk in random environment.*
Firas Rassoul-Agha*, Ohio State University, and **Timo Seppalainen**, University of Wisconsin at Madison (1003-60-1529)

- 9:00AM *Products of random variables and asymptotic distribution of the extremes.* Preliminary report.
▶ (1316) **Italo Simonelli**, Texas A&M University-Commerce (1003-60-1589)
- 9:15AM *On dispersive, stochastic inequalities and comparisons of the Cauchy, Gauss and logistic distributions.*
(1317) **Broderick Oluyede**, Georgia Southern University (1003-60-1597)
- 9:30AM *On a stationary, triple-wise independent, absolutely regular counterexample to the central limit theorem.*
(1318) **Richard C. Bradley**, Indiana University (1003-60-33)
- 9:45AM *Palindromes Under a 1st Order Markov Model with Applications to Genetic Sequences.* Preliminary report.
▶ (1319) **Leanna Horton***, East Tennessee State University, **Anne Shiu**, University of Chicago, and **James Gardner**, East Tennessee State University (1003-60-581)
- 10:00AM *Survival Among Traps for a Random Walk on an Infinite Graph.* Preliminary report.
(1320) **Lee Gibson**, Cornell University (1003-60-856)
- 10:15AM *A definition of wavelet variance.*
(1321) **Xunming Du**, Great Basin College (1003-60-899)
- 10:30AM *A Moment Inequality for a Functional of a Birth Markov Chain.* Preliminary report.
▶ (1322) **Constantine Georgakis**, DePaul University (1003-60-998)
- 10:45AM *Applications of Geometric Moment Theory related to Optimal Portfolio Management.*
(1323) **George A Anastassiou**, University of Memphis (1003-60-21)

AMS Session on Combinatorics, IV

8:00 AM – 10:55 AM

- 8:00AM *On the Well-Coveredness of Cartesian Products of Graphs.*
▶ (1324) **Alexandra Ovetsky**, Princeton University (1003-05-506)
- 8:15AM Break
- 8:30AM *On H-Imitations.*
(1325) **Michael J Ferrara***, **Ronald J. Gould**, **Gerard R. Tansey**, Emory University, and **Thor Whalen**, Metron, Inc. (1003-05-583)
- 8:45AM *On an interpolation property of outerplanar graphs.*
▶ (1326) **Ko-Wei Lih***, Academia Sinica, **Chen-Yin Lin** and **Li-Da Tong**, National Sun Yet-sen University (1003-05-603)
- 9:00AM *Classes of graphs with bounded integrity.* Preliminary report.
▶ (1327) **Nadia Heninger***, University of California, Berkeley, **Annalies Vuong**, University of California, Santa Barbara, and **Anne Shiu**, University of Chicago (1003-05-604)
- 9:15AM *Completing Partial Latin Squares: a conjecture of Haggkvist.*
▶ (1328) **Jaromy Scott Kuhl*** and **Tristan Denley**, University of Mississippi (1003-05-612)
- 9:30AM *Bad Squares on Board Games.*
(1329) **Amy N. Myers**, St. Joseph's University (1003-05-617)
- 9:45AM *A new extension of the cage problem.* Preliminary report.
▶ (1330) **Connie M. Campbell***, Millsaps College, and **William Staton**, University of Mississippi (1003-05-670)

- 10:00AM *Pebbling random graphs.* Preliminary report.
▶ (1331) **James Gardner*** and **Anant Godbole**, East Tennessee State University (1003-05-705)
- 10:15AM *Class 0, Deep, and Profound Graphs.* Preliminary report.
▶ (1332) **Carl Yerger***, Harvey Mudd College, and **Nathaniel Watson**, Washington University in St. Louis (1003-05-706)
- 10:30AM *Vertex neighbor integrity of graphs.* Preliminary report.
▶ (1333) **Anne Shiu***, University of Chicago, **Nadia Heninger**, University of California, Berkeley, and **Annalies Vuong**, University of California, Santa Barbara (1003-05-718)
- 10:45AM *On H-Linked Graphs.*
(1334) **Michael J. Ferrara**, **Ronald J. Gould**, **Gerard R. Tansey***, Emory University, and **Thor Whalen**, Metron, Inc. (1003-05-732)

AMS Session on Applied Mathematics, II

8:00 AM – 9:25 AM

- 8:00AM *Curriculum Development Through Primary Historical Sources.* Preliminary report.
(1335) **Jerry M. Lodder**, New Mexico State University (1003-97-1246)
- 8:15AM *Exponential Stability of Wave Systems Via Distributed Coupling Controllers.*
(1336) **M. Najafi**, Kent State University Ashtabula (1003-93-1019)
- 8:30AM *Measure Solutions for Impulsive Evolution Equations with Measurable vector Fields.*
(1337) **N U Ahmed**, University of Ottawa (1003-93-239)
- 8:45AM *The Analysis of Intrinsic Mode Functions and Instantaneous Phase.*
(1338) **V. Vatchev*** and **R. Sharpley**, University of South Carolina (1003-94-1508)
- 9:00AM *Affine Transformation Method in Automatic Image Registration.* Preliminary report.
▶ (1339) **Xiquan Shi*** and **Fengshan Liu**, Delaware State University (1003-94-366)
- 9:15AM *Improved Lagrangian for the Fermionic String.*
(1340) **A. M. Abdurrahman***, Shippensburg University, and **J. M. Bordes**, Universitat de Valencia (1003-81-912)

MAA Session on My Three Favorite Original Calculus Problems

8:00 AM – 10:55 AM

- Organizers: **J. D. Phillips, Jr.**, Wabash College
Timothy J. Pennings, Hope College
- 8:00AM *Self-interest and mean values: three problems.*
▶ (1341) **J. D. Phillips**, Wabash College (1003-R1-1534)
- 8:15AM *Honors Class Problems on Uniqueness and Inversion.* Preliminary report.
▶ (1342) **Charles W. Groetsch**, University of Cincinnati (1003-R1-873)
- 8:30AM *Putting it all Together.*
▶ (1343) **G. Elton Graves**, Rose-Hulman Institute of Technology (1003-R1-710)
- 8:45AM *My Favorite Three Calculus Problems.* Preliminary report.
▶ (1344) **Heakyung Lee**, Winthrop University (1003-R1-805)
- 9:00AM *Coffee and fast food: Calculus on shapes familiar to students.*
▶ (1345) **John C George**, Eastern New Mexico University (1003-R1-619)

- 9:15AM *My Three Favorite Original Calculus Problems.*
▶ (1346) **Ron Buckmire**, Occidental College (1003-R1-479)
- 9:30AM *Three Interesting Calculus Challenges.* Preliminary report.
▶ (1347) **Kevin E. Charlwood**, Washburn University (1003-R1-191)
- 9:45AM *Three Problems for the Analytic Geometry Component of a First-Year Calculus Course.*
▶ (1348) **Ralf G. Peters**, University of Northern British Columbia (1003-R1-1095)
- 10:00AM *Differing by a Constant and an Alternate Approach to Partial Fractions of Integrals.* Preliminary report.
▶ (1349) **N. R. Nandakumar***, Delaware State University, and **Michael J. Bosse**, East Carolina University (1003-R1-417)
- 10:15AM *Non-standard problems on Definite Integrals.*
(1350) **Anand Kumar**, Ramanujan School of Mathematics (1003-R1-1621)
- 10:30AM *Standard Problems with a Twist.*
▶ (1351) **Timothy J. Pennings**, Hope College (1003-R1-1083)
- 10:45AM Discussion.

MAA Session on Meeting the Challenge: Relationship Between Mathematics and Biology in the 21st Century

8:00 AM – 10:50 AM

- Organizers: **Catherine M. Murphy**, Purdue University Calumet
G. Elton Graves, Rose Hulman Institute of Technology
David A. Smith, Duke University
- 8:00AM *Modeling Biological Systems with Difference Equations.* Preliminary report.
▶ (1352) **Mazen Shahin**, Delaware State University (1003-S1-1545)
- 8:30AM *A Calculus Sequence for Biology Students.*
▶ (1353) **Timothy D Comar**, Benedictine University (1003-S1-401)
- 8:45AM *A Model Introductory Mathematical Biology Course.*
(1354) **Ronald E Mickens**, Clark Atlanta University (1003-S1-1626)
- 9:00AM *The Institute for Quantitative Biology at East Tennessee State University.*
(1355) **Jeff R. Knisley**, East Tennessee State University (1003-S1-967)
- 9:15AM *From data to derivatives: lessons for the general calculus.*
▶ (1356) **Eric S Marland*** and **Mary E Searcy**, Appalachian State University (1003-S1-261)
- 9:30AM *The Good, the Bad, and the Surprising.*
(1357) **Mary E Searcy*** and **Eric S Marland**, Appalachian State University (1003-S1-259)
- 9:45AM *Student Projects Using the Mathematical Models of Pharmacokinetics.*
▶ (1358) **Theresa A Laurent**, St. Louis College of Pharmacy (1003-S1-323)
- 10:00AM *An Unrestricted Model for Dating Genetic Separation.*
▶ (1359) **Scott R Herriott**, Maharishi University of Management (1003-S1-245)
- 10:30AM *Agent-Based Modeling as a Tool for Teaching Computational Modeling of Biology.*
▶ (1360) **Suman Ganguli**, University of California San Francisco (1003-S1-1582)

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

8:00 AM – 10:30 AM

- Organizers: **Philip E. Gustafson**, Mesa State College
Michael G. Monticino, University of North Texas
- 8:00AM Opening remarks.
- 8:05AM *The Military Entrance Processing Command Location Optimization Study - A Team Effort.*
▶ (1361) Preliminary report.
Edgar K Rugenstein* and **Darrall Henderson**, United States Military Academy (1003-T1-385)
- 8:20AM *Summary of Mathematics Used In Planning Processes For Supply Chain Activities.* Preliminary report.
▶ (1362) **Charlie E Stevens**, GE Plastics Materials Management (1003-T1-1390)
- 8:35AM *Recent Results on Costas Arrays.*
▶ (1363) **Gregory E. Coxson***, **James K Beard**, Lockheed Martin MS2, **Jon C Russo**, Lockheed Martin ATL, **Keith Ericson**, **Michael Monteleone**, New Jersey Institute of Technology, and **Michael Wright**, New Jersey Institute of Technology (1003-T1-347)
- 8:50AM *A Channel Model for Ultrawideband Radio Networks.*
(1364) **Marcus Pendergrass**, Convergent Corporation (1003-T1-749)
- 9:05AM *Office Management: A Markov Model.*
▶ (1365) **Gregory Battle**, Morehouse College (1003-T1-151)
- 9:20AM *The Statistics Behind the Scenes: Statistics in Consumer Reports.*
▶ (1366) **Abbe H. Herzig**, University at Albany, State University of New York (1003-T1-905)
- 9:35AM *Solving a process line modification problem.*
▶ (1367) **James C Pomfret*** and **Youmin Lu**, Bloomsburg University (1003-T1-445)
- 9:50AM *The Effect of the Rayleigh Instability on Anisotropic Crystalline Rods.*
(1368) **Katharine F Gurski***, George Washington University, **Geoffrey B McFadden**, National Institute for Standards and Technology, and **Michael J Miksis**, Northwestern University (1003-T1-1088)
- 10:05AM *A walk on the industry side: a mathematician takes on the seismic exploration business.*
▶ (1369) **Nicholas Coult**, Augsburg College (1003-T1-1411)
- 10:20AM *Optimizing the Retail Experience: A New Frontier for Applied Mathematics.*
▶ (1370) **Tracy A Bibelnieks**, Augsburg College (1003-T1-1156)

MAA Session on In-Service Training Programs For K-12 Mathematics Teachers, I

8:00 AM – 10:55 AM

- Organizers: **Zsuzsanna Szaniszló**, Valparaiso University
Judith L. Covington, Louisiana State University, Shreveport
Tamas Szabo, Weber State University
- 8:00AM *MST@UNH: A graduate degree in mathematics for mathematics teachers.*
(1371) **Karen Graham**, University of New Hampshire, and **Steve Benson***, Education Development Center, Inc. (1003-W1-760)

- 8:20AM (1372) *Yearlong, Sustained Contact Model for 7-12 Mathematics Teachers.*
Judy S O'Neal, North Georgia College & State University (1003-W1-298)
- 8:40AM (1373) *Harvard University and the Boston Public Schools.*
John Boller, Harvard University (1003-W1-1231)
- 9:00AM (1374) *Mathematics Knowledge: Implications for Teaching and Learning Mathematics in Middle and High Schools.* Preliminary report.
Wayne Harvey*, Education Development Center, Inc., **Glenn H. Stevens**, Boston University, and **Al Cuoco**, Education Development Center, Inc. (1003-W1-764)
- 9:20AM (1375) *A System Initiative Program Lives in Louisiana.* Preliminary report.
Vic Schneider, University of Louisiana at Lafayette (1003-W1-443)
- 9:40AM (1376) *Professional Development for In-service Teachers through Project PRIME.*
Jamar Pickreign*, **Robert Rogers** and **Keary Howard**, SUNY Fredonia (1003-W1-675)
- 10:00AM (1377) *Implementing Comprehensive Multi-faceted Professional Development: Lessons Learned from University and K-12 Partnerships.*
Paul E Kehle* and **Daniel Maki**, Indiana University (1003-W1-1216)
- 10:20AM (1378) *A Mathematics Partnership Program for Teachers of ESL Students.*
Mary K. Porter* and **Colleen M. Hoover**, Saint Mary's College, Notre Dame, Indiana (1003-W1-737)
- 10:40AM (1379) *Teachers as Leaders and Learners.* Preliminary report.
Cathy S. Liebars, The College of New Jersey (1003-W1-608)

AWM Workshop

8:20 AM – 4:10 PM

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

Organizers: **Dawn A. Lott**, Delaware State University
Claudia Polini, University of Notre Dame
Judy L. Walker, University of Nebraska, Lincoln

AMS Special Session on Inverse Spectral Geometry, II

8:30 AM – 10:50 AM

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

- 8:30AM (1380) *Arithmetic progressions of zeros of the Riemann zeta function.*
Machiel van Frankenhuysen, Utah Valley State College (1003-11-595)
- 9:00AM (1381) *Eigenfunctions of the Laplacian on high tensor powers of a line bundle.*
David Borthwick, Emory University (1003-58-1644)
- 9:30AM (1382) *Laminations and eigenvalues.*
Christopher M Judge, Indiana University (1003-58-1049)
- 10:00AM (1383) *Feynman diagrams and inverse spectral theory.*
Steve Zelditch, Johns Hopkins University (1003-35-1110)

- 10:30AM (1384) *Wave trace asymptotics with the equivariant spectrum.*
Alejandro Uribe, University of Michigan (1003-58-882)

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

8:30 AM – 10:55 AM

Organizers: **William O. Martin**, North Dakota State University
Barbara E. Edwards, Oregon State University
Draga D. Vidakovic, Georgia State University

- 8:30AM (1385) *Describing Undergraduates' Reasoning Within and Across Multiple Geometries.*
Stephen D Blair, Grand Valley State University (1003-V1-352)
- 8:45AM (1386) *Which Comes First, Development or Learning? A New Twist on the Chicken versus Egg Question.*
Katherine Safford-Ramus, Saint Peter's College (1003-V1-283)
- 9:00AM (1387) *The Special Nature of Mathematical Definitions.*
John Urenko, Penn State Capital College (1003-V1-87)
- 9:15AM (1388) *The Development of a Community Concept of Proof.*
Jennifer Christian Smith, The University of Texas at Austin (1003-V1-1630)
- 9:30AM (1389) *College Prep: Fact or Fiction?*
Ernest Shen, California State Polytechnic University, Pomona (1003-V1-1369)
- 9:45AM (1390) *Undergraduates' Uses of Variables and Success in Entry-Level Mathematics Courses.*
Susan S. Gray, University of New England, **Barbara J. Loud**, Regis College, and **Carole P. Sokolowski***, Merrimack College (1003-V1-1250)
- 10:00AM (1391) *On Schema Thematization.*
Maria Trigueros*, ITAM, Mexico, **Laurel Cooley**, CUNY, New York, and **Bernadette Baker**, Drake University, Iowa (1003-V1-1203)
- 10:15AM (1392) *Implementing Lesson Study at the Undergraduate Level.* Preliminary report.
Emilie Wiesner, **Aaron Weinberg*** and **Bret Benesh**, University of Wisconsin-Madison (1003-V1-976)
- 10:30AM (1393) *What symbols facilitate learning and transfer of mathematical concepts? College students' performance on learning instantiations of Abelian groups.*
Jennifer A Kaminski*, **Vladimir M Sloutsky**, Ohio State University, and **Andrew F Heckler**, Ohio State University (1003-V1-881)
- 10:45AM (1394) *General Reading Comprehension Strategies Do Not Suffice for Learning Mathematics from Texts.*
Mary D Shepherd, Northwest Missouri State University (1003-V1-833)

MAA General Contributed Paper Session, VI

8:30 AM – 10:55 AM

Organizers: **Daniel E. Otero**, Xavier University
Michael A. Jones, Montclair State University
Thomas A. Hern, Bowling Green State University
Janice B. Walker, Xavier University

- 8:30AM Discussion

- 8:45AM *Impact of Islamic mathematics on the European Renaissance.*
 ▶ (1395) **Elizabeth C Rogers**, Piedmont College (1003-X1-1092)
- 9:00AM *Why can't I divide by zero?*
 ▶ (1396) **Curtis J. Feist**, Southern Oregon University (1003-X1-1289)
- 9:15AM *Centers and Generalized Centers of Nearrings.*
 (1397) **G. Alan Cannon***, Southeastern Louisiana University, **Mark Farag**, Wagner College, and **Lucyna Kabza**, Southeastern Louisiana University (1003-X1-430)
- 9:30AM *Good and Square Matrices are Invertible.*
 ▶ (1398) Preliminary report.
William P. Wardlaw, U. S. Naval Academy (1003-X1-386)
- 9:45AM *The Monge shuffle for a deck with 2^n cards.*
 ▶ (1399) **Arne Ledet**, Texas Tech University (1003-X1-381)
- 10:00AM *Seminearrings of bivariate polynomials over a ring.*
 ▶ (1400) Preliminary report.
Kent M. Neuerburg, Southeastern Louisiana University (1003-X1-321)
- 10:15AM *Pascal and Poker.*
 ▶ (1401) **William M. Wagner**, Wagner Machine Works (1003-X1-204)
- 10:30AM *Learning mathematical concepts through object manipulation.* Preliminary report.
 ▶ (1402) **Akihiro Matsuura**, College of Science and Engineering, Tokyo Denki University (1003-X1-1475)
- 10:45AM *Data Analysis and Statistics for Practicing Teachers: Understanding Student's Statistical Ideas.*
 ▶ (1403) Preliminary report.
Wei Shen Hsia*, University of Alabama, **Cristina Gomez**, College of Education, University of Alabama, and **Cecelia Laurie**, University of Alabama (1003-X1-338)

AWM Workshop: Research Presentations by Recent Ph.D.s, I

- 8:30 AM – 10:20 AM
- 8:30AM *Unit Rank and the Rank of the Class Group of a Global Function Field.*
 (1404) **Allison M. Pacelli**, Williams College
- 9:00AM *Strichartz estimates for solutions of Schrödinger equations with external fields.*
 (1405) **Virginia Naibo*** and **Atanas Stefanov**, University of Kansas
- 9:30AM *A Theoretical Simulation Of Hematopoietic Stem Cells During Oxygen Fluctuations: Prediction Of Bone Marrow Responses During Blood Loss.*
 ▶ (1406) **Eliana S Antoniou***, William Paterson University, **Steve Sund**, **Emile Homsj**, Honeywell Research & Technology, Morristown, NJ, **Leonard F Challenger**, NJIT-Graduate School of Biomedical Engineering, and **Pranela Rameshwar**, UMDNJ-New Jersey Medical School
- 10:00AM *Linear Algebra and Image Restoration.*
 (1407) **Lisa Perrone**, Tufts University

AMS Committee on Education Panel Discussion

- 8:30 AM – 10:00 AM
- Mathematicians as educators.*
 Moderator: **William G. McCallum**, University of Arizona
 Presenters: **Kristin L. Umland**, University of New Mexico

Raven McCrory, Michigan State University
Steven G. Krantz, Washington University in St. Louis

MAA Invited Address

9:00 AM – 9:50 AM

- (1408) *Square ice is very nice, but can you put a match to it?*
Georgia Benkart, University of Wisconsin, Madison (1003-A0-10)

ASL Invited Address

9:00 AM – 9:50 AM

- (1409) *The nonstationary ideal and club guessing ideals.*
Tetsuya Ishiu, University of Kansas

MAA Minicourse #10: Part B

9:00 AM – 11:00 AM

Bridging the gap between mathematics and the physical sciences.
 Organizer: **Tevian Dray**, Oregon State University

MAA Minicourse #15: Part B

9:00 AM – 11:00 AM

Conceptests and Peer Instruction: Active learning in the calculus classroom.
 Organizers: **Deborah Hughes Hallett**, University of Arizona
David O. Lomen, University of Arizona
Maria Robinson, Seattle University

MAA Minicourse #4: Part B

9:00 AM – 11:00 AM

Java applets in teaching mathematics.
 Organizers: **Joe Yanik**, Emporia State University
David M. Strong, Pepperdine University

MAA Invited Paper Session on Worlds of Interactive Mathematics, Part I: The Legacy of Elias Deeba

9:00 AM – 10:55 AM

Organizers: **Ananda Gunawardena**, Carnegie Mellon University
Dan Kalman, American University
Gerald J. Porter, University of Pennsylvania

- 9:00AM *Some of Elias Deeba's work.*
 ▶ (1410) **Ananda D Gunawardena**, Carnegie Mellon University (1003-15-1243)
- 9:30AM *Linear Relations.*
 ▶ (1411) **M. Zuhair Nashed**, University of Central Florida (1003-15-1610)
- 10:00AM Discussion.

MAA/RUME Panel Discussion

9:00 AM – 10:20 AM

The ICME-10 meeting.
 Organizers: **Martha J. Siegel**, Towson University

Andy R. Magid, University of Oklahoma

MAA Panel Discussion

9:00 AM – 10:20 AM

Revisiting crossroads: The teaching and learning of mathematics in two-year colleges.

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

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

Susan L. Ganter, Clemson University
Susan S. Wood

NAM-AWM Panel Discussion

9:00 AM – 9:50 AM

Achieving diversity in graduate programs, Part II: The challenge to retain underrepresented groups.

Organizers: **Nathaniel Dean**, Texas Southern University

Rhonda J. Hughes, Bryn Mawr College

Exhibits and Book Sales

9:00 AM – NOON

Employment Center

9:00 AM – NOON

Math on the Web, IV

9:30 AM – 11:00 AM

9:30AM *How to make your browser speak math (and why you should care).*
(1412)

Neil Soiffer, Design Science Inc

10:30AM *Authoring Web Pages with MathML for Cross-browser Display.*
(1413)

Bob Mathews, Design Science Inc

NAM Business Meeting

10:00 AM – 10:50 AM

MAA Invited Address

10:05 AM – 10:55 AM

- ▶ (1414) *Symmetry in complex analysis.*
Steven G. Krantz, Washington University in St. Louis (1003-A0-13)

ASL Invited Address

10:05 AM – 10:55 AM

- (1415) *Extensions of Hilbert's Tenth Problem.*
Bjorn Poonen, University of California at Berkeley

AWM Workshop: Poster Session with Presentations from Women Recent Ph.D.'s and Graduate Students

10:30 AM – 11:00 AM

- 10:30AM *Extensions of Noncyclic p -Algebras with an application to Indecomposable Division Algebras.*
(1416)
- Kelly L. McKinnie**, University of Texas at Austin

10:30AM *Decay of the probability of ruin under uncertain investments.*
(1417)

Corina D. Constantinescu* and **Enrique A. Thomann**, Oregon State University

10:30AM *Finding Rational Cubic Spirals.* Preliminary report.
▶ (1418)

Donna Ann Dietz, Mansfield University

10:30AM *A decoupling technique and necessary conditions for the neutral problem of Bolza.*
(1419)

Norma L. Ortiz, Louisiana State University

10:30AM *Residual intersections in Cohen-Macaulay rings.* Preliminary report.
(1420)

Christine K. Cumming, Purdue University

10:30AM *Filtration Shrinkage and Compensators.*
(1421)

A. Deniz Sezer, Cornell University, School of ORIE

10:30AM *Almost-Additive Thermodynamic Formalism.*
(1422)

Anna Mummert, Pennsylvania State University

10:30AM *The Geometry of the Loewner Equation.*
(1423)

Joan R. Lind, University of Washington

10:30AM *Realizability of Graphs.*
▶ (1424)

Maria T. Sloughter, Cornell University

10:30AM *Stanley's partition function and its relation to $p(n)$.*
(1425)

Holly M Swisher, University of Wisconsin - Madison

10:30AM *A mathematical model for signaling in early stages of tumor-induced angiogenesis.* Preliminary report.
(1426)

Nicoleta E Tarfulea* and **Hans G Othmer**, University of Minnesota

10:30AM *Classifying the Type of Groupoid C^* -algebras.*
(1427)

Lisa Orloff Clark, Colby-Sawyer College

10:30AM *Stability in Some Nonlinear Difference Equations.* Preliminary report.
▶ (1428)

Mihaela Predescu, Bentley College

10:30AM *Monotone factors and stochastic domination.*
(1429)

Karen T. Ball, Indiana University

10:30AM *Success in University-Required Mathematics Courses: An Investigation of Students with Learning Disabilities.*
▶ (1430)

Brooke Evans, Morgan State University

MAA Business Meeting

11:10 AM – 11:40 AM

AMS Business Meeting

11:45 AM – 12:15 PM

NAM Claytor-Woodard Lecture

1:00 PM – 1:50 PM

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

1:00 PM – 5:50 PM

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

- 1:00PM *The Shapley Value of Phylogenetic Trees.*
▶ (1431)
- Akemi Kashiwada***, Harvey Mudd College,
Claus-Jochen Haake, University of Bielefeld, and
Francis Edward Su, Harvey Mudd College (1003-05-990)

- 1:30PM *Domination Parameters of RNA Trees*. Preliminary report.
 ▶ (1432) **Jeremy Smith**, Univ. of Tenn & East Tenn State (1003-05-169)
- 2:00PM *A Combinatorial Study of RNA Sequences*. Preliminary report.
 ▶ (1433) **Francesca Duncan***, Tuskegee Univ. & East Tenn State, and **Mariam Konate**, Virginia Tech & East Tenn State (1003-05-170)
- 2:30PM *Proteins as Simple Graphs*. Preliminary report.
 ▶ (1434) **Daniel Lamb*** and **Bradley Wild**, East Tenn State & Institute for Quantitative Biology (1003-05-171)
- 3:00PM *A Local Cellular Model for Growth on Quasicrystals*.
 ▶ (1435) **Prince Chidyagwai*** and **Clifford A Reiter**, Lafayette College (1003-70-174)
- 3:30PM *The LSB theorem implies the KKM lemma*.
 ▶ (1436) **Gwen Spencer*** and **Francis E. Su**, Harvey Mudd College (1003-54-1295)
- 4:00PM *New Developments for Analysis of Intracranial Saccular Aneurysms: I. Biomechanical model, II. Computational algorithm, and III. Scientific visualization*. Preliminary report.
 ▶ (1437) **James B. Collins*** and **Matthew K. Watts**, James Madison University (1003-74-228)
- 4:30PM *Decimation-in-frequency Fast Fourier Transforms for the Symmetric Group*. Preliminary report.
 ▶ (1438) **Eric J. Malm**, Harvey Mudd College (1003-20-1214)
- 5:00PM *p-Coloring Classes of Torus Knots*.
 ▶ (1439) **Layla K. Oesper***, Pomona College, and **Anna-Lisa Breiland**, Willamette University (1003-54-918)
- 5:30PM *Cyclic Structures with Lag-time Generators: Lag-Time Sequences, Matrices, and Torus Knots*.
 ▶ (1440) **Rachel Betz***, **Sandrah Eckel** and **Peter Pappas**, Vassar College (1003-57-1668)

AMS-MAA Special Session on History of Mathematics, III

1:00 PM – 5:50 PM

- Organizers: **Joseph W. Dauben**, Lehman College (CUNY)
Patti Hunter, Westmont College
Karen H. Parshall, University of Virginia
- 1:00PM *Benjamin Peirce and The Cambridge Miscellany: Directing a National Mathematical Research Agenda? Preliminary report*.
 ▶ (1441) **Deborah A. Kent**, University of Virginia (1003-01-1352)
- 1:30PM *American Ph.D.'s in Mathematics Before 1940: Spotlight on Women's Careers*. Preliminary report.
 ▶ (1442) **Judy Green**, Marymount University, and **Jeanne LaDuke***, DePaul University (1003-01-639)
- 2:00PM *The evolution of a curriculum: tests at Vassar College 1888–1969*. Preliminary report.
 ▶ (1443) **John McCleary**, Vassar College (1003-01-1401)
- 2:30PM *Mathematics at West Point in the Early Twentieth Century*. Preliminary report.
 ▶ (1444) **V. Frederick Rickey**, United States Military Academy (1003-01-1232)
- 3:00PM *Components of the Early American Mathematics Publication Community*.
 ▶ (1445) **Todd Timmons**, University of Arkansas–Fort Smith (1003-01-322)
- 3:30PM *When Mathematicians were Computers*.
 ▶ (1446) **David Alan Grier**, Elliott School of International Affairs, George Washington University (1003-01-300)

- 4:00PM *Stefan Banach and the Weigl Institute: Banach During World War II*. Preliminary report.
 ▶ (1447) **Daniel S. Alexander**, Drake University (1003-01-733)
- 4:30PM *Grin and Baire It: The Original Baire Category Theorem*.
 ▶ (1448) **William Dunham**, Muhlenberg College (1003-01-271)
- 5:00PM *History of manifolds*.
 ▶ (1449) **Frank S. Quinn**, Virginia Tech (1003-01-189)
- 5:30PM *A Short History of the Zipf-Pareto Distribution*.
 ▶ (1450) **Paul Schuette**, Meredith College (1003-01-109)

AMS-SIAM Special Session on Nonsmooth Analysis in Variational and Imaging Problems, III

1:00 PM – 6:20 PM

- Organizers: **M. Zuhair Nashed**, University of Central Florida
Otmar Scherzer, University of Innsbruck
- 1:00PM *Essential features of the (local) minimizers of non-smooth regularized functionals*.
 ▶ (1451) **Mila Nikolova**, CMLA (ENS de Cachan) (1003-49-982)
- 1:30PM *Hybrid Steepest Descent Method and Adaptive Projected Subgradient Method — Their Unified View and Signal Processing Applications*.
 ▶ (1452) **Isao Yamada**, Tokyo Institute of Technology (1003-65-1101)
- 2:00PM *Vector Radial Basis Functions and Isotropic Pseudo-differential Operators on the Sphere*.
 ▶ (1453) **Willi Freeden**, TU Kaiserslautern, Geomathematics Group (1003-41-1372)
- 2:30PM *Regularization by Means of Locally Supported Wavelets on the Sphere*.
 ▶ (1454) **Michael Schreiner**, University Buchs, Laboratory for Industrial Mathematics (1003-41-1373)
- 3:00PM *New Tools for Geomagnetic Field Analysis From Satellite Data*.
 ▶ (1455) **Thorsten Maier**, University of Kaiserslautern (1003-41-1371)
- 3:30PM *Mathematical Modeling of the Inverse Source Problem in Geomagnetism*.
 ▶ (1456) **Carsten Mayer**, University of Kaiserslautern (1003-45-1370)
- 4:00PM *Slant Differentiability for Nonsmooth Operators and Applications to Operator Equations and Variational Inequalities*. Preliminary report.
 ▶ (1457) **M. Zuhair Nashed**, University of Central Florida (1003-49-1635)
- 4:30PM *Nonsmooth Optics: the case of phase retrieval*.
 ▶ (1458) **James V. Burke**, University of Washington, and **D. Russell Luke***, University of Delaware (1003-49-1678)
- 5:00PM *Relaxation of non-convex singular Functionals*.
 ▶ (1459) **Markus Grasmair*** and **Otmar Scherzer**, University of Innsbruck (1003-35-1159)
- 5:20PM *Radius of Metric Regularity In Variational Analysis*.
 ▶ (1460) **Wondimagegnehu Geremew*** and **Boris Mordukhovich**, Wayne State University (1003-49-1316)
- 5:40PM *Hemivariational inequality models in contact problems*.
 ▶ (1461) **Dan D. Pascali**, Courant Institute, New York University (1003-47-1170)
- 6:00PM *A parametric proximal point algorithm*.
 ▶ (1462) **I. L. Raykov**, University of Toledo (1003-65-553)

AMS-SIAM Special Session on Analysis and Applications in Nonlinear Partial Differential Equations, II

1:00 PM – 5:55 PM

Organizers: **Michael T. Lacey**, Georgia Institute of Technology
Jason L. Metcalfe, Georgia Institute of Technology
Gerd Mockenhaupt, Georgia Institute of Technology
Ronghua Pan, Georgia Institute of Technology
Andrzej J. Swiech, Georgia Institute of Technology

- 1:00PM *L^p estimates for eigenfunctions of the Laplacian in manifolds with boundary.*
 (1463) **Christopher D Sogge**, Johns Hopkins University (1003-35-1051)
- 2:00PM *Global Stability for the (3 + 1) Dimensional Maxwell-Klein-Gordon Equations.*
 (1464) **Jacob K Sterbenz**, Princeton University (1003-35-1233)
- 2:30PM *Global existence for 3D incompressible isotropic elastodynamics via the incompressible limit.*
 (1465) **Thomas C. Sideris**, University of California, Santa Barbara, and **Becca Thomases***, Courant Institute of Mathematical Sciences, New York University (1003-35-761)
- 3:00PM *Isentropic Gas Dynamics with Large BV Data.*
 (1466) **Robin Young**, U Mass Amherst (1003-35-402)
- 4:00PM *The Aronsson equation and the Calculus of Variations in L-infinity.*
 (1467) **Changyou Wang**, University of Kentucky (1003-35-1215)
- 4:30PM *Wolff potentials and singularities of harmonic functions.* Preliminary report.
 (1468) **Denis A Labutin**, University of California Santa Barbara (1003-35-1624)
- 5:00PM *Dispersive Interpolation Inequalities and Applications.* Preliminary report.
 (1469) **Carlos E Kenig**, University of Chicago (1003-35-1085)

AMS-SIAM Special Session on Integrable Systems and Special Functions, III

1:00 PM – 5:50 PM

Organizers: **Andras Balogh**, University of Texas-Pan American
Mourad E. H. Ismail, University of Central Florida
Wen-Xiu Ma, University of South Florida
Zhijun Qiao, Los Alamos National Laboratory

- 1:00PM *Zeros of Schur polynomials and cohomology of certain compact Lie groups.* Preliminary report.
 (1470) **Yuji Kodama**, Ohio State University (1003-14-1252)
- 1:30PM *Co-adjoint orbits and integrable Hamiltonians.*
 (1471) **Michael Gekhtman**, University of Notre Dame (1003-58-1070)
- 2:00PM *Generalized Darboux-Halphen equations and Modular Forms.*
 (1472) **S Chakravarty**, University of Colorado, Colorado Springs (1003-33-1643)

- 2:30PM *Hirota's bilinear method, Pfaffians and their applications in soliton equations.*
 (1473) **Xing-Biao Hu**, Institute of Computational Math. & S.E.C., AMSS, Chinese Academy of Sciences (1003-37-842)
- 3:00PM *On KP Generators and the Geometry of the HBDE.*
 (1474) **Michael Gekhtman**, University of Notre Dame, and **Alex Kasman***, College of Charleston (1003-39-54)
- 3:30PM *k-Schur functions: why are they special?*
 (1475) **Luc Lapointe**, Universidad de Talca, and **Jennifer Morse***, University of Miami (1003-05-1136)
- 4:00PM *The Generalized Weierstrass System Inducing Surfaces of Constant and Non constant Mean Curvature in Euclidean Three Space.*
 (1476) **Paul F Bracken**, University of Texas (1003-35-317)
- 4:30PM *Laplacian Growth and Whitham Equations in Soliton Theory.*
 (1477) **Mark Mineev-Weinstein**, Los Alamos National Laboratory (1003-35-814)
- 5:00PM *Stable cnoidal waves in a coupled Kuramoto-Sivashinsky-Korteweg-de Vries equation.*
 (1478) **Bao-Feng Feng**, The University of Texas-Pan American (1003-33-641)
- 5:30PM *Nonlinear wave phenomena in continuum mechanics: Some recent findings.*
 (1479) **Pedro M. Jordan**, Naval Research Laboratory (1003-76-1303)

AMS Special Session on Dynamics of Mapping Class Groups on Moduli Spaces, II

1:00 PM – 5:50 PM

Organizer: **Richard J. Brown**, American University

- ▶ 1:00PM *Relative mapping class group of $S^p \times D^q$.*
 (1480) **Nikolai A. Krylov**, International University Bremen (1003-55-767)
- 1:30PM *Automorphisms of the Hatcher-Thurston Complex.*
 (1481) **E Irmak***, University of Michigan, and **M Korkmaz**, Middle East Technical University (1003-58-726)
- 2:00PM *The Mod(S)-action on the variety of $PSL(2, C)$ -characters.*
 (1482) **Juan Souto**, CNRS, and **Peter Storm***, Stanford (1003-53-720)
- 2:30PM *Dynamics of the Automorphism Group of the $GL(2, \mathbb{R})$ -Characters of a Rank Two Free Group.*
 (1483) **George Stantchev*** and **William Goldman**, University of Maryland at College Park (1003-53-1018)
- 3:00PM *Dynamics of the mapping class group on the moduli of a punctured sphere with rational holonomy.*
 (1484) **Joseph P Previte***, Penn State Erie, and **Eugene Z Xia**, National Cheng-Kung University, Taiwan (1003-57-680)
- 3:30PM *Weil-Petersson isometries.*
 (1485) **Dan Margalit**, University of Utah (1003-20-576)
- 4:00PM *Homological action of the modular group on some cubic moduli spaces.*
 (1486) **Walter D Neumann***, Barnard College, Columbia University, and **William M Goldman**, University of Maryland (1003-57-552)
- 4:30PM *Generalized Markoff Maps and McShane's Identity.*
 (1487) **Ser Peow Tan***, **Yan Loi Wong** and **Ying Zhang**, National University of Singapore (1003-22-398)
- 5:00PM *Deformation theory of hyperbolic 3-manifolds.*
 (1488) **Richard Douglas Canary**, University of Michigan (1003-57-1686)

5:30PM *An Ergodic Theorem for Random Walks on the Mapping Class Group.*
(1489) **Moon Duchin**, University of Chicago
(1003-37-1722)

AMS Special Session on Inverse Spectral Geometry, III

1:00 PM – 4:20 PM

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

- 1:00PM *The Spectrum of Orbifolds.* Preliminary report.
(1490) **Sarah J Greenwald**, Appalachian State University
(1003-53-1209)
- 1:30PM *The Trace Formula on Orbifolds.* Preliminary report.
(1491) **Elizabeth Stanhope***, Willamette University,
and **Alejandro Uribe**, University of Michigan
(1003-53-1600)
- 2:00PM *Spectral subtleties of Fuchsian groups with elements of order two and three.*
(1492) **Peter Buser***, **Nicole Flach**, EPFL, **Colin MacLachlan**, University of Aberdeen, **Gerhard Rosenberger**, University of Dortmund, and **Klaus-Dieter B. Semmler**, EPFL (1003-58-932)
- 2:30PM *Collars and Partitions of Hyperbolic Cone-Surfaces.*
(1493) **Emily B. Dryden***, McGill University, and **Hugo Parlier**, Ecole Polytechnique Federale de Lausanne
(1003-53-1517)
- 3:00PM *Jacobians of Sunada isospectral Riemann surfaces.*
(1494) Preliminary report.
Carolyn S. Gordon, Dartmouth College, **Eran Makover**, Central Connecticut State University, and **David L. Webb***, Dartmouth College
(1003-58-1040)
- 3:30PM *Short Geodesic on Random Riemann surfaces.*
(1495) Preliminary report.
Eran Makover* and **Jeffrey McGowan**, Central Connecticut State University (1003-53-667)
- 4:00PM *On geodesic exponential maps of the Virasoro group.*
(1496) **Adrian Constantin**, University of Lund, **Thomas Kappeler***, University of Zurich, **Boris Kolev**, Universite de Marseille, and **Peter Topalov**, University of Zurich (1003-58-579)

AMS Special Session on Complex and Functional Analysis, II

1:00 PM – 5:50 PM

Organizers: **Mihaly Bakonyi**, Georgia State University
Imre Patyi, University of California San Diego

- 1:00PM *Acyclic sheaves in Banach spaces.*
(1497) **Laszlo Lempert**, Purdue University (1003-46-709)
- 1:30PM $\bar{\partial}$: *Compactness and hypoellipticity in L^2_{loc} .*
(1498) Preliminary report.
Sönmez Şahutoğlu and **Emil J Straube***, Texas A&M University (1003-32-1168)
- 2:00PM *Transcendence measures and algebraic growth of entire functions.*
(1499) **Evgeny A Poletsky**, Syracuse University
(1003-32-1147)
- 2:30PM *A note on the upper level sets of Lelong numbers for projective currents.*
(1500) **Dan Coman**, Syracuse University (1003-32-383)

3:00PM *Heat equations and the $\bar{\partial}$ -problem on weighted L^2 spaces in \mathbb{C} .* Preliminary report.
(1501) **Andrew S Raich**, University of Wisconsin-Madison
(1003-32-648)

3:30PM *Surfaces that are locally polynomially convex at degenerate CR singularities.* Preliminary report.
(1502) **Gautam Bharali**, University of Michigan
(1003-32-893)

4:00PM *Algebras of Bounded Functions.* Preliminary report.
(1503) **Alexander J. Izzo**, Bowling Green State University
(1003-46-1431)

4:30PM *Convex mappings of the ball in \mathbb{C}^n that have a maximal real subspace in their image.* Preliminary report.
(1504) **Jerry R. Muir, Jr.***, University of Scranton, and **Ted J. Suffridge**, University of Kentucky (1003-32-610)

5:00PM *Some extremal properties of holomorphic mappings of the ball onto convex domains.* Preliminary report.
(1505) **Ted J Suffridge**, University of Kentucky
(1003-32-427)

5:30PM *Projections on Bergman Space.*
(1506) **Joseph A. Cima***, University of North Carolina at Chapel Hill, **Alexandru Aleman**, Lund University, Sweden, and **Alec Matheson**, Lamar University
(1003-30-487)

AMS Special Session on Arithmetic Algebraic Geometry, II

1:00 PM – 5:50 PM

Organizers: **Matthew H. Baker**, University of Georgia
Dino J. Lorenzini, University of Georgia

- 1:00PM *The p -torsion of hyperelliptic curves.*
(1507) **Darren B Glass***, Columbia University, and **Rachel J. Pries**, Colorado State University (1003-11-123)
- 1:30PM *Galois groups of Drinfeld modules and Carlitz logarithms.*
(1508) **Matthew A. Papanikolas**, Texas A&M University
(1003-11-379)
- 2:00PM *Deformation of curves with a wildly ramified group action and applications to error-correcting codes.*
(1509) **Rachel Pries**, Colorado State University
(1003-14-567)
- 2:30PM *Elevated rank in positive characteristic.*
(1510) **Keith Conrad**, Univ. of Connecticut (1003-11-184)
- 3:00PM *Almost rational torsion points on Fermat quotient curves.*
(1511) **Pavlos Tzermias**, University of Tennessee
(1003-11-554)
- 3:30PM *Computational Verification of the Full Birch and Swinnerton-Dyer Conjecture.* Preliminary report.
(1512) **William A Stein**, Harvard University (1003-11-186)
- 4:00PM *Stable Reduction of $X_0(p^3)$.*
(1513) **Ken McMurdy***, Rose-Hulman Institute of Technology, and **Robert F. Coleman**, University of California at Berkeley (1003-11-1346)
- 4:30PM *Exceptional primes for elliptic curves.*
(1514) **Alina Carmen Cojocaru***, Princeton University, and **Chris Hall**, Univ. Texas at Austin (1003-11-657)
- 5:00PM *Infinite multiplicity of roots of unity of the absolute Galois group on elliptic curves.*
(1515) **Bo-Hae Im**, University of Utah, Salt Lake City, Utah.
(1003-11-1257)

5:30PM *Average Frobenius distributions for elliptic curves with rational torsion.* Preliminary report.
 (1516) **Jonathan L Battista**, Michigan State University, **Jonathan Bayless**, Dartmouth College, **Dmitriy Ivanov**, Stanford, and **Kevin L James***, Clemson University (1003-11-955)

AMS Special Session on Algorithmic Algebraic and Analytic Geometry, III

1:00 PM – 5:50 PM

Organizers: **Saugata Basu**, Georgia Institute of Technology
Victoria A. Powers, Emory University
Mika K. Sepälä, Florida State University
Tanush T. Shaska, University of Idaho
Emil J. Volcheck, National Security Agency

- 1:00PM *Automated Certification for Control Systems.* Preliminary report.
 (1517) **Sanjay Lall**, Stanford (1003-14-1499)
- 1:30PM *Hilbert’s theorem on decomposability of nonnegative ternary forms as sums of squares of rational functions.* Preliminary report.
 (1518) **Dmitrii V Pasechnik**, Tilburg University (1003-14-1526)
- 2:00PM *Stiefel-Whitney classes of real toric varieties.* Preliminary report.
 (1519) **Clint McCrory**, University of Georgia (1003-14-1124)
- 2:30PM *Topology of o-minimal Hausdorff limits and applications.*
 (1520) **Thierry Zell**, Georgia Institute of Technology (1003-14-1141)
- 3:00PM *A Refinement of the Shapiro Conjecture in Enumerative Geometry.* Preliminary report.
 (1521) **Ruffo James**, Texas A&M University (1003-14-1650)
- 3:30PM *Some Speed-Ups and Speed Limits for Real Fewnomials.*
 ▶ (1522) **J Maurice Rojas**, Texas A&M University (1003-14-1343)
- 4:00PM *Effective methods for resolving singularities in the plane with applications to analysis.*
 (1523) **Michael Greenblatt**, Metron Inc. (1003-14-1310)
- 4:30PM *On the extremal disks embedded in compact Riemann surfaces of genus three.*
 (1524) **Gou Nakamura**, Aichi Institute of Technology (1003-30-360)
- 5:00PM *Non-normal pairs of NEC groups.*
 (1525) **Milagros Izquierdo**, Linköpings Universitet, and **Jose Luis Estevez***, UNED, Madrid, Spain (1003-14-222)
- 5:30PM *Birational Equivalence, Linear Systems, and Desingularization.*
 (1526) **John J Iskra**, Emory & Henry College, **Yasuyuki Kachi*** and **S B Mulay**, University of Tennessee (1003-14-119)

AMS Special Session on Modular Representation Theory of Finite and Algebraic Groups, III

1:00 PM – 5:50 PM

Organizers: **David J. Hemmer**, University of Toledo
Cornelius Pillen, University of South Alabama

1:00PM *Character ratios and probabilistic generation of classical groups.* Preliminary report.
 (1527) **Corneliu Hoffman**, BGSU (1003-20-1591)

- 1:30PM *A Phan-Type Theorem for Orthogonal Groups.* Preliminary report.
 (1528) **Adam E. Roberts**, Bowling Green State University (1003-20-750)
- 2:00PM *The non-coprime $k(GV)$ -problem.* Preliminary report.
 (1529) **Robert M. Guralnick**, University of Southern California, and **Pham Huu Tiep***, University of Florida (1003-20-528)
- 2:30PM *Varieties and injective modules over group cohomology.*
 (1530) **David J Benson**, University of Georgia (1003-20-1172)
- 3:00PM *“Rank Varieties” for finite group schemes.*
 (1531) **Eric Friedlander**, Northwestern University, and **Julia Pevtsova***, University of Oregon (1003-16-679)
- 3:30PM *Lifting modules of group rings and Gorenstein orders using syzygy functors.*
 (1532) **Jon F. Carlson***, University of Georgia, and **Klaus W. Roggenkamp**, University of Stuttgart (1003-16-1421)
- 4:00PM *Endo-trivial modules for finite groups of Lie type.*
 (1533) **Jon F. Carlson**, **Nadia P. Mazza*** and **Daniel K. Nakano**, University of Georgia (1003-20-622)
- 4:30PM *Finite p -groups and Lie orders.* Preliminary report.
 (1534) **J. L. Alperin**, University of Chicago (1003-20-27)
- 5:00PM *Permutation modules and incidence matrices.*
 (1535) **Peter K Sin**, University of Florida (1003-20-984)
- 5:30PM *Nilpotent orbits over ground fields of good characteristic.*
 (1536) **George J McNinch**, Tufts University (1003-20-611)

MAA Minicourse #11: Part B

1:00 PM – 3:00 PM

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

MAA Minicourse #13: Part B

1:00 PM – 3:00 PM

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

MAA Minicourse #5: Part B

1:00 PM – 3:00 PM

Hands-on discrete mathematics with technology.
 Organizers: **Douglas E. Ensley**, Shippensburg University
Katherine G. McGivney, Shippensburg University

AMS Session on Geometry

1:00 PM – 5:25 PM

- 1:00PM *Nodal sets and contact structures.*
 (1537) **Rafal Komendarczyk**, Georgia Tech (1003-51-1646)
- 1:15PM *Minimal Triangulations of Simplotopes and Cubes.*
 ▶ (1538) **Tyler Seacrest** and **Francis Edward Su***, Harvey Mudd College (1003-52-1642)

- 1:30PM *Packing for Frontier Life in Three Dimensional Space.*
 ▶ (1539) **Edwin H. Smith**, Jacksonville State University (1003-52-287)
- 1:45PM *Vertex replacement rules yield fractals.*
 ▶ (1540) **Michelle Previte**, Penn State Erie (1003-52-727)
- 2:00PM *Letter Representations of Rectangular $m \times n \times p$ Proper Arrays.* Preliminary report.
 ▶ (1541) **Jocelyn Quaintance**, Kutztown University (1003-52-93)
- 2:15PM *Harmonic forms on cohomogeneity one four manifolds.*
 (1542) **Eduard Chiru**, Bellarmine University (1003-53-1002)
- 2:30PM *Locally isotropic pseudo-Riemannian manifolds.* Preliminary report.
 (1543) **Iva Stavrov**, Lewis and Clark College (1003-53-1030)
- 2:45PM *Connected components of the space of positive scalar curvature metrics on spheres - concordance vs. cobordism.* Preliminary report.
 (1544) **Brian M Loft**, Sam Houston State University (1003-53-1064)
- 3:00PM *Riemannian Submersions of Compact Semisimple Lie Groups with Connected Totally Geodesic Fibers.* Preliminary report.
 (1545) **Marius I Munteanu**, SUNY College at Oneonta (1003-53-1208)
- 3:15PM *Para- φ -Lie Algebras.* Preliminary report.
 (1546) **Andrew Bucki**, Langston University (1003-53-1344)
- 3:30PM *A surgery model on open books and their holomorphic curves.* Preliminary report.
 (1547) **Mei-Lin Yau**, Michigan State University (1003-53-135)
- 3:45PM *Minimal Surfaces in Three Dimensional Sub-Riemannian Spaces.* Preliminary report.
 (1548) **Daniel Richard Cole**, Dartmouth College (1003-53-1451)
- 4:00PM *Energy and foliations on Riemann surfaces.*
 (1549) **Amine Fawaz**, The University of Texas of the Permian Basin (1003-53-1481)
- 4:15PM *Classification of Einstein metrics on $I \times S^3$.*
 ▶ (1550) **Curtis Tor Asplund***, Oberlin College, **Brian Krummel**, The University of Maryland, Baltimore County, **Evan D. Merrell**, Truman State University, **Robert T. Rachal**, Metairie, Louisiana, and **DaGang Yang**, Tulane University (1003-53-861)
- 4:30PM *CMC Spacelike Surfaces of Revolution in Minkowski 3-Space.* Preliminary report.
 ▶ (1551) **Sungwook Lee** and **Jeffrey H. Varnado***, University of Southern Mississippi (1003-53-989)
- 4:45PM *Iteration models and invariant measures for holomorphic self-maps of the unit disc.* Preliminary report.
 (1552) **William E. Hornor**, University of Southern Mississippi (1003-30-1490)
- 5:00PM *Spectral geometry of Moyal manifolds.*
 ▶ (1553) **Dmitri V. Vassilevich**, Institute for Theoretical Physics, Leipzig University (1003-58-46)
- 5:15PM *Spacelike CMC Surfaces in AdS 3-space $\mathbb{H}_1^3(-1)$ and Spinor Representation.* Preliminary report.
 (1554) **Sungwook Lee**, University of Southern Mississippi (1003-53-240)

AMS Session on Statistics, Numerical Analysis, II

1:00 PM – 5:40 PM

- 1:00PM *An Empirical Comparison of Several Popular Designs for Computer Experiments.*
 (1555) **Ofelia Marin**, Ohio State University (1003-62-1000)
- 1:15PM *Asymptotic Distributions of Buckley-James Estimator.* Preliminary report.
 (1556) **Fanhui Kong*** and **Qiqing Yu**, SUNY at Binghamton (1003-62-1012)
- 1:30PM *Strength and resolution of arbitrary fractional factorial designs.* Preliminary report.
 (1557) **Wiebke S. Diestelkamp***, University of Dayton, and **Jay H. Beder**, University of Wisconsin - Milwaukee (1003-62-1163)
- 1:45PM *Assessing the Risks of the Two Graft Versus Host Diseases.*
 (1558) **Mouchumi Bhattacharyya**, University of the Pacific (1003-62-1299)
- 2:00PM *Iterative Method for Regularized Total Least Squares.*
 (1559) **Hongbin Guo*** and **Rosemary A Renaut**, Arizona State University (1003-65-1613)
- 2:15PM *On Kernel Density Estimation for Censored Data.*
 ▶ (1560) **Kagba Nkrumah Suaray**, University of California at Riverside (1003-62-536)
- 2:30PM Break.
- 2:45PM *Rectangular Mixed Finite Elements for Elasticity.*
 (1561) **Gerard M Awanou*** and **Douglas Arnold**, IMA/University of Minnesota (1003-65-1126)
- 3:00PM *A comparison between the Adomian decomposition and the sinc-Galerkin methods.*
 (1562) **Ahmed I Zayed***, DePaul University, **Elias Deeba** and **Jeong-Mi Yoon**, University of Houston-Downtown (1003-65-1187)
- 3:15PM *Explicit Null Space of the Discrete Laplacian.* Preliminary report.
 ▶ (1563) **Hanna Joy VanderZee**, University of Illinois, Urbana-Champaign (1003-65-1357)
- 3:30PM *Minimal energy homogeneous spherical splines for data interpolation.*
 (1564) **Victoria Baramidze*** and **Ming Jun Lai**, The University of Georgia (1003-65-1415)
- 3:45PM *A 3-D Molecular Mechanics Simulation of Cracks and Fractures in a Solid under Stress.* Preliminary report.
 ▶ (1565) **Mark S. Korlie**, Montclair State University (1003-65-1478)
- 4:00PM *Multiple time scale numerical methods for highly oscillatory ODE.*
 (1566) **Richard W Sharp***, Princeton University, **Yen-Hsi Tsai** and **Bjorn Engquist**, University of Texas at Austin (1003-65-1573)
- 4:15PM Break.
- 4:30PM *Convergence rate of truncated Herimite polynomial chaos expansion and applications to finite element method for Stochastic Partial differential equations.*
 (1567) **Yanzhao Cao**, Florida A&M University (1003-65-324)
- 4:45PM *The Finite Element Method for Elliptic Problems with a highly oscillating coefficient containing singularities.*
 (1568) **Bongsoo Jang*** and **Haesoo Oh**, University of North Carolina at Charlotte (1003-65-400)
- 5:00PM *Fourth-order implicit scheme for acoustic waves.*
 (1569) **Hyeona Lim***, Mississippi State University, and **Seongjai Kim**, University of Kentucky (1003-65-531)

5:15PM *A Quasilinear Hierarchical Size Structured Model: Well-Posedness and Approximation.*
(1570) **Azmy Ackleh, Keng Deng**, University of Louisiana at Lafayette, and **Shuhua Hu***, University of Louisiana at Lafayette (1003-65-894)

5:30PM *Low-Storage Runge-Kutta Methods for Stochastic Differential Equations.*
▶ (1571) **Dongjin Kim*** and **Dan Stanescu**, University of Wyoming (1003-60-1585)

AMS Session on Math Biology

1:00 PM – 4:10 PM

1:00PM *Pairing Strategy Draws in 2-player N^d Tic-Tac-Toe.*
▶ (1572) **Klay T Kruczek**, Western Oregon University (1003-90-590)

1:15PM *Random Graphical Dynamical Systems.*
▶ (1573) **William H Sulis** and **Irina N. Trofimova***, McMaster University (1003-92-1093)

1:30PM *Disease outbreaks in coupled populations.*
▶ (1574) Preliminary report.
Kirsten Maggie Viz*, **Lora Billings**, Montclair State University, and **Ira B. Schwartz**, U.S. Naval Research Laboratory (1003-92-1153)

1:45PM *Protein Structure Determination by Analysis of Orientational Restraints obtained from Solid State Nuclear Magnetic Resonance.* Preliminary report.
▶ (1575) **Srisairam Achuthan***, **Jack Quine**, Florida State University, **Tom Asbury**, Institute of Molecular Biophysics, Florida State University, and **Richard Bertram**, Florida State University (1003-92-1211)

2:00PM *Mathematically Modeling Tumor Growth with Immune Response.* Preliminary report.
▶ (1576) **A. E. Radunskaya***, Pomona College, and **L. G. dePillis**, Harvey Mudd College (1003-92-142)

2:15PM *An Agent-Based Model of Nest Construction in Social Wasps.* Preliminary report.
▶ (1577) **Mike Phillips***, **Istvan Karsai** and **Jeff Knisley**, East Tennessee State University (1003-92-1627)

2:30PM *Modeling Tubuloglomerular Feedback in Coupled Nephrons with Backleak.* Preliminary report.
▶ (1578) **Amanda L Hattaway**, Wentworth Institute of Technology (1003-92-241)

2:45PM *Applications of Navier Stokes equations in blood dynamics.*
▶ (1579) **Mihaela D Iftime**, Massachusetts College of Pharmacy, Boston (1003-92-642)

3:00PM *Competitive Exclusion and Coexistence for a Quasilinear Size-Structured Population Model.*
(1580) **Azmy S Ackleh, Keng Deng** and **Xubo Wang***, University of Louisiana at Lafayette (1003-92-658)

3:15PM *A Mathematical Model of Atherogenesis as an Inflammatory Response.*
▶ (1581) **L. R. Ritter***, Texas A&M University, **A. I. Ibragimov**, Texas Tech University, **C. J. McNeal**, Dept. of Internal Medicine, Div. of Cardiology, Dept. of Pediatrics, Div. of Endocrinology Scott & White, and **J. R. Walton**, Texas A&M University (1003-92-849)

3:30PM *A hierarchical size-structured population model.*
(1582) **Azmy S Ackleh***, University of Louisiana at Lafayette, and **Kazufumi Ito**, North Carolina State University (1003-92-886)

3:45PM *Monotone Approximation for a Hierarchical Age-structured Population Model.*
(1583) **Azmy S Ackleh** and **Keng Deng***, University of Louisiana at Lafayette (1003-92-890)

4:00PM *Modelling the Ultradian Oscillations of Insulin Secretion with Two Time Delays.* Preliminary report.
(1584) **Jiaxu Li*** and **Yang Kuang**, Arizona State University (1003-92-1572)

MAA Session on Mathematical Experiences for Students Outside the Classroom

1:00 PM – 4:25 PM

Organizers: **Kay B. Somers**, Moravian College
Jody M. Sorensen, Grand Valley State University

1:00PM *The P's and Q's of an Active and Effective Undergraduate Math Club.* Preliminary report.
▶ (1585) **Sarah V. Cook**, Washburn University (1003-U1-877)

1:15PM *Some Success Stories from Slippery Rock.*
▶ (1586) **J. Lyn Miller**, Slippery Rock University of Pennsylvania (1003-U1-413)

1:30PM *The Southeastern Math Club's Activities and Experiences: Successes and Failures.* Preliminary report.
▶ (1587) **Lee Ann Rayburn**, Southeastern Oklahoma State University (1003-U1-1495)

1:45PM *Sonia Kovalevsky Math Day.*
▶ (1588) **AbdelNaser Al-Hasan**, Mount Mary College (1003-U1-682)

2:00PM *A Mathematical Tournament.*
▶ (1589) **Maureen T Carroll**, University of Scranton (1003-U1-1282)

2:15PM *Faculty-Student Connection Outside of the Classroom.*
▶ (1590) **Maureen Doyle***, **Nathan Gilbert** and **Amanda Thompson**, Morehead State University (1003-U1-1398)

2:30PM *Starting a Basic Notions Seminar for Undergraduates.*
(1591) **Edward W. Welsh**, Westfield State College (1003-U1-458)

2:45PM *The Anatomy of an Undergraduate Mathematics Conference.*
(1592) **Michael Fraboni**, Moravian College (1003-U1-780)

3:00PM *Inland Northwest Math Experience Its IN ME ... is it in YOU?*
▶ (1593) **Kimberly M. Vincent**, Washington State University (1003-U1-1608)

3:15PM *This is Jeopardy!*
▶ (1594) **John M. Harris**, Furman University (1003-U1-1191)

3:30PM *Whetting Young Mathematical Appetites: The Trinity Triathlon.* Preliminary report.
▶ (1595) **Sharon K. Robbert*** and **David B. Klanderaman**, Trinity Christian College (1003-U1-370)

3:45PM *Math Bowl: Running a mathematics trivia contest.*
(1596) **Gary Gordon** and **Elizabeth McMahan***, Lafayette College (1003-U1-440)

4:00PM *Everybody Loves a Good Problem!*
▶ (1597) **Patricia L Hale**, Cal Poly Pomona (1003-U1-335)

4:15PM *Group problem-solving on a Low Ropes Course.*
▶ (1598) **Emily E. Puckette**, Sewanee: The University of the South (1003-U1-678)

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

1:00 PM – 4:15 PM

Organizers: **William O. Martin**, North Dakota State University
Barbara E. Edwards, Oregon State University

- Draga D. Vidakovic**, Georgia State University
- ▶ 1:00PM (1599) *A Tool for Describing Students' Journey to Proficiency in Proof.*
Jacqueline M. Dewar* and **Curtis D. Bennett**, Loyola Marymount University (1003-V1-800)
- ▶ 1:15PM (1600) *Using Web-Based Testing Software for Calculus Instruction.* Preliminary report.
Glenn Ledder, University of Nebraska-Lincoln (1003-V1-956)
- ▶ 1:30PM (1601) *A Study in First-Semester Calculus using Various Technologies.* Preliminary report.
Erick Brian Hofacker* and **Pam Katzman**, University of Wisconsin-River Falls (1003-V1-914)
- ▶ 1:45PM (1602) *Assisting students in coordinating between two equivalent definitions in the case of exponential functions.*
May Hamdan, Lebanese American University (1003-V1-824)
- ▶ 2:00PM (1603) *The Effects of a Web-based Application on Teaching and Learning Calculus I.* Preliminary report.
Andrew J Incognito* and **Sophia Tan**, Coastal Carolina University (1003-V1-391)
- ▶ 2:15PM (1604) *Investigating Factors that Affect Student Achievement in Virtual Business Calculus.* Preliminary report.
Brian H Felkel, Appalachian State University (1003-V1-339)
- ▶ 2:30PM (1605) *Creating and Using Online Quizzes to Enhance Student Learning.*
Manmohan Kaur, Benedictine University (1003-V1-457)
- ▶ 2:45PM (1606) *A Case Study in the use of Course Portfolios in the Scholarship of Teaching and Learning.*
Troy L. Goodsell, Brigham Young University-Idaho (1003-V1-809)
- ▶ 3:00PM (1607) *Playing Games to Learn College Mathematics.* Preliminary report.
Edwin P Herman, University of Wisconsin, Stevens Point (1003-V1-384)
- ▶ 3:15PM (1608) *Using MERLOT to turn research into research that has impact.*
Bernd S. W. Schroeder*, Louisiana Tech University, **James Rutledge**, St. Petersburg College, and **Alice Bedard-Voorhees**, Colorado Community Colleges Online (1003-V1-759)
- ▶ 3:30PM (1609) *Some Ideas About the Frequency of Assessment in Lower Level Mathematics Courses.* Preliminary report.
Ellen F Hill, Minnesota State University Moorhead (1003-V1-367)
- ▶ 3:45PM (1610) *Course Redesign.* Preliminary report.
Margo P Alexander*, Georgia State University, Atlanta, GA, **Jean Bevis**, Georgia State University, Atlanta, GA, and **Valerie Miller**, Georgia State University (1003-V1-106)
- ▶ 4:00PM (1611) *Teaching an ON-Line Business Calculus Course.*
Cornelius Nelan, Quinnipiac University (1003-V1-1190)

MAA Session on In-Service Training Programs For K-12 Mathematics Teachers, II

1:00 PM – 2:55 PM

- Organizers: **Zsuzsanna Szaniszló**, Valparaiso University
Judith L. Covington, Louisiana State University, Shreveport
Tamas Szabo, Weber State University

- ▶ 1:00PM (1612) *Summer Institute on Probability and Statistics for Middle-grades Teachers - A Report on an ESEA Title IIB MSP Grant Project.* Preliminary report.
Martha VanCleave*, Linfield College, and **Michael Boardman**, Pacific University (1003-W1-220)
- ▶ 1:20PM (1613) *Math ADEPT: a working model for teacher professional development which builds professional communities of learners.* Preliminary report.
Harel Barzilai* and **Homer Austin**, Salisbury University (1003-W1-210)
- ▶ 1:40PM (1614) *A Partnership to Improve Middle Grades Teachers' Content Knowledge.*
A. Susan Gay, University of Kansas (1003-W1-494)
- ▶ 2:00PM (1615) *Conceptual Mathematics Institute at Augsburg College.*
Tracy Bibelnieks, **Matthew J Haines*** and **Linda Stevens**, Augsburg College (1003-W1-666)
- ▶ 2:20PM (1616) *The ETSU M.S. Program in the Teaching of K-8 Mathematics.* Preliminary report.
Anant Godbole, East Tennessee State University (1003-W1-723)
- ▶ 2:40PM (1617) *Comprehensive Math Instruction Professional Development Program.* Preliminary report.
Janet Walter, **Blake Peterson**, **Candice Ridlon**, **Sterling Hilton**, **Richard Sudweeks**, Brigham Young University, **Nedra Call**, Nebo School District, **Julie Warren**, Mapleton Elementary School, **Mel Twitchell**, Provo School District, and **Michael Dorff***, Brigham Young University (1003-W1-632)

MAA General Contributed Paper Session, VII

1:00 PM – 4:25 PM

- Organizers: **Daniel E. Otero**, Xavier University
Michael A. Jones, Montclair State University
Thomas A. Hern, Bowling Green State University
Janice B. Walker, Xavier University
- ▶ 1:00PM (1618) *An approach to Portfolio Selection with Some Potential Satisfactory Solutions.*
A. Chunxiang, Xi'dian University (1003-X1-199)
- ▶ 1:15PM (1619) *An algorithm for perturbed second-order cone programs.* Preliminary report.
Yu Xia, McMaster University (1003-X1-448)
- ▶ 1:30PM (1620) *Modeling the MinCDE System in Escherichia coli.* Preliminary report.
Gretchen A Koch* and **Donald A Drew**, Rensselaer Polytechnic Institute (1003-X1-534)
- ▶ 1:45PM (1621) *Fast wavelet collocation methods for second kind integral equations using parallel computing.* Preliminary report.
Yi Wang, Fairmont State University (1003-X1-1179)
- ▶ 2:00PM (1622) *Inverse Scattering: Inversion of Gamow's Formula.*
Sohang Chander Gandhi, University of Central Florida (1003-X1-740)
- ▶ 2:15PM (1623) *The Partial Sums of $\sum_{k=1}^{\infty} \sin(kx)$ and their Relationship to the Saw-Tooth Function.*
Michael A. Brilleslyper, U. S. Air Force Academy (1003-X1-296)
- ▶ 2:30PM (1624) *Orthogonal quadruple systems and 3-frames.*
William Brian Muse*, Columbus State University, and **K. T. Phelps**, Auburn University (1003-X1-1540)
- ▶ 2:45PM (1625) *Billiards with polynomial mixing rates.*
Hong-Kun Zhang, University of Alabama at Birmingham (1003-X1-311)

- 3:00PM *Revisiting Interval Maps with Thick Cantor Sets.*
 ▶ (1626) **Fernanda Botelho** and **J. Angela Murdock***,
 University of Memphis (1003-X1-1017)
- 3:15PM *The Aeroacoustics of Turbulent Coanda Jet Flows.*
 ▶ (1627) **Caroline Smith**, James Madison University
 (1003-X1-908)
- 3:30PM *Techniques For Resource Selection Studies Using
 Correlated Data.*
 (1628) **Ashraf F. EL-Houbi**, John Carroll University
 (1003-X1-1173)
- 3:45PM *How a truck driver's question about water glasses
 leads to Cantor sets and unusual probability
 distributions.*
 ▶ (1629) **Kevin Iga**, Pepperdine University (1003-X1-1461)
- 4:00PM *Navier-Stokes Equations and Biofluid Dynamics.*
 (1630) **M D Iftime**, MCPHS, Boston (1003-X1-326)
- 4:15PM *High Frequency Response to Low Frequency Forcing
 in a Nonlinear Mechanical Model.*
 ▶ (1631) **Krista O'Neill**, University of Connecticut
 (1003-X1-1629)

Panelists: **William G. McCallum**, University of
 Arizona
Judith Roitman, University of Kansas
Robert P. Moses

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

1:00 PM – 2:20 PM

Faculty development for adjuncts and new faculty.
 Organizer: **Donald B. Small**, U.S. Military Academy
 Moderator: **Philip H. Mahler**, Middlesex
 Community College
 Panelists: **Michael D. Phillips**, U.S. Military
 Academy
William E. Haver, Virginia
 Commonwealth University
Robert Kimball, Wake Tech
 Community College
Pat Shure, University of Michigan

MAA Invited Paper Session on Symmetry in Analysis

1:00 PM – 2:55 PM

- Organizer: **Steven Krantz**, Washington University
 in St. Louis
- 1:00PM *Orbifolds, Regular Solids, and the Hurwitz 84(g-1)
 Theorem.*
 ▶ (1632) **Robert E. Greene**, University of California, Los
 Angeles (1003-Z1-63)
- 1:30PM *One-parameter subgroup arising from a discrete
 non-compact automorphism group of a domain.*
 ▶ (1633) **Kang-Tae Kim**, Pohang University of Science and
 Technology (1003-Z1-65)
- 2:00PM *The order of contact of a holomorphic ideal.
 Blow-up and finiteness of testing set.*
 (1634) **Jeffery D McNeal**, Ohio State University
 (1003-Z1-29)
- 2:30PM *Symmetry in Minimal Surfaces.*
 (1635) **Harold R. Parks**, Oregon State University
 (1003-Z1-44)

AWM Workshop Panel Discussion

1:00 PM – 2:25 PM

Shaping a career in mathematics.
 Moderator: **Dawn A. Lott**, Delaware State
 University
 Panelists: **Pamela Cook**, University of Delaware
Helen Moore, American Institute of
 Mathematics
Anne Trenk, Wellesley College

MAA Special Presentation

1:00 PM – 2:20 PM

*First-semester calculus: Meeting the needs of our
 students.*
 Organizers: **David M. Bressoud**, Macalester
 College
William E. Haver, Virginia
 Commonwealth University
 Panelists: **Nancy Baxter Hastings**, Dickinson
 College
Herbert E. Kasube, Bradley University
Kay B. Somers, Moravian College
Rod Sturdivant, U.S. Military Academy

ASL Invited Address

1:20 PM – 2:10 PM

(1636) *Projective well-orderings of the reals.*
Andres Caicedo, Institut fur formale Logik, Vienna

ASL Invited Address

2:25 PM – 3:15 PM

(1637) *A asymptotic differential algebra.*
Matthias Aschenbrenner, University of Illinois at
 Chicago

**AWM Workshop: Research Presentations by Recent
 Women Ph.D.'s, II**

2:30 PM – 4:20 PM

2:30PM *Hypercyclic and Supercyclic Operators in the Weak
 Topology of Banach Spaces.*
 (1638) **Rebecca L Sanders**, Marquette University

3:00PM *The Cayley-Bacharach Theorem and Coding Theory.*
 (1639) **Leah H. Gold**, Texas A&M University

3:30PM *Distinguishing chambers of the moment polytope.*
 (1640) **Tara S. Holm***, University of California, Berkeley,
Rebecca F. Goldin, George Mason University, and
Lisa C. Jeffrey, University of Toronto

4:00PM *Lifting maps from a vector space of Jacobi cusp
 forms to a subspace of certain elliptic modular
 forms.*
 (1641) **Kathrin Bringmann**, University of Wisconsin

MAA Panel Discussion

1:00 PM – 3:00 PM

*Using mathematically rich activities to develop
 K-12 curricula, part II.*
 Organizers: **Robert P. Moses**, Cambridge, MA
Robert E. Megginson, Mathematical
 Sciences Research Institute
Ed Dubinsky, Kent State University

MAA Committee on Mathematics and the Environment Panel Discussion

2:30 PM – 3:50 PM

Mathematical outreach and the environment.

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

Panelists: **James M. Wright**, Green Mountain College

Michael P. Cohen

William Dean Stone, New Mexico Tech

AMS Banquet

7:30 PM – 10:30 PM

Lesley M. Sibner
AMS Associate Secretary
Brooklyn, New York

James J. Tattersall
MAA Associate Secretary
Providence, Rhode Island

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

2:30 PM – 3:50 PM

Open discussion on refocusing the courses before calculus.

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

Moderator: **Jack Bookman**, Duke University

Panelists: **Nancy Baxter Hastings**, Dickinson College

Bruce Crowder, Oklahoma State University

MAA Minicourse #6: Part B

3:15 PM – 5:15 PM

Webwork, an Internet-based system for generating and delivering homework problems to students.

Organizers: **Arnold K. Pizer**, University of Rochester

Michael E. Gage, University of Rochester

Vicki Roth, University of Rochester

MAA Invited Paper Session on Worlds of Interactive Mathematics, Part II: The Legacy of James E. White

3:15 PM – 5:10 PM

Organizers: **Ananda Gunawardena**, Carnegie Mellon University

Dan Kalman, American University

Gerald J. Porter, University of Pennsylvania

3:15PM *James White's Work.*
▶ (1642) **Dan Kalman***, American University, and **Gerald J Porter**, University of Pennsylvania (1003-Z3-397)

3:45PM Discussion.

4:15PM *Interactive Investigation of Geometry through Light Rays.*
▶ (1643)

Margie Hale, Stetson University (1003-Z3-470)

4:45PM *Using Mathwright to Develop Interactive Workbooks for Precalculus.*
▶ (1644)

James E Miller, West Virginia University (1003-Z3-1675)

AMS Notices Tenth Anniversary Reception

5:00 PM – 6:00 PM

AMS Banquet Reception

6:30 PM – 7:30 PM