
Program of the Sessions

Washington, District of Columbia, January 19–22, 2000

Monday, January 17

AMS Short Course on Quantum Computation: The Grand Mathematical Challenge for the 21st Century and the Millennium

9:00 AM – 5:00 PM

Organizer: **Samuel J. Lomonaco**, University of Maryland Baltimore County

AMS Short Course on Environmental Mathematics

9:00 AM – 5:00 PM

Organizer: **V. S. Manoranjan**, Washington State University

MAA Short Course on Fuzzy Mathematics

9:00 AM – 5:00 PM

Organizer: **Kiran Bhutani**, Catholic University of America

Tuesday, January 18

MAA Board of Governors

8:30 AM – 4:00 PM

AMS Short Course on Quantum Computation: The Grand Mathematical Challenge for the 21st Century and the Millennium

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AMS Council

1:00 PM – 6:00 PM

Joint Meetings Registration

3:00 PM – 7:00 PM

Gala Reception and Opening Banquet

6:30 PM – 10:00 PM

Wednesday, January 19

Joint Meetings Registration

7:30 AM – 4:00 PM

Mathematical Sciences Employment Center

7:30 AM – 5:00 PM

Open for receipt of all interview request forms (forms accepted between 9:30 a.m. and 4:00 p.m.; none accepted on Thursday or Friday).

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

8:00 AM – 10:50 AM

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

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

- 8:00AM *A Survey of the Function Literature: What Have we Learned?*
▶ (1) **Marilyn P. Carlson**, Arizona State University (950-98-1014)
- 8:30AM *Undergraduate Mathematics Students' Understanding of the Role of Definitions and the Consequences of These Understandings on Students' Ability to Use Definitions in a Mathematically Acceptable Way.*
(2) **Barbara S Edwards**, Oregon State University (950-98-454)
- 9:00AM *Effects on students learning topics in collegiate mathematics of pedagogy based on APOS Theory, using cooperative learning, students writing computer programs and in-class problem solving.*
▶ (3) **Ed Dubinsky**, Georgia State University (950-98-597)
- 9:30AM *Minorities are Invisible in Mathematics.* Preliminary report.
▶ (4) **William Y Velez**, University of Arizona (950-98-507)
- 10:00AM *Attracting Undergraduate Minorities To Mathematics.*
▶ (5) **Etta Z. Falconer**, Spelman College (950-98-1091)
- 10:30AM *Increasing the number of minority Ph.D.s in mathematics.* Preliminary report.
▶ (6) **David Manderscheid**, University of Iowa (950-97-102)

AMS Special Session on Mathematical Aspects of Consensus Theory, I

8:00 AM – 10:45 AM

Organizer: **Melvin F. Janowitz**, University of Massachusetts, Amherst

- 8:00AM Welcoming Remarks, M.F. Janowitz
- 8:05AM *Understanding Arrow's Theorem and voting paradoxes through symmetry.*
▶ (7) **Donald G Saari**, Northwestern University (950-91-196)
- 8:45AM *Optimal Voting Rules.*
(8) **H. Peyton Young**, Johns Hopkins University (950-90-662)
- 9:25AM *Probabilistic Preferences, Random Utilities and Majority Rule Social Welfare.* Preliminary report.
▶ (9) **Michel Regenwetter**, Fuqua School of Business, Duke University (950-91-696)
- 9:55AM *Using the local majority rule to reach an agreement on the global majority.* Preliminary report.
▶ (10) **Aleksandar Pekec**, Duke University (950-05-676)
- 10:25AM *A Comparison of Dodgson's Method and Kemeny's Rule.*
(11) **Tommy Ratliff**, Wheaton College (950-90-353)

AMS Special Session on Holomorphic Dynamics and Related Issues, I

8:00 AM – 11:00 AM

Organizers: **Mikhail Lyubich**, SUNY at Stony Brook
Kevin Pilgrim, University of Missouri at Rolla
Michael Yampolsky, Institut des Hautes Études

- 8:00AM *Dynamics in two complex dimensions.* Preliminary report.
(12) **John Smillie***, Cornell University, and **Eric Bedford**, Indiana University (950-37-1159)
- 8:50AM *Growing trees, laminations and the dynamics on the Julia set.*
(13) **Alexander Blokh***, University of Alabama at Birmingham, and **Genadi Levin**, Hebrew University of Jerusalem (950-37-1101)

- 9:20AM *Pruning, homoclinic orbits and the partial order on horseshoe braids.*
(14) **Andre de Carvalho***, IMS - SUNY at Stony Brook, and **Toby Hall**, University of Liverpool (950-58-1138)
- 9:50AM *Dynamics of iterated exponential maps: Dynamic rays and parameter space.*
(15) **Dierk Schleicher**, SUNY Stony Brook & TU Muenchen (950-30-451)
- 10:20AM *The global topology of deformation spaces of hyperbolic 3-manifolds.*
(16) **James W Anderson**, University of Southampton, **Richard D Canary***, University of Michigan, and **Darryl McCullough**, University of Oklahoma (950-57-626)

AMS Special Session on Beautiful Graph Theory, I

8:00 AM – 10:50 AM

Organizers: **Gary Chartrand**, Western Michigan University
Frank Harary, New Mexico State University

- 8:00AM *Full Domination in Graphs.* Preliminary report.
(17) **Robert C Brigham**, University of Central Florida, **Gary Chartrand**, Western Michigan University, **Ronald D Dutton**, University of Central Florida, and **Ping Zhang***, Western Michigan University (950-05-709)
- 8:30AM *On Minimal Ultimately Economical Supergraphs.* Preliminary report.
▶ (18) **Curtis Clark**, Morehouse College (950-05-1169)
- 9:00AM *Monotone Reachability in Arc Colored Tournaments.* Preliminary report.
▶ (19) **K. B. Reid**, California State University San Marcos (950-05-979)
- 9:30AM *On the Planarity of Iterated Jump Graphs.*
(20) **Gary Chartrand***, Western Michigan University, **Heather Gavlas**, Grand Valley State University, **Hector Hevia**, Universidad Adolfo Ibanez, Vina del Mar, Chile, **Donald W VanderJagt**, Grand Valley State University, and **Ping Zhang**, Western Michigan University (950-05-715)
- 10:00AM *Critical and Stable Graphs with Total Irredundance of Zero.*
(21) **Teresa W Haynes**, East Tennessee State University, **Steve Hedetniemi**, Clemson University, **Michael Henning**, University of Natal, and **Debra J Knisley***, East Tennessee State University (950-05-978)
- 10:30AM *Excellent Graphs.*
(22) **Gerd H Fricke**, Wright State University, **Teresa W Haynes***, East Tennessee State University, **Sandee S Hedetniemi**, **Stephen T Hedetniemi** and **Renu C Laskar**, Clemson University (950-05-857)

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

8:00 AM – 10:50 AM

Organizers: **Dubravko Ivansic**, George Washington University
Mark E. Kidwell, U.S. Naval Academy
Jozef H. Przytycki, George Washington University
Yongwu Rong, George Washington University
Ted Stanford, U. S. Naval Academy

- 8:00AM *On a theorem of Wu.*
▶ (23) **Lorenzo Traldi**, Lafayette College (950-57-267)

- 8:30AM (24) *SL(2, C) Representations of Tunnel Number One Knots*. Preliminary report.
Hugh M Hilden, University of Hawaii, **Debora M Tejada*** and **Margarita M Toro**, Universidad Nacional de Colombia (950-57-242)
- 9:00AM (25) *On the Homflypt skein module of $S^1 \times S^2$* . Preliminary report.
Jianyuan Zhong* and **Patrick M Gilmer**, Louisiana State University (950-57-574)
- 9:30AM (26) *Symmetry of quantum link invariants*.
Thang T Le, SUNY Buffalo (950-57-1280)
- 10:00AM (27) *A note on the mapping class group and positive Dehn twists*.
Feng Luo, Rutgers University (950-57-797)
- 10:30AM (28) *On the relationship between the A-polynomial and the Jones polynomial*. Preliminary report.
Razvan Gelca, University of Michigan (950-57-272)

AMS Special Session on Quantum Computation and Information, I

8:00 AM – 10:45 AM

Organizers: **Samuel J. Lomonaco, Jr.**, University of Maryland, Baltimore County
Howard E. Brandt, Army Research Labs

- 8:00AM (29) *The entanglement-assisted capacity of a quantum channel*.
Peter W Shor, AT&T Labs – Research (950-94-77)
- 8:35AM (30) *Manipulating pure state quantum entanglement*.
Lucien Hardy, Oxford University, UK (950-81-74)
- 9:10AM (31) *On the structure of the entangled states*. Preliminary report.
Michael A Nielsen, California Institute of Technology (950-81-92)
- 9:45AM (32) *Improved two-party and multi-party purification protocols*.
John A Smolin*, IBM Research, and **Elitza N Makeva**, California Institute of Technology (950-81-1105)
- 10:20AM (33) *Entangled chains*.
William K Wootters, Williams College (950-81-1054)

AMS Special Session on Singularities in Algebraic and Analytic Geometry, I

8:00 AM – 10:50 AM

Organizers: **Ruth I. Michler**, University of North Texas
Caroline Melles, U. S. Naval Academy

- 8:00AM (34) *Complete Kahler Metrics for Singular Toroidal Varieties*. Preliminary report.
Caroline G Melles*, U. S. Naval Academy, and **Pierre Milman**, University of Toronto (950-14-716)
- 8:30AM (35) *Pure Hodge structure on the L_2 -cohomology of varieties with isolated singularities*.
William Pardon* and **Mark Stern**, Duke University (950-14-1151)
- 9:20AM (36) *Equivariant intersection homology of toric varieties, Poincaré duality, and extensions of IH sheaves*. Preliminary report.
Tom C Braden, Harvard University (950-14-924)
- 10:00AM (37) *Combinatorial Intersection Cohomology of Toric Varieties*.
Karl-Heinz Fieseler, Uppsala University (950-14-1273)

AMS Special Session on Integral Equations and Applications, I

8:00 AM – 10:55 AM

Organizers: **Constantin Corduneanu**, University of Texas at Arlington
Mehran Mahdavi, Bowie State University

- 8:00AM (38) *Integrodifferential equations with non-autonomous operators*.
James H Liu, James Madison University (950-45-234)
- 8:30AM (39) *On integral equation in inverse spectral problems*. Preliminary report.
Eduard R Tsekanovskii, Niagara University (950-45-40)
- 9:00AM (40) *Arbitrary Order Linear Ordinary Differeintegral Equations with Polynomial Coefficients*.
Ismail Ali, Kuwait University (950-34-22)
- 9:30AM (41) *Stability preservation for functional differential equations with causal operators*.
Constantin C. Corduneanu*, The University of Texas at Arlington, and **Yizeng Li**, The Tarrant County College, Hurst, Texas (950-45-511)
- 10:00AM (42) *Self-similar Asymptotics for Hyperbolic Integrodifferential Equations*. Preliminary report.
Hans P Engler, Georgetown University (950-45-818)
- 10:35AM (43) *Locally Quasi-Dissipative Evolution Equation and Application to Functional Differential Equations*.
Kazufumi Ito, North Carolina State University (950-39-897)

AMS Special Session on Operator Algebras, I

8:00 AM – 10:50 AM

Organizers: **May M. Nilsen**, University of Nebraska, Lincoln, and Texas A&M University
David R. Pitts, University of Nebraska, Lincoln

- 8:00AM (44) *Quantum Dixmier algebras*. Preliminary report.
Iwan Praton, Franklin and Marshall College (950-17-297)
- 8:30AM (45) *The Exactness and Novikov Conjectures for Discrete Groups*. Preliminary report.
Erik Guentner* and **Jerome Kaminker**, IUPUI (950-47-936)
- 9:00AM (46) *Non-commutative n -tuples and dilation theory*.
David W Kribs, University of Waterloo (950-47-238)
- 9:30AM (47) *Approximation properties of group C^* -algebras, boundaries, and the Novikov Conjecture*.
Erik Guentner and **Jerome Kaminker***, IUPUI (950-46-834)
- 10:00AM (48) *Applications of free entropy to von Neumann algebras*.
Liming Ge*, Univ. of New Hampshire, and **Junhao Shen**, Univ. of Penn. (950-46-962)
- 10:30AM (49) *Wandering Vector Multipliers*.
Deguang Han, McMaster University, and **David R Larson***, Texas A&M University (950-47-973)

MAA Minicourse #12: Part A

8:00 AM – 10:00 AM

Transforming anxiety into hatred: Rethinking this standard model of reaching liberal arts students and the general public.

Organizers: **Edward B. Burger**, Williams College
Michael Starbird, University of Texas at Austin

MAA Minicourse #1: Part A

8:00 AM – 10:00 AM

Mathematical finance.

Organizer: **Walter R. Stromquist**, Berwyn, PA

MAA Minicourse #7: Part A

8:00 AM – 10:00 AM

Getting students involved in undergraduate research.

Organizers: **Joseph A. Gallian**, University of Minnesota-Duluth
Aparna W. Higgins, University of Dayton
Stephen G. Hartke, Rutgers University

AMS Session on Algebraic Geometry

8:00 AM – 8:55 AM

- 8:00AM (50) *Characteristic Pairs Along the Resolution Sequence.*
Kent M Neuerburg, Southeastern Louisiana University (950-14-115)
- 8:15AM (51) *On polarized surfaces of low degree whose adjoint bundles are not spanned.*
Gian Mario Besana*, Eastern Michigan University, and **Sandra Di Rocco**, Royal Institute of Technology (950-14-477)
- 8:30AM (52) *A Construction of Codes from Higher-dimensional Varieties.*
Gary L Salazar, Louisiana State University (950-14-882)
- 8:45AM (53) *Open subschemes of $\text{Hilb}_{\mathbb{A}_k^n}^n$ that are isomorphic to \mathbb{A}_k^{2n} .* Preliminary report.
Mark E Huibregtse, Skidmore College (950-14-1150)

AMS General Session

8:00 AM – 10:40 AM

- 8:00AM (54) *“Speed-up” properties of major subsets and supersets of computably enumerable sets.* Preliminary report.
Lisa R Galminas, Northwestern State University of LA (950-03-1204)
- 8:15AM (55) *Möbius Inversion and Codes over Rings.*
Marcus Greferath, Ohio University, and **Stefan E Schmidt***, M.I.T. (950-05-1010)
- 8:30AM (56) *Free stochastic measures via noncrossing partitions.*
Michael Anshelevich, UC Berkeley (950-46-1058)
- 8:45AM (57) *Minimal matrices and Kronecker products.* Preliminary report.
Ernesto Vallejo, National University of Mexico (950-05-1163)
- 9:00AM (58) *A new face ring for mixed simplicial and cubical complexes.* Preliminary report.
Margaret A. Readdy, Stockholm University (950-05-758)
- 9:15AM (59) *The V-invariant of a polynomial knot.*
Alan H Durfee, Mount Holyoke College (950-57-149)
- 9:30AM (60) *Transitions of Ridges in Parameterized Families of Functions.*
Robert S Keller, Loras College (950-68-1130)
- 9:45AM (61) *Some integral equations from the theory of probability.* Preliminary report.
Ty Lee, University of Maryland (950-45-54)

- 10:00AM (62) *Efficient computing of minimum-cost grid network flows and applications to the discrete Monge-Kantorovich mass transfer problem.* Preliminary report.
Eugene Belogay, Purdue University (950-90-1258)
- 10:15AM (63) *A Structure Theory and Related Results for Orthomodular Lattices with Applications to Non-Commutative Measure Theory and Quantum Logic.* Preliminary report.
Bruce J Legan*, St. Paul’s College, and **Richard J Greechie**, Louisiana Tech University (950-06-164)
- 10:30AM (64) *The Mindy Waterhouse method for selecting an supremum point.* Preliminary report.
C. S. Felicitas, C.F.C.T.E., Inc. (950-68-04)

MAA Session on The Use of History in the Teaching of Mathematics, I

8:00 AM – 10:55 AM

Organizers: **V. Frederick Rickey**, United States Military Academy
Florence Fasanelli, College-University Resource Institute
Victor J. Katz, University of the District of Columbia

- 8:00AM (65) *Using projects involving technology in a history of mathematics class.*
Lee H Armstrong, University of Central Florida (950-A1-312)
- 8:20AM (66) *HPM-History and Pedagogy of Mathematics: An Exploration of Scope and Barriers.*
Alphonse Buccino, University of Georgia Emeritus (950-A1-555)
- 8:40AM (67) *Original Sources vs. Survey.*
Linda Marie Saliga, The University of Akron (950-A1-865)
- 9:00AM (68) *Modern Mathematical Revolutions: A Historical Approach.* Preliminary report.
Robert W Case, Northeastern University (950-A1-1161)
- 9:20AM (69) *Addressing Two-Year College Challenges Using Math History.* Preliminary report.
Joanne V Peeples, El Paso Community College (950-A1-1070)
- 9:40AM (70) *Using Near-original Sources in the Graduate Analysis Course for Teachers.*
Phillip E Johnson, UNC Charlotte (950-A1-397)
- 10:00AM (71) *Getting to One: Pre-Service Teachers meet Zeno.*
Joan D Lukas*, University of Massachusetts Boston, and **Judy Clark**, University of Massachusetts (950-A1-763)
- 10:20AM (72) *Teaching calculus at three Argentinian universities during the period 1991-1999: A comparison.*
Sandra Aida Visokolskis, University of Cordoba, and **Carla Fernanda Gomez***, Blas Pascal University (950-A1-988)
- 10:40AM (73) *Historically Inspired Curriculum Development Projects as Part of an M.A.T. Program in Mathematics.* Preliminary report.
David Dennis, Univ. of Texas at El Paso (950-A1-953)

MAA Session on Integrating Mathematics and Other Disciplines, I

8:00 AM – 10:55 AM

Organizers: **William G. McCallum**, University of Arizona
Duff G. Campbell, United States Military Academy

Deborah Hughes Hallett, University of Arizona
David C. Lay, University of Maryland, College Park
Nicholas Losito, SUNY Farmingdale
Jim Rolf, United States Military Academy
Yajun Yang, SUNY Farmingdale

- 8:00AM *Calculus That Matters in the Life Sciences.*
▶ (74) **Patti Frazer Lock**, St. Lawrence University (950-B1-785)
- 8:15AM *Spreadsheets and Mathematics for the Life Sciences.*
▶ (75) **Edward H Grossman*** and **Jane Gallagher**, City College of CUNY (950-B1-611)
- 8:30AM *The Biology and Economics of Bee-keeping: A Native American Summer Program.* Preliminary report.
▶ (76) **Kate G McGivney*** and **Joseph C Watkins**, University of Arizona (950-B1-986)
- 8:45AM *Creating an Integrated Biology and Mathematics Course for High School Students.*
(77) **Juan Estrada** and **Michael D Green***, Metropolitan State University (950-B1-633)
- 9:00AM *BioCalc at Illinois.*
▶ (78) **Jerry Uhl***, Univ of Illinois at Urbana, and **Sandy Lazarowitz**, Cornell University (950-B1-460)
- 9:15AM *Motivating Calculus Concepts with Physics Labs.*
▶ (79) **Mysore S Jagadish*** and **John F Goehl**, Barry University (950-B1-547)
- 9:30AM *Modeling the Flight of a Missile.*
▶ (80) **Gerald C Kobylski***, **Randall E Donaldson** and **Bryndol Sones**, United States Military Academy (950-B1-761)
- 9:45AM *Integration of Mathematics and Physics: Workshop and Interdisciplinary Course.* Preliminary report.
▶ (81) **Yuen S Chinn*** and **Irina L Neymotin**, SUNY-Farmingdale (950-B1-745)
- 10:00AM *The Golden Ratio in Physics - Revisited.*
▶ (82) **Tom Foley**, St. Joseph's University (950-B1-895)
- 10:15AM *Conversations with Electrical Engineers.* Preliminary report.
▶ (83) **William G McCallum**, University of Arizona (950-B1-1026)
- 10:30AM *Interdisciplinary Curriculum - Natural or Synthetic?*
▶ (84) **Gary W Krahn**, United States Military Academy (950-B1-1094)
- 10:45AM *Curriculum Design: Seeking Guidance from the Partner Disciplines.* Preliminary report.
▶ (85) **William Barker**, Bowdoin College (950-B1-755)

MAA Session on Innovative Uses of the World Wide Web in Teaching Mathematics, I

8:00 AM – 10:40 AM

Organizers: **Brian E. Smith**, McGill University
Marcelle Bessman, Jacksonville University

- 8:00AM *Numbers, News, and the Net.*
(86) **John M. Harris** and **Gregory S. Rhoads***, Appalachian State University (950-C1-598)
- 8:15AM *MATtours: Inquiry-based hypertext materials in discrete mathematics.*
▶ (87) **Larry Copes**, Augsburg College and Institute for Studies in Educational Mathematics (950-C1-1009)
- 8:30AM *Using Javascript for an Active Discrete Math Class.*
▶ (88) **Douglas E. Ensley**, Shippensburg University (950-C1-573)
- 8:45AM *On-Line Quizzes for Students to Check their Readiness for College Algebra.*
▶ (89) **Bryce F Hanlon**, University of Arizona (950-C1-604)

- 9:00AM *Web-based Homework and Quizzes.* Preliminary report.
▶ (90) **Jimmy Smith***, **Jeff Hirst** and **Holly P. Hirst**, Appalachian State University (950-C1-1072)
- 9:15AM *Using Web-Based Interactive Materials in a Studio Classroom.*
▶ (91) **David A Smith*** and **Lawrence C Moore**, Duke University (950-C1-921)
- 9:30AM *The Global Classroom.* Preliminary report.
▶ (92) **Marcelle Bessman**, Jacksonville University (950-C1-1263)
- 9:45AM *The Global Classroom, A Visitor's Perspective.*
▶ (93) **Marcelle Bessman**, Jacksonville University, and **Douglas A Quinney***, University of Keele (950-C1-1262)
- 10:00AM *Using the Web to Motivate and Apply Symbolic Logic.* Preliminary report.
▶ (94) **Florence S Gordon**, New York Institute of Technology (950-C1-473)
- 10:15AM *Applets, Data Sets and Other Web Resources in a Business Statistics Class.*
▶ (95) **Brian E Smith**, McGill University (950-C1-820)
- 10:30AM *NetMath at Illinois.*
▶ (96) **Jerry Uhl**, Univ of Illinois at Urbana-Champaign, and **Debra Woods***, University of Illinois at Urbana-Champaign (950-C1-954)

MAA Session on Environmental Mathematics in the Classroom, I

8:00 AM – 10:35 AM

Organizers: **Ben Fusaro**, Florida State University
Patricia C. Kenschaft, Montclair State University

- 8:00AM *HS Students Tackle Issues in Plant Growth.*
▶ (97) Preliminary report.
Stephanie Fitchett, Florida Atlantic University (950-P1-708)
- 8:20AM *Environmental Mathematics in a Liberal Arts Class.*
▶ (98) Preliminary report.
Holly P Hirst* and **James R Smith**, Appalachian State University (950-P1-1049)
- 8:40AM *The Interpolation of Hydraulic Head Contours.*
▶ (99) **Kelly M Knapp*** and **Linda C Thiel**, Ursinus College (950-P1-496)
- 9:00AM *Water Purification.* Preliminary report.
▶ (100) **Gerald C Kobylski**, United States Military Academy (950-P1-760)
- 9:20AM *Pollution in the Great Lakes - Discrete and Continuous Solutions.*
▶ (101) **Paul J Laumakis**, Rowan University (950-P1-803)
- 9:40AM *Environmental Awareness in the Calculus Classroom.*
▶ (102) **Patti Frazer Lock**, St. Lawrence University (950-P1-789)
- 10:00AM *Population Growth and Optimal Harvesting.*
▶ (103) Preliminary report.
James T Sandefur, Georgetown University (950-P1-210)
- 10:20AM *Mathematics, Economics and the Environment.*
▶ (104) Preliminary report.
Martin E Walter, University of Colorado (950-P1-207)

AMS Special Session on Geometric Analysis, I

8:05 AM – 10:50 AM

Organizers: **Paul C. Yang**, University of Southern California
Matthew J. Gursky, Indiana University

- 8:05AM *How to use integrals to count lattice points in polytopes.* Preliminary report.
 ► (105) **Matthias Beck**, Temple University (950-52-384)
- 8:40AM *Hölder Continuity of Polycrystals Whose Interfaces Flow by Curvature.*
 (106) **David G. Caraballo**, Embry-Riddle Aeronautical University (950-49-738)
- 9:15AM *Existence and compactness results of conformal metrics with constant scalar curvature and constant boundary mean curvature.*
 (107) **Zheng-Chao Han*** and **Yanyan Li**, Rutgers University (950-58-1045)
- 9:50AM *Topology and Sobolev spaces.* Preliminary report.
 (108) **Haim Brezis**, Rutgers University and the University of Paris VI, and **Yanyan Li***, Rutgers University (950-35-963)
- 10:25AM *The geometry of the first non-zero Stekloff eigenvalue.*
 (109) **Jose F Escobar**, Cornell University (950-35-1160)

AMS Special Session on Ergodic Theory and Topological Dynamics of \mathbb{Z}^d and \mathbb{R}^d Actions, I

8:30 AM – 10:50 AM

Organizers: **E. Arthur Robinson**, George Washington University
Ayse A. Sahin, North Dakota State University

- 8:30AM *Expansive subdynamics for algebraic \mathbb{Z}^d -actions.*
 (110) **Douglas A Lind**, University of Washington (950-37-365)
- 9:00AM *An Example of a Flow with a Single Nonperiodic, Nonexpansive Direction.*
 (111) **Kathleen M Madden**, Drew University (950-58-859)
- 9:30AM *Rank one group actions with mixing simple \mathbb{Z} subactions.*
 (112) **Blair F Madore**, SUNY Potsdam (950-37-1183)
- 10:00AM *Examples of Rank One \mathbb{Z}^d Actions.* Preliminary report.
 (113) **Cesar E Silva**, Williams College (950-37-1038)
- 10:30AM *Multiple mixing for rank one group actions.*
 (114) **Andres del Junco***, University of Toronto, and **Reem Yassawi**, Trent University (950-28-878)

AMS Session on Optimization

8:30 AM – 9:40 AM

- 8:30AM *A Circular Problem.*
 ► (115) **William T Mahavier**, Nicholls State University (950-49-294)
- 8:45AM *Direct Method for Variational Problems via Hybrid Functions.*
 (116) **Mohsen Razzaghi**, Mississippi State University (950-49-402)
- 9:00AM *A Sufficient Optimality Theorem for Protoconvex Programs.*
 (117) **Thurai Kugendran**, City University of New York (950-49-741)
- 9:15AM *Optimizing Optical Design Using Linear Complementarity.* Preliminary report.
 (118) **Caroline N Haddad**, SUNY Geneseo (950-49-770)
- 9:30AM *A gradient method to solve a nonlinear optimization problem arising in computational anatomy.*
 (119) **M F Beg**, **M I Miller**, **J T Ratnanather***, Center for Imaging Science, Johns Hopkins University, and **L Younes**, CMLA, ENS-Cachan, France (950-49-1212)

AMS Special Session on Nonlinear Eigenvalue Problems and Applications, I

9:00 AM – 10:50 AM

Organizers: **Alfonso Castro**, University of Texas at San Antonio
Maya Chhetri, Mississippi State University
Ratnasingham Shivaji, Mississippi State University

- 9:00AM *Sturm Theorems via Picone's Identity.*
 (120) **Walter Allegretto**, University of Alberta, Edmonton, Canada (950-35-551)
- 9:30AM *Global bifurcations of semilinear Neumann boundary value problem.*
 ► (121) **Junping Shi**, Tulane University (950-35-351)
- 10:00AM *Recent Developments on Semipositone Systems.*
 (122) **Maya Chhetri**, University of North Carolina at Greensboro (950-35-1082)
- 10:30AM *Nonexistence of nonnegative solutions for classes of semilinear elliptic systems.*
 (123) **Ratnasingham Shivaji***, Georgia Southern University and Mississippi State University, and **Hai Dang**, Mississippi State University (950-35-319)

AMS Session on Global Analysis, Manifolds

9:00 AM – 10:40 AM

- 9:00AM *A non-fixed point theorem for Hamiltonian Lie group actions.*
 (124) **Christopher J Allday***, University of Hawaii, **Volker Puppe**, University of Konstanz, and **Volker Hauschild**, Unical (950-57-133)
- 9:15AM *Nine and Ten Crossing Harmonic Knots.* Preliminary report.
 ► (125) **Aaron K Trautwein**, Carthage College (950-57-498)
- 9:30AM *Group theoretic conditions under which closed aspherical manifolds are covered by Euclidean space.*
 (126) **Hanspeter Fischer*** and **David G Wright**, Brigham Young University (950-57-655)
- 9:45AM *Adding 2-cells to a 2-complex with an eye to π_2 .*
 (127) **Michael P Hitchman**, Lewis and Clark College (950-57-917)
- 10:00AM *Orbit Distribution of Symmetric Maps of the Interval under Multiple Valued Iteration.* Preliminary report.
 (128) **Richard E Lampe**, Illinois Wesleyan University (950-58-641)
- 10:15AM *Fractal Dimensions for Group Generated Cellular Automata.* Preliminary report.
 ► (129) **Michael J Bardzell***, **Kathleen M Shannon** and **Steven M Hetzler**, Salisbury State University (950-58-401)
- 10:30AM *Heisenberg-like two-step nilpotent Lie groups.*
 (130) Preliminary report.
Maura B Mast, University of Massachusetts Boston (950-58-1226)

AMS Session on Finite Differences and Functional Equations

9:00 AM – 10:55 AM

- 9:00AM *Differentiability Results for a Dynamical System with Multi-point Boundary Values.*
 (131) **Bonita A Lawrence**, University of South Carolina-Beaufort (950-37-1046)
- 9:15AM *Systems of difference equations with asymptotically constant solutions.*
 (132) **William F Trench**, Trinity University (Emeritus) (950-39-71)

- 9:30AM (133) *Existence and Behavior of Solutions of a Rational System Part II.*
Edward A Grove, Gerasimos Ladas, Lynn C McGrath* and **Christopher T Teixeira**, University of Rhode Island (950-39-136)
- 9:45AM (134) *On the Functional Equation $M(fg) = M(f)M(g) - L(f)L(g)$ on $H(G)$.* Preliminary report.
P L Kannappan, University of Waterloo, and **N R Nandakumar***, Delaware State University (950-39-175)
- 10:00AM (135) *Asymptotic behavior of solutions of systems of linear difference equations with oscillatory decreasing coefficients.* Preliminary report.
Alexei V Bourd, QUALCOMM, Inc. (950-39-461)
- 10:15AM (136) *Identifiability of the Yakovlev-Polig model of carcinogenesis and functional equations.*
Leonid G. Hanin, Idaho State University (950-39-727)
- 10:30AM (137) *A Runge-Kutta Discretization of a Differential Delay Equation.* Preliminary report.
Anatoli F Ivanov, Pennsylvania State University (950-39-1170)
- 10:45AM (138) *A Proof of Thwaites's Difference Process Conjecture.*
Marc A. Chamberland, Grinnell College (950-39-48)

MAA Committee on the Participation of Women Panel Discussion

9:00 AM – 10:20 AM

Building mathematical leadership among women.
 Moderator: **Carole B. Lacampagne**, U.S. Department of Education
 Organizer: **Carolyn Connell**, Westminster College
 Panelists: **Joan R. Leitzel**, University of New Hampshire
Margaret H. Wright, Bell Labs
Sadie C. Bragg, Borough of Manhattan Community College (CUNY)
Marcia P. Sward, MAA

MAA Panel Discussion

9:00 AM – 10:20 AM

Tenure and post-tenure review policies.
 Organizers: **John D. Fulton**, Virginia Polytech Institute & State University
James W. Daniel, University of Texas at Austin
Bernard L. Madison, University of Arkansas
 Presenters: **Susan C. Geller**, Texas A&M University
Robert F. Olin, Virginia Polytechnic Institute and State University
Jimmy L. Solomon, Georgia Southern University

AMS Invited Address

10:05 AM – 10:55 AM

- (139) *The proof of the Kepler conjecture.*
Thomas C. Hales, University of Michigan, Ann Arbor (950-52-05)

AMS-MAA-SIAM Invited Address

11:10 AM – NOON

- (140) *Title to be announced.*
Brian Greene, Columbia University

Exhibits and Book Sale

NOON – 5:30 PM

AMS Colloquium Lecture: Lecture I

1:00 PM – 2:00 PM

- (141) *Riemann surfaces in dynamics, topology, and arithmetic, Part I.*
Curtis T. McMullen, Harvard University

MAA Invited Address

2:15 PM – 3:05 PM

- (142) *Combinatorics at the crossroads: Progress, problems and prospects.*
Ronald L. Graham, University of California at San Diego and AT&T Labs (950-00-10)

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

2:15 PM – 6:00 PM

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

- 2:15PM (143) *Mathematics departments, new faculty, and Project NEXt.* Preliminary report.
T. Christine Stevens*, Saint Louis University,
Joseph A Gallian, Univ. of Minnesota-Duluth, and
Aparna W Higgins, University of Dayton (950-98-940)
- 2:45PM (144) *From One Community to the NEXt.*
Michele Intermont, Kalamazoo College (950-98-982)
- 3:15PM (145) *New Experiences with Tenure.*
Douglas E. Ensley, Shippensburg University (950-98-437)
- 3:45PM (146) *Project NEXt - A Chair's View.* Preliminary report.
Jim Lewis, University of Nebraska-Lincoln (950-98-1272)
- 4:15PM Break
- 4:30PM (147) *Panel Discussion on Mathematicians, the NCTM, and the Standards 2000 Project.* Preliminary report.
Kenneth C Millett*, University of California, Santa Barbara, **Alfred Manaster***, University of California, San Diego, **James Sandefur***, Georgetown University, **John Thorpe***, National Council of Teachers of Mathematics, and **Philip Wagreich**, University of Illinois at Chicago (950-97-1246)

AMS Special Session on Effective Methods and Commutative Algebra, I

2:15 PM – 5:35 PM

Organizers: **Anna Guerrieri**, Universita Degli Studi dell'Aquila
Irene Swanson, New Mexico State University

- 2:15PM *Residually S_2 -ideals and applications.*
(148) **Alberto Corso**, Michigan State University (950-13-413)
- 2:45PM *Strongly Cohen–Macaulay ideals of small second analytic deviation.*
(149) **Claudia Polini**, Hope College (950-13-414)
- 3:15PM *F-rational rings and the integral closures of ideals.*
(150) Preliminary report.
Ian M Aberbach*, University of Missouri, and **Craig Huneke**, University of Kansas (950-13-880)
- 3:45PM *First Coefficient Ideals and the S_2 -ification of a Rees Algebra.* Preliminary report.
(151) **Catalin Ciuperca**, University of Kansas (950-13-856)
- 4:15PM *Normal Ideals of Graded Rings.*
(152) **Sara Faridi**, University of Michigan (950-13-638)
- 4:45PM *Ascent of finite Cohen–Macaulay type.*
(153) **Graham J Leuschke*** and **Roger A Wiegand**, University of Nebraska (950-13-787)
- 5:15PM *The Buchsbaum–Rim polynomial and the Rees algebra of a parameter modules.* Preliminary report.
(154) **Jung-Chen Liu**, National Taiwan Normal University (950-13-566)

AMS Special Session on Holomorphic Dynamics and Related Issues, II

2:15 PM – 5:50 PM

Organizers: **Mikhail Lyubich**, SUNY at Stony Brook
Kevin Pilgrim, University of Missouri at Rolla
Michael Yampolsky, Institut des Hautes Études

- 2:15PM *Meromorphic functions and singular surfaces.*
▶ (155) **Alexandre Eremenko***, Purdue University, and **Mario Bonk**, Tech. Univ. Berlin (950-30-1031)
- 3:10PM *On pointwise dimension of non-hyperbolic measures.*
(156) **Victoria Sadovskaya*** and **Boris Kalinin**, The Pennsylvania State University (950-00-852)
- 3:40PM *Quadratic Rational Maps with a Parabolic Fixed Point.*
(157) **Adam L Epstein**, Cornell University (950-37-736)
- 4:10PM *On the structure of conjugacy classes of unimodal maps.* Preliminary report.
(158) **Artur A de Melo**, IMPA (950-37-1008)
- 4:40PM *Stability in Complex Dynamics: Domains of Holomorphy.* Preliminary report.
(159) **Laura G DeMarco**, Harvard University (950-30-985)
- 5:10PM *Dynamics in Two Complex Variables.* Preliminary report.
(160) **Eric Bedford***, Indiana University, and **John Smillie**, Cornell University (950-32-1166)

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

2:15 PM – 6:00 PM

Organizers: **Dubravko Ivansic**, George Washington University
Mark E. Kidwell, U.S. Naval Academy
Jozef H. Przytycki, George Washington University
Yongwu Rong, George Washington University
Ted Stanford, U. S. Naval Academy

- 2:15PM *State-sum Invariants of Knotted Curves and Surfaces from Quandle Cohomology.*
(161) **Daniel D Jelsovsky***, University of South Florida, **J S Carter**, University of South Alabama, **Seiichi Kamada**, Osaka City University, **Laurel Langford**, University of Wisconsin–River Falls, and **Masahico Saito**, University of South Florida (950-57-111)
- 2:45PM *The noncommutative deRham homology of the Kauffman bracket skein module.* Preliminary report.
(162) **Charles D Frohman**, The University of Iowa (950-57-1060)
- 3:15PM *A subcategory of a cobordism category.* Preliminary report.
(163) **Patrick M. Gilmer**, Louisiana State University (950-57-734)
- 3:45PM *Cyclic Group Actions on Manifolds.* Preliminary report.
(164) **Adam S Sikora**, Univ. of Maryland at College Park (950-57-1200)
- 4:15PM *A quantum obstruction to embedding.*
(165) **Charles Frohman**, University of Iowa, and **Joanna Kania-Bartoszyńska***, Boise State University (950-57-1223)
- 4:45PM *Minimal crossing number of alternating knots in $S \times I$.*
(166) **Colin C Adams***, **Thomas Fleming**, Williams College, **Michael Levin**, Harvard University, and **Ari Turner**, Princeton University (950-57-499)
- 5:15PM *Relating Hopf-algebraic invariants of 3-manifolds.* Preliminary report.
(167) **Fernando J. O. de Souza***, Los Alamos Nat. Lab./ U. I. C., **Louis H. Kauffman** and **David E. Radford**, U. I. C. (950-57-937)
- 5:40PM *Non-semisimple TQFT's in $dim=1+1+1$.* Preliminary report.
(168) **Thomas Kerler**, The Ohio State University (950-57-1254)

AMS Special Session on Quantum Computation and Information, II

2:15 PM – 5:35 PM

Organizers: **Samuel J. Lomonaco, Jr.**, University of Maryland, Baltimore County
Howard E. Brandt, Army Research Labs

- 2:15PM *Physically inspired ways of thinking about information.*
▶ (169) **Charles H Bennett**, IBM Research, Yorktown (950-81-1181)
- 2:50PM *On Unknown Quantum States.*
(170) **Christopher A Fuchs**, California Institute of Technology (950-15-33)
- 3:25PM *Quantum Information and Communication.* Preliminary report.
(171) **Umesh V Vazirani**, U.C. Berkeley (950-81-286)
- 4:00PM *How to Share a Quantum Secret.*
▶ (172) **Richard Cleve**, University of Calgary, **Daniel Gottesman***, Microsoft Research, and **Hoi-Kwong Lo**, HP Labs Bristol (950-81-70)
- 4:35PM *Inconclusive rate with a positive operator valued measure.*
▶ (173) **Howard E Brandt**, Army Research Lab & Isaac Newton Institute of Mathematical Sciences (950-94-44)
- 5:10PM *Quantum games and quantum algorithms.* Preliminary report.
▶ (174) **David A Meyer**, University of California/San Diego (950-81-740)

AMS Special Session on Nonlinear Eigenvalue Problems and Applications, II

2:15 PM – 5:05 PM

Organizers: **Alfonso Castro**, University of Texas at San Antonio

Maya Chhetri, Mississippi State University

Ratnasingham Shivaji, Mississippi State University

2:15PM *Type-II Superconductivity and Nonlinear Eigenvalue Problems*. (175)

M. S. Berger, University of Massachusetts (950-81-128)

2:45PM *A nonlinear eigenvalue problem arising in astrophysics*. Preliminary report. (176)

Alfonso Castro*, The University of Texas at San Antonio, and **Victor Padron**, Universidad de los Andes, Venezuela (950-35-201)

3:15PM *Newton Flows and Invariant Manifolds for Semilinear Elliptic Dirichlet Problems*. Preliminary report. (177)

John M Neuberger, Northern Arizona University (950-35-823)

3:45PM *A non-radial sign-changing solution for a semilinear elliptic problem*. Preliminary report. (178)

Jorge Cossio*, **Carlos Mejia**, Universidad Nacional de Colombia, and **Alfonso Castro**, The University of Texas at San Antonio (950-35-198)

4:15PM *A General Minimax Type Result Proved by Fan-KKM Theorem and Its Applications to Approximation Theory, Fixed Point Theory and Nonlinear Eigenvalue Problems*. Preliminary report. (179)

Jinlu Li, Shawnee State University, Portsmouth, Ohio (950-49-1073)

4:45PM *Resonance Problems for the p -Laplacian*. (180)

Stephen B Robinson, Wake Forest University (950-35-1255)

AMS Special Session on Singularities in Algebraic and Analytic Geometry, II

2:15 PM – 5:50 PM

Organizers: **Ruth I. Michler**, University of North Texas

Caroline Melles, U. S. Naval Academy

2:15PM *On characteristic classes of singular varieties*. Preliminary report. (181)

Jean-Paul Brasselet, CNRS - France (950-14-1251)

3:00PM *Equisingularity applications of the theory of integral closure of modules and ideals*. (182)

Terence J Gaffney, Northeastern University (950-14-811)

3:45PM *Combinatorics of rational singularities*. Preliminary report. (183)

Dung Trang Le, Provence university at Marseille (950-14-805)

4:30PM *A Little Microlocal Morse Theory*. (184)

David B Massey, Northeastern University (950-32-637)

5:15PM *Singularities and linear orbits of plane curves*. (185)

Paolo Aluffi*, Florida State University, and **Carel Faber**, KTH, Stockholm and OSU, Stillwater (950-14-717)

AMS Special Session on Integral Equations and Applications, II

2:15 PM – 5:55 PM

Organizers: **Constantin Corduneanu**, University of Texas at Arlington

Mehran Mahdavi, Bowie State University

2:15PM *New problems in optimal control of Volterra equations*. (186)

S. A Belbas, Univ. of Alabama (950-45-154)

2:45PM *Stability theory for impulsive integro-differential equations*. Preliminary report. (187)

Xinzhi Liu, University of Waterloo (950-39-124)

3:15PM *The Modified Iterative Method for Relaxation Schemes of Solving Nonlinear Boundary Value Problems*. Preliminary report. (188)

Abdul J. Jerri*, Clarkson University, and **Russell L. Herman**, University of North Carolina at Wilmington (950-45-1208)

3:45PM *Symmetric Rapidly Oscillating Periodic Solutions*. (189)

Anatoli F Ivanov, Pennsylvania State University (950-34-1162)

4:15PM *Quenching and Explosion in Diffusion Problems with Local and Nonlocal Features*. (190)

Catherine A Roberts*, Northern Arizona University, and **W. E. Olmstead**, Northwestern University (950-45-106)

4:45PM *Projection Methods for the Hopf Operator*. (191)

Mario Ahues and **Alain Largillier***, Universite de Saint Etienne, France (950-45-159)

5:35PM *Stochastic Integral Equations and Random Oscillations of Mechanical Systems*. Preliminary report. (192)

Boris P Belinskiy and **Peter Caithamer***, University of Tennessee at Chattanooga (950-60-38)

AMS Special Session on Operator Algebras, II

2:15 PM – 5:50 PM

Organizers: **May M. Nilsen**, University of Nebraska, Lincoln, and Texas A&M University

David R. Pitts, University of Nebraska, Lincoln

2:15PM *The joint similarity problem for weighted Bergman shifts*. (193)

Sarah H Ferguson*, Wayne State University, and **Srdjan Petrovic**, Western Michigan University (950-47-264)

2:45PM *Flow equivalence and graph groupoid isomorphism*. (194)

Doug Drinen, Dartmouth College (950-46-232)

3:15PM *Order Preserving Limits of Finite Dimensional Nest Algebras*. Preliminary report. (195)

Alan Hopenwasser*, University of Alabama, and **Stephen C Power**, Lancaster University (950-47-205)

3:45PM *Problems concerning algebraic K -theory of operator algebras*. Preliminary report. (196)

Jonathan M Rosenberg, University of Maryland (950-19-330)

4:15PM Break

4:30PM *Irreducible Representations of Limit Algebras*. Preliminary report. (197)

Elias Katsoulis, East Carolina University (950-47-112)

5:00PM *Some applications of norming C^* -algebras*. Preliminary report. (198)

Florin Pop, A.A.S.T., **Allan M Sinclair**, Univ. of Edinburgh, and **Roger R Smith***, Texas A&M Univ. (950-46-956)

5:30PM *C*-algebras over a CW-complex with fibres a non-commutative torus.*
(199) **Chun-Gil Park**, Chungnam National University (950-46-1102)

MAA Minicourse #13: Part A

2:15 PM – 4:15 PM

Teaching contemporary statistics with active learning.

Organizers: **Beth L. Chance**, California Polytechnic State University
Robin H. Lock, St. Lawrence University
Mary R. Parker, Austin Community College
Allan J. Rossman, Dickinson College

MAA Minicourse #2: Part A

2:15 PM – 4:15 PM

Projects in precalculus, calculus, and differential equations using biology and chemistry applications.

Organizers: **Meghan A. Burke**, Kennesaw State University
Sean F. Ellermeyer, Kennesaw State University

MAA Minicourse #8: Part A

2:15 PM – 4:15 PM

Facilitating active learning: Concrete ways to foster student participation.

Organizer: **Sandra L. Rhoades**, San Diego State University

AMS Session on Group Theory

2:15 PM – 5:40 PM

- 2:15PM *On the upper near Frattini subgroups of free products of groups with or without amalgamations.*
(200) **Mohammad K Azarian**, University of Evansville (950-20-176)
- 2:30PM *Extendible Elements of the Alternating Groups.*
▶ (201) Preliminary report.
Owen J Brison, University of Lisbon, and **Wasin So***, Sam Houston State University (950-20-182)
- 2:45PM *The Double Coset Problem in Algebraic Groups.*
(202) Preliminary report.
William Ethan Duckworth, University of Oregon (950-20-283)
- 3:00PM *Commuting Automorphisms of Groups.*
▶ (203) **Gary L Walls**, University of Southern Mississippi (950-20-336)
- 3:15PM *On the Mod-p Cohomology of the Symplectic Group $Sp(4, p)$.* Preliminary report.
(204) **Jennifer J Ziebarth**, University of Wisconsin, Madison (950-20-586)
- 3:30PM *Using recurrence relations to count certain elements in symmetric groups.* Preliminary report.
▶ (205) **Stephen P. Glasby**, The University of the South Pacific (950-20-690)
- 3:45PM *Covering of abelian groups by its proper subgroups.*
▶ (206) Preliminary report.
Kandasamy Muthuvel, UW Oshkosh (950-20-735)
- 4:00PM *Some analogues of a group problem of P. Erdos and B.H. Neumann.*
(207) **Luise-Charlotte Kappe***, SUNY-Binghamton, **John C Lennox**, UWC of Cardiff, and **James Wiegold**, UWC Cardiff (950-20-839)

- 4:15PM *Perfect Order Subsets in Finite Abelian Groups.*
▶ (208) Preliminary report.
Carrie E Finch* and **Lenny K Jones**, Shippensburg University (950-20-795)
- 4:30PM *Permutable Subgroups of a Direct Product of Finite Groups.*
(209) **Joseph Evan**, SUNY Binghamton (950-20-867)
- 4:45PM *Radicals and Semisimplicity in the Projective System of Semigroups $\{Z_{3^n} \times Z_{3^n}\}$.* Preliminary report.
(210) **Y. Phoebe Ho**, Central Missouri State University (950-20-884)
- 5:00PM *Finiteness Properties of Diagram Groups.*
(211) Preliminary report.
Daniel S Farley, SUNY-Binghamton (950-20-1179)
- 5:15PM *Elementary symmetric functions of Murphy operators, and the centre of an Iwahori-Hecke algebra of type A.*
(212) **Andrew R Francis**, University of Virginia (950-20-1215)
- 5:30PM *The Orbit Method for Finite Groups.* Preliminary report.
▶ (213) **Aleksandrs Mihailovs**, Shepherd College (950-20-1244)

AMS Session on Fourier Analysis and Approximation

2:15 PM – 5:55 PM

- 2:15PM *On the Numerical Aspects in Using Positive Hybrid Sampling Series.* Preliminary report.
(214) **Xiaoping Shen**, Eastern Connecticut State University (950-42-168)
- 2:30PM *On the Computation of Nonharmonic Fourier Series by Interpolation.*
(215) **William H Heller**, University of Texas-Pan American (950-42-471)
- 2:45PM *On the Construction of Positive Scaling Vectors.*
(216) **David K Ruch***, Metropolitan State College of Denver, and **Patrick J Van Fleet**, University of St. Thomas (950-42-609)
- 3:00PM *Good- λ Inequalities for Wavelets.* Preliminary report.
(217) **Sarah V. Cook**, Washburn University (950-42-640)
- 3:15PM *Using the Axiom of Choice to find large sets of uniqueness.* Preliminary report.
▶ (218) **J. Marshall Ash**, DePaul University (950-42-885)
- 3:30PM *Local Smoothing Results for a Family of Averaging Operators.* Preliminary report.
(219) **David T Kung**, University of Wisconsin - Madison (950-42-1165)
- 3:45PM *When Fourier phase or magnitude characterizes non-uniformly spaced discrete-time functions.*
▶ (220) Preliminary report.
Andrew J Siefker, Murray State University (950-42-1176)
- 4:00PM *Absolute Summability Factors for Fourier Series.*
(221) **Syed M. Mazhar**, Kuwait University (950-42-1288)
- 4:15PM *Remez-type Inequalities in Weighted Spaces.*
▶ (222) **Michael Ganzburg**, Hampton University (950-41-55)
- 4:30PM *A Sharp Inequality of Markov-type for Polynomials Associated with Laguerre Weight.*
(223) **Holly Carley***, **Xin Li** and **Ram N Mohapatra**, University of Central Florida (950-41-63)
- 4:45PM *On cubic lacunary fourier series.*
(224) **Joseph L. Gerver**, Rutgers University - Camden (950-41-145)
- 5:00PM *Greedily choosing terms from the harmonic series.*
▶ (225) Preliminary report.
Valerio De Angelis, Xavier University of Louisiana (950-41-372)

- 5:15PM *Determining the stability of a multidimensional (M,c)-refinable function.*
(226) **Julie A Belock**, West Chester University of Pennsylvania (950-41-743)
- 5:30PM *Quasi-Invariant Signatures and Wavelets.*
(227) **Emil-Adrian I Cornea**, Northern Illinois University (950-41-977)
- 5:45PM *A central limit theorem for complex-valued probabilities.* Preliminary report.
(228) **Natalia A Humphreys***, Purdue University, and **Bogdan M Baishanski**, The Ohio State University (950-41-997)

AMS Session on Rings and Algebras

2:15 PM – 5:55 PM

- 2:15PM *Multivariable Hilbert Polynomials.*
(229) **Alexander Levin**, The Catholic University of America (950-13-27)
- 2:30PM *U-factorizations in Commutative Rings with Zero Divisors.*
(230) **Michael C Axtell**, University of Iowa (950-13-199)
- 2:45PM *On Reductions of a Certain Class of Ideals.* Preliminary report.
(231) **Sherwood Washburn**, Seton Hall University (950-13-788)
- 3:00PM *Normal Subgroups of $GL(2,A)$.*
(232) **Christopher A Terry**, Augusta State University (950-13-828)
- 3:15PM *Suslin's Stability Theorem and Multidimensional Signal Processing.* Preliminary report.
(233) **Cynthia J Woodburn**, Pittsburg State University (950-13-862)
- 3:30PM *An analysis of the maximal growth of Hilbert functions.* Preliminary report.
(234) **Kimberly J. Presser**, University of South Carolina (950-13-914)
- 3:45PM *N-Dimensional Chaotic Attractors with Crystallographic Symmetry.*
▶ (235) **Jeffrey P Dumont**, Lafayette College, **Flynn J Heiss***, SUNY Geneseo, **Kevin C Jones**, University of Illinois at Chicago, **Clifford A Reiter** and **Lisa M Vislocky**, Lafayette College (950-06-349)
- 4:00PM *Join Congruence Relations and Closure Relations.* Preliminary report.
(236) **Laura H Montague**, Dartmouth College (950-06-482)
- 4:15PM *Probability Weights on Orthoalgebras.* Preliminary report.
(237) **Nathan R Ritter**, University of Massachusetts - Amherst (950-06-650)
- 4:30PM *The Convex Partitions of a Partially Ordered Set.*
(238) **Scott R. Sykes**, University of West Georgia (950-06-790)
- 4:45PM *On Extensions of Nilpotent Lie Algebras.* Preliminary report.
(239) **Bill Yankosky**, Chowan College (950-17-907)
- 5:00PM *Semisimple Differential Graded Algebras.*
(240) **Stephen T Aldrich***, University of Kentucky, and **Juan Ramon Garcia Rozas**, University of Almeria (950-18-138)
- 5:15PM *Dimensions of the cohomology of the Orlik-Solomon algebras.* Preliminary report.
(241) **Kelly J Pearson**, University of Oregon (950-18-363)
- 5:30PM *Homotopy Theory of Modules.*
(242) **Changchao Joanna Su**, State University of New York at Binghamton (950-18-577)
- 5:45PM *Ideals and Homology in Additive Categories.*
▶ (243) **Lucian M Ionescu**, Kansas State University (950-18-677)

MAA Session on Mathematical Modeling in Biology Via Differential Equations

2:15 PM – 6:15 PM

- Organizers: **Sunil Tiwari**, Sonoma State University
Sanjay Rai, Jacksonville University
Robert Robertson, Huntingdon College
- 2:15PM *Constraints in the Use of Free Amino Acids (FAA) in the Osmoregulation of *Tigriopus californicus*.* Preliminary report.
▶ (244) **Dale R Lockwood** and **Eric S Marland***, University of California, Davis (950-92-288)
- 2:50PM *A model for an SI disease in an age-structured population.*
(245) **Fred Brauer**, University of British Columbia
- 3:25PM *Qualitative and numerical properties of a nonlinear system of delay-differential equations in population modeling.*
(246) **Dennis W. Brewer**, University of Arkansas
- 4:00PM *Absolute stability, conditional stability and bifurcation in Kolmogorov-type predator-prey systems with discrete delays.*
(247) **Shigui Ruan**, Dalhousie University
- 4:35PM *Global Behaviour in Competitive Lotka-Volterra Systems.*
(248) **Mary Lou Zeeman***, University of Texas at San Antonio, and **Christopher Zeeman**, Oxford, UK. (950-34-582)
- 5:10PM *Stability and persistence of a SIR epidemic model with time delay.*
(249) **Wanbiao Ma**, Osaka Prefecture University
- 5:45PM *Synchronization of biological oscillators.*
(250) **Sunil K. Tiwari**, Sonoma State University

MAA Session on Interdisciplinary Applications for College Algebra, I

2:15 PM – 6:00 PM

- Organizers: **Donald B. Small**, United States Military Academy
Della D. Bell, Texas Southern University
Ahmad Kamalvand, Houston-Tillotson College
- 2:15PM *Short writing exercise in a pre-calculus course: What, how and why?* Preliminary report.
▶ (251) **Jane-Jane Lo**, Cornell University (950-E1-347)
- 2:35PM *All things considered.*
(252) **Kalpna A Godbole**, Michigan Technological University (950-E1-1141)
- 2:55PM *From Zero to Hero: The Transformation of a Remedial Intermediate Algebra Course into a College Algebra Course at an Urban Community College.*
▶ (253) **Fred Peskoff**, Borough of Manhattan Community College/CUNY (950-E1-465)
- 3:15PM *CBL Experiments for Entry Level Courses.*
(254) **Joanne L Eary**, Oklahoma State University (950-E1-500)
- 3:35PM *A Modeling Alternative to College Algebra at Oklahoma State University.*
(255) **Eileen E Durand**, Oklahoma State University (950-E1-236)
- 3:55PM *College Algebra for the Biological Sciences (CABS) at Oklahoma State University.*
▶ (256) **Rick W Pongratz**, Oklahoma State University (950-E1-247)

- 4:15PM Applications in college algebra: Effective learning strategies. (257)
 ▶ **Elaine Hubbard**, Kennesaw State University (950-E1-362)
- 4:35PM College Algebra with Applications to the Management, Life, and Social Sciences. (258)
 ▶ **Ronald J Harshbarger**, Univ of South Carolina Beaufort (950-E1-702)
- 4:55PM Data-driven Mathematics and the Concept of Function. Preliminary report. (259)
 ▶ **Robert R Mann**, Southeast Community College (950-E1-315)
- 5:15PM How to Pop the Perfect Popcorn. (260)
 ▶ **George W Moss**, University of Virginia's College at Wise (950-E1-396)
- 5:35PM Experience Curves as an Application of the Power Function in the College Algebra Course. (261)
 ▶ **Scott R Herriott**, Maharishi University of Management (950-E1-356)

MAA Session on Interdisciplinary Collaborations to Improve Service Courses in Mathematics and Statistics, I

2:15 PM – 5:45 PM

Organizers: **Linda H. Boyd**, Georgia Perimeter College
Thomas L. Moore, Grinnell College

- 2:15PM Introduction.
- 2:20PM A Mathematics and Engineering Marriage of Numerical Methods. (262)
 ▶ **Carolyn B Morgan*** and **Morris H Morgan**, Hampton University (950-F1-987)
- 2:45PM A Developmental Approach to Teaching Calculus using Writing and Presentations. (263)
 ▶ **Charles S Allen** and **Carol E Collins***, Drury University (950-F1-1177)
- 3:10PM A Team-Taught Course in Math and Physics. (264)
 ▶ **Jon L Shupenus***, **Joseph Myers**, **Chris Lehner**, **Robert Fuller**, **Duff Campbell**, **Thomas Lainis** and **Jeff Strickland**, US Military Academy (950-F1-879)
- 3:35PM Archaeometrics: Statistics in the Humanities. (265)
 ▶ **Jim Bentley***, Winthrop University, **Donald L. Bentley** and **Adolfo Rumbos**, Pomona College (950-F1-945)
- 4:00PM Computer Mathematics Course Development and Collaboration. (266)
 ▶ **Elizabeth Chu*** and **Josephine Freedman**, Suffolk County Community College (950-F1-835)
- 4:25PM Collaboration in Teaching and Learning: An Interdisciplinary Finite Mathematics Service Course. Preliminary report. (267)
 ▶ **Morteza Shafii-Mousavi*** and **Paul Kochanowski**, Indiana University South Bend (950-F1-557)
- 4:50PM Project-Driven Mathematics for the Earth and Life Sciences. Preliminary report. (268)
 ▶ **Steven D. Leonhardi*** and **Barry A. Peratt**, Winona State University (950-F1-935)
- 5:15PM Integrating Local and Community Issues in Mathematics Service Courses. (269)
 ▶ **Faiz Al-Rubae**, University of North Florida (950-F1-410)
- 5:35PM Discussion.

AMS Panel Discussion

2:15 PM – 5:15 PM

Putting and finding mathematics on the Web.
 Organizer: **Robby Robson**, Oregon State University

SUMMA Special Presentation

2:15 PM – 3:35 PM

Organizer: **William A. Hawkins**, SUMMA
 Presenters: **John H. Harris**, Lemoyne-Owen College
Abid S. Elkhader, Northern State University

MAA Committee on Computers in Mathematics Education Panel Discussion

2:15 PM – 3:35 PM

Through the looking glass.
 Organizers: **Mary L. Platt**, Salem State College
Marcelle Bessman, Jacksonville University

MAA Special Presentation

2:15 PM – 3:05 PM

Why study the history of mathematics?
 Moderator: **Donald J. Albers**, MAA
 Organizer: **Ronald Calinger**, Catholic University of America
 Presenters: **I. M. James**, Oxford University
Joseph Dauben, City University of New York

AMS Special Session on Geometric Analysis, II

2:30 PM – 5:50 PM

- Organizers: **Paul C. Yang**, University of Southern California
Matthew J. Gursky, Indiana University
- 2:30PM Einstein Metrics, Minimal Volumes, and Seiberg-Witten Theory. (270)
 ▶ **Claude R LeBrun**, SUNY Stony Brook (950-53-995)
- 3:05PM A gluing construction for solutions of the Einstein constraint equations. Preliminary report. (271)
 ▶ **Daniel Pollack***, University of Washington, **Jim Isenberg**, University of Oregon, and **Rafe Mazzeo**, Stanford University (950-83-749)
- 3:40PM Construction of complete minimal hypersurfaces with finitely many ends in euclidean n-space. (272)
 ▶ **Frank Pacard**, Université Paris 12, France (950-53-775)
- 4:15PM Break
- 4:45PM Construction of minimal surfaces by gluing methods. (273)
 ▶ **Seong-Deog Yang**, Indiana University (950-53-918)
- 5:20PM Minimal surfaces without area bounds. (274)
 ▶ **William P. Minicozzi***, Johns Hopkins University, and **Tobias H. Colding**, NYU (950-53-769)

AMS Special Session on Ergodic Theory and Topological Dynamics of Z^d and R^d Actions, II

2:30 PM – 5:20 PM

- Organizers: **E. Arthur Robinson**, George Washington University
Ayse A. Sahin, North Dakota State University
- 2:30PM Rigidity of measurable structure for algebraic actions of higher-rank abelian groups. (275)
 ▶ **Svetlana Katok**, The Pennsylvania State University (950-58-459)

- 3:00PM *Isomorphism rigidity of simple algebraic \mathbb{Z}^d -actions.*
(276) **Bruce Kitchens***, IBM Watson Research Center, and **Klaus Schmidt**, Erwin Schrodinger Institute (950-37-225)
- 3:30PM *Measurable rigidity and disjointness for \mathbb{Z}^k actions by toral automorphisms.* Preliminary report.
(277) **Boris V Kalinin*** and **Anatole Katok**, The Pennsylvania State University (950-00-646)
- 4:00PM *The symbolic dynamics of tiling the integers.*
(278) **Ethan Coven**, Wesleyan University, **William Geller***, IUPUI, **Sylvia Silberger**, Hofstra University, and **William Thurston**, U.C. Davis (950-37-1211)
- 4:30PM *Dynamics of multi-dimensional symbolic substitutions.*
(279) **Clifford W Hansen**, The George Washington University (950-37-624)
- 5:00PM *Rotational Symmetry and the Topology of Substitution Tilings.* Preliminary report.
(280) **Nicholas S Ormes***, **Charles Radin** and **Lorenzo Sadun**, University of Texas (950-37-710)

AWM Panel Discussion

2:45 PM – 4:05 PM

How to increase the number of tenured women in mathematics departments.

Organizer: **Jean E. Taylor**, Rutgers University

Panelists: **Mille Dresselhaus**, M.I.T.

Elaine Hansen, Haverford College

Maria Klawe, University of British Columbia

Jerry Ostriker, Princeton University

Karen Uhlenbeck, University of Texas at Austin

AMS Session on Differential Geometry

3:15 PM – 5:25 PM

- 3:15PM *Canonical contact hypersurfaces of Kaehler manifolds.* Preliminary report.
(281) **Ramesh Sharma**, University of New Haven (950-53-125)
- 3:30PM *Weakly symmetric spaces and polar actions.* Preliminary report.
(282) **Hieu D Nguyen**, Rowan University (950-53-190)
- 3:45PM *Classification of minimal submanifolds by total Gauss curvature.* Preliminary report.
(283) **Tracy I Bowers**, Lehigh University (950-53-228)
- 4:00PM *The Double Bubble Conjecture.* Preliminary report.
▶ (284) **Frank Morgan**, Williams College (950-53-255)
- 4:15PM *The compact, Einstein, 6-dimensional total space of an almost Kähler submersion, $F^2 \rightarrow M^6 \rightarrow N^4$, which satisfies the AH_2 condition of A. Gray is Kähler.* Preliminary report.
(285) **Bill Watson**, St. John's University (950-53-357)
- 4:45PM *Singularities of the Binormal Surface.*
(286) **Daniel L Dreibelbis**, University of North Florida (950-53-938)
- 5:00PM *Grassmannians via projection operators and some of their special submanifolds.* Preliminary report.
(287) **Ivko M Dimitric**, Penn State University-Fayette (950-53-1205)
- 5:15PM *Simplex Packings.* Preliminary report.
▶ (288) **Jean B Mastrangeli***, Immaculata College, **Lisa Traynor**, Bryn Mawr College, and **F. Miller Maley**, IDA Center for Communications Research (950-52-399)

MAA Special Presentation

3:15 PM – 4:05 PM

A metaphorical unveiling of Archimedes' palimpsest on the method: In memoriam to Wilbur Knorr.

Moderator: **Joseph Dauben**, City University of New York

Organizer: **Ronald Calinger**, Catholic University of America

Presenters: **Reviel Netz**, Stanford University
Edith Sylla, North Carolina State University

MAA Invited Address

3:20 PM – 4:10 PM

(289) *Mathematics and modeling.*

Wade Ellis, Jr., West Valley College (950-98-09)

MAA Session on Association for Research on Undergraduate Mathematics Education Contributed Papers, I

3:45 PM – 6:00 PM

Organizers: **Julie Clark**, Emory and Henry College
M. Kathleen Heid, Pennsylvania State University
Rina Zazkis, Simon Fraser University

- 3:45PM *Fostering Reflective Thinking in Complex Analysis: A Preliminary Report.* Preliminary report.
▶ (290) **Pam Crawford**, Jacksonville University (950-D1-928)
- 4:00PM *Too Many Skills, Too Little Structure: The Case of Differential Equation.*
(291) **Debasree Raychaudhuri**, Simon Fraser University (950-D1-826)
- 4:15PM *An Examination of Student Performance Data in Recent APOS-Based Papers.*
▶ (292) **Kirk E Weller***, Bethel College, **Julie M Clark**, Emory & Henry College, and **Michael A McDonald**, Occidental College (950-D1-448)
- 4:30PM *Influencing Preservice Middle School Teachers' Beliefs on Mathematics-Specific Technology Use in Mathematics Instruction: The Effects of a Technology-based Capstone Mathematics Course.*
(293) **Diane Eagle***, **James A Epperson** and **Gary A Harris**, Texas Tech University (950-D1-1126)
- 4:45PM *Changes in Teacher Technology Use During the Implementation of a Reform Calculus Curriculum.* Preliminary report.
▶ (294) **Thomas B Fox**, University of Houston-Clear Lake (950-D1-1209)
- 5:00PM *Visual Representation Use In Solving Applied Calculus Problems: Gender and Performance Level Differences.*
▶ (295) **Elizabeth A George**, Ball State University (950-D1-701)
- 5:15PM *Evaluating the Effect of a Transitions Course: A Comparative Study of Subsequent Student Performance.* Preliminary report.
(296) **Douglas D. Smith***, **Kenneth R. Gurganus**, **Paul G. Shottsberger** and **Kenneth W. Spackman**, University of North Carolina at Wilmington (950-D1-1152)
- 5:30PM *Investigating Students' Understanding of Proofs in Advanced Calculus or Analysis.*
▶ (297) **William J. Shipley**, Mount Saint Mary's College (950-D1-197)
- 5:45PM *Focusing on Multiples.*
▶ (298) **Rina Zazkis**, Simon Fraser University (950-D1-301)

MAA-Young Mathematicians Network Panel Discussion

Jeffrey A. Ehme, Spelman College

3:45 PM – 5:05 PM

Finding your second job.

Moderator: **Michael Prophet**, University of Northern Iowa

Organizers: **Kevin E. Charwood**, Washburn University
Philip E. Gustafson, Mesa State University

Panelists: **Evelyn L. Hart**, Colgate University
Frank Sottile, University of Wisconsin
Edward Aboufadel, Grand Valley State University
T. Christine Stevens, Saint Louis University

AMS Special Session on Beautiful Graph Theory, II

4:00 PM – 5:50 PM

Organizers: **Gary Chartrand**, Western Michigan University
Frank Harary, New Mexico State University

4:00PM (299) *Strong Distance in Strong Oriented Graphs.*
Gary T Chartrand, **David J Erwin**, **Michael E Raines*** and **Ping Zhang**, Western Michigan University (950-05-971)

4:30PM (300) *The Peripheral Appendage Number of Edge-Deleted Graphs.* Preliminary report.
► **Steven J Winters**, University of Wisconsin Oshkosh (950-05-605)

5:00PM (301) *(a : b)-choosability: Beauty from Ugliness.*
Glenn G Chappell, Southeast Missouri State University (950-05-912)

5:30PM (302) *"Colorful" trees in edge-colorings of graphs.*
► **Tao Jiang**, University of Illinois at Urbana-Champaign (950-05-724)

AWM Business Meeting

4:05 PM – 4:25 PM

MAA Special Presentation

4:15 PM – 5:05 PM

Composing the history of twentieth-century mathematics.

Moderator: **Daniele Struppa**, George Mason University

Organizer: **Ronald Calinger**, Catholics University of America

Presenters: **Michael I. Monastyrsky**, Institute of History and Science, Moscow
David Roberts, National Museum of American History

AMS-MAA-MSEB-SIAM Invited Address

4:25 PM – 5:15 PM

(303) *Title to be announced.*
Judith S. Sunley, National Science Foundation

MAA Minicourse #3: Part A

4:30 PM – 6:30 PM

The curves and surfaces of the digital age.

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

MAA Minicourse #9: Part A

4:30 PM – 6:30 PM

Generating functions: Techniques and tricks.

Organizer: **Louis W. Shapiro**, Howard University

MAA Section Officers

4:30 PM – 6:30 PM

MAA Special Presentation

5:15 PM – 6:05 PM

Mathematics, computers, and other calculating instruments.

Moderator: **Peggy Kidwell**, National Museum of American History

Organizer: **Ronald Calinger**, Catholic University of America

Presenters: **William Aspray**, Computer Research Association
Ulf Hashagen, Heinz Nixdorf Museumsforum

AMS-MAA-SIAM Joint Committee on Employment Opportunities Workshop

5:30 PM – 7:00 PM

Making the most of the job search process.

Organizer: **Thomas W. Rishel**, Cornell University

Mathematical Sciences Institutes Reception

5:30 PM – 7:30 PM

Young Mathematicians Network Discussion

7:15 PM – 8:15 PM

Concerns of young mathematicians: A town meeting.

AMS Josiah Willard Gibbs Lecture

8:30 PM – 9:30 PM

(304) *Physics, computability, and mentality.*
Sir Roger Penrose, Oxford University

AWM Reception

9:30 PM – 11:00 PM

Thursday, January 20

MAA Department Chairs Liaison Breakfast

7:00 AM – 8:30 AM

Mathematical Sciences Employment Center

7:00 AM – 7:30 PM

*Distribution of all interview schedules (7:00–8:15 a.m.).
Interviews (8:15 a.m.–4:40 p.m.).
Interview Center open until 7:30 p.m.*

Joint Meetings Registration

7:30 AM – 4:00 PM

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

8:00 AM – 10:55 AM

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

- 8:00AM **Girls on Track: Middle Grade Girls Modeling Community Problems - An Experiment in Progress.** Preliminary report.
 ▶ (305) **Sarah Berenson, Tiffany Barnes, Laurie Cavey***, North Carolina State University, and **Virginia Knight**, Meredith College (950-97-1278)
- 8:30AM **Training Mathematics TAs Using Case Studies.** Preliminary report.
 (306) **Solomon Friedberg**, Boston College (950-98-475)
- 9:00AM Discussion
- 9:30AM **Panel Discussion on A Facilitated Dialog on Teaching Reform Issues.** Preliminary report.
 ▶ (307) **William J Davis, (Starter)***, The Ohio State University, **Steven G Krantz***, Washington University, **Alan C Tucker***, SUNY at Stony Brook, **Steven M Zucker***, Johns Hopkins University, and **Lauren McGarity, (Facil.)**, Alternative Solutions, Inc (950-98-601)

AMS-MAA Special Session on Mathematics in Business, Government and Industry, I

8:00 AM – 10:50 AM

Organizers: **Mary Lynn Reed**, National Security Agency
Navah Langmeyer, National Security Agency

- 8:00AM **A Mathematician Appraises a Gas Field.** Preliminary report.
 ▶ (308) **Walter Stromquist**, Berwyn, PA (950-90-1107)
- 8:30AM **Tracking and classifying vehicles using invariance theory.** Preliminary report.
 ▶ (309) **Thomas Patrick Bidigare**, ERIM International (950-22-603)
- 9:00AM **The Curse of Dimensionality – Nonparametric Multivariate Density Estimation in Speech Recognition.**
 ▶ (310) **Phil Fong**, Carnegie Mellon University, and **Peder A Olsen***, IBM, T. J. Watson Research Center (950-62-506)
- 9:30AM **2000 Pseudorandom Binary Sequences.** Preliminary report.
 ▶ (311) **John F. Dillon**, National Security Agency (950-05-1186)
- 10:00AM **Speeding up computational proof.** Preliminary report.
 ▶ (312) **Isabel Beichl**, NIST, and **Francis Sullivan***, IDA (950-28-354)
- 10:30AM **Ink jet printing. What math has to do with it?.**
 ▶ (313) **Antonio Cabal**, Eastman Kodak Company (950-76-240)

AMS Special Session on Mathematical Aspects of Consensus Theory, II

8:00 AM – 10:45 AM

Organizer: **Melvin F. Janowitz**, University of Massachusetts, Amherst

- 8:00AM **Notions of Independence in Closed Set Systems.**
 ▶ (314) **Richard A Cramer-Benjamin**, Niagara University (950-05-744)
- 8:30AM **A New Consensus Method for Committee Elections.** Preliminary report.
 (315) **Hans-Hermann Bock**, Technische Hochschule Aachen, **William H Day**, Port Maitland, Nova Scotia, and **Fred R McMorris***, Illinois Institute of Technology (950-90-377)
- 9:05AM **Condorcet and convexity axioms for consensus on graphs.** Preliminary report.
 (316) **Henry Martyn Mulder**, Erasmus Universiteit (950-05-504)
- 9:40AM **The Arrovian program for consensus n-trees.**
 ▶ (317) **Robert C Powers**, University of Louisville (950-90-340)
- 10:15AM **Combinatorics of Consensus.** Preliminary report.
 (318) **Peter C Fishburn**, AT&T Shannon Laboratory (950-05-246)

AMS Special Session on Effective Methods and Commutative Algebra, II

8:00 AM – 10:50 AM

Organizers: **Anna Guerrieri**, Universita Degli Studi dell'Aquila
Irene Swanson, New Mexico State University

- 8:00AM **Computing Gröbner Bases Using Hilbert Lucky Primes.** Preliminary report.
 (319) **Elizabeth A Arnold**, University of Maryland, College Park (950-13-1025)
- 8:30AM **An Intersection Multiplicity in Terms of Ext-modules.**
 (320) **C-Y. Jean Chan**, University of Utah (950-13-645)
- 9:00AM **Koszul property and rate of standard graded algebras.** Preliminary report.
 (321) **Maria Evelina Rossi**, Universita' di Genova, Italia (950-13-1261)
- 9:30AM **Multigraded modules: A presentation.**
 (322) **Hara Charalambous**, University at Albany, SUNY (950-13-725)
- 10:00AM **Approximating infinite resolutions.** Preliminary report.
 (323) **David Eisenbud**, MSRI and University of California, Berkeley, and **Craig Huneke***, University of Kansas (950-13-503)
- 10:30AM **Residual Representation of Algebraic-Geometric Codes.** Preliminary report.
 (324) **Reinhold P Hübl**, Universität Regensburg (950-14-610)

AMS Special Session on Holomorphic Dynamics and Related Issues, III

8:00 AM – 11:00 AM

Organizers: **Mikhail Lyubich**, SUNY at Stony Brook
Kevin Pilgrim, University of Missouri at Rolla
Michael Yampolsky, Institut des Hautes Études

- 8:00AM (325) *Twisted face-pairing manifolds and Kleinian groups.* Preliminary report.
J. W. Cannon*, Brigham Young University, **W. J. Floyd**, VPI&SU, and **W. R. Parry**, Eastern Michigan University (950-57-1068)
- 8:50AM (326) *On saddle sets for dynamics in the complex projective plane.*
Mattias Jonsson*, University of Michigan, and **Jeffrey Diller**, University of Notre Dame (950-37-189)
- 9:20AM (327) *Dessins d'enfant and Hubbard trees.* Preliminary report.
Kevin M Pilgrim, University of Missouri at Rolla (950-11-509)
- 9:50AM (328) *Newton's method in two variables—an example of Hubbard.* Preliminary report.
Jeffrey A Diller, University of Notre Dame (950-37-860)
- 10:20AM (329) *Conformally invariant scaling limits.*
Oded Schramm, Microsoft Research (950-60-874)

AMS Special Session on Invariants of Knots and 3-Manifolds, III

8:00 AM – 10:50 AM

Organizers: **Dubravko Ivansic**, George Washington University
Mark E. Kidwell, U.S. Naval Academy
Jozef H. Przytycki, George Washington University
Yongwu Rong, George Washington University
Ted Stanford, U. S. Naval Academy

- 8:00AM (330) *Bordism dependence of refined quantum invariants of 3-manifolds.* Preliminary report.
Ivelina Bobtcheva, Ancona, Italy, and **Frank Quinn***, Virginia Tech (950-57-101)
- 8:30AM (331) *Vassiliev invariants and cohomology of Lin's knot complex.* Preliminary report.
Ilya S. Kofman, University of Maryland, College Park (950-57-107)
- 9:00AM (332) *Foliations of spanning surfaces for links in homology spheres.* Preliminary report.
Gretchen Wright, Bronx Community College, CUNY (950-57-96)
- 9:30AM (333) *On the η -function of links.*
Xiao-Song Lin, University of California, Riverside (950-57-1013)
- 10:00AM (334) *Homology cylinders: an extension of the mapping class group.* Preliminary report.
Jerome P. Levine, Brandeis University (950-57-45)
- 10:30AM (335) *Geometric Invariants of Knots.* Preliminary report.
Kenneth C Millett, University of California (950-57-307)

AMS Special Session on Quantum Computation and Information, III

8:00 AM – 10:45 AM

Organizers: **Samuel J. Lomonaco, Jr.**, University of Maryland, Baltimore County
Howard E. Brandt, Army Research Labs

- 8:00AM (336) *Quantum Computation and the Jones Polynomial.* Preliminary report.
Louis H Kauffman, UIC (950-68-61)
- 8:35AM (337) *Universal quantum computation by S_3 anyons.* Preliminary report.
Alexei Y Kitaev, Microsoft Research (950-81-293)

- 9:10AM (338) *The Shor/Simon Quantum Algorithm from the Perspective of Group Representation Theory.* Preliminary report.
Samuel J Lomonaco, University of Maryland Baltimore County (950-81-174)
- 9:45AM (339) *Quantum Computation by Geometrical Means.*
Jiannis Pachos, Institute for Scientific Interchange (ISI) (950-81-73)
- 10:20AM (340) *Measures of Entanglement.* Preliminary report.
Nolan R Wallach, University of California San Diego (950-22-517)

AMS Special Session on Singularities in Algebraic and Analytic Geometry, III

8:00 AM – 10:45 AM

Organizers: **Ruth I. Michler**, University of North Texas
Caroline Melles, U. S. Naval Academy

- 8:00AM (341) *Deformations of isolated hypersurface singularities.* Preliminary report.
Ruth I Michler, University North Texas (950-14-1106)
- 8:35AM (342) *Deformation of Semi-Stable Covers of Curves.* Preliminary report.
Rachel J. Pries, University of Pennsylvania (950-14-187)
- 9:10AM (343) *Infinitely near points: A differential approach.* Preliminary report.
Monique Lejeune-Jalabert, LAMA CNRS-UVSQ (950-14-575)
- 10:00AM (344) *Desingularization and modular Galois descent.*
Shreeram S. Abhyankar, Purdue University (950-14-144)

AMS Special Session on Integral Equations and Applications, III

8:00 AM – 10:50 AM

Organizers: **Constantin Corduneanu**, University of Texas at Arlington
Mehran Mahdavi, Bowie State University

- 8:00AM (345) *Semilinear Volterra integro-differential equations with nonlocal initial conditions.* Preliminary report.
Mark McKibben*, Goucher Collete, and **Sergiu Aizicovici**, Ohio University (950-45-29)
- 8:30AM (346) *Asymptotic Stability and Liapunov Functionals for Integro-Differential Equations.* Preliminary report.
Theodore A Burton, Northwest Research Institute, and **Alfredo Somolinos***, Mercy College (950-45-69)
- 9:00AM (347) *Iterative Methods for Optimal Control Processes described by Integral Equations.*
Werner Schmidt, Halle University (950-45-630)
- 9:40AM (348) *Stability & Numerical Stability of Non-linear Delay Integro-Differential Equations via Approximating Equations.*
Christopher T Baker*, The Victoria University of Manchester, and **Arsalang Tang**, Ottawa, Ontario (950-45-120)
- 10:25AM (349) *A Volterra Equation Modeling a Moving Hot Spot in a Reactive-Diffusive Medium.*
C. M. Kirk, Montclair State University, and **W. E. Olmstead***, Northwestern University (950-45-457)

MAA Minicourse #10: Part A

8:00 AM – 10:00 AM

Interdisciplinary lively applications projects.
 Organizers: **Richard D. West**, U. S. Military Academy
Laurette B. Foster, Prairie View A&M University
Marie M. Vanisko, Carroll College

MAA Minicourse #15: Part A

8:00 AM – 10:00 AM

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

MAA Minicourse #4: Part A

8:00 AM – 10:00 AM

Computer-based modeling with difference equations and matrices.
 Organizers: **Mazen Shahin**, College Misericordia
Richard E. Bayne, Howard University

AMS Session on Ordinary Differential Equations

8:00 AM – 10:55 AM

- 8:00AM (350) *Right Focal Eigenvalue Problems on a Measure Chain.*
John Davis, Baylor University, **Johnny Henderson**, Auburn University, and **Denise T Reid***, Valdosta State University (950-34-41)
- 8:15AM (351) *Three Symmetric Positive Solutions for a Second Order Boundary Value Problem.*
Johnny Henderson*, Auburn University, and **Richard I. Avery**, Dakota State University (950-34-118)
- 8:30AM (352) *Controllability of hybrid Integro-differential systems.*
Seenith Sivasundaram, Embry-Riddle Aeronautical University (950-34-206)
- 8:45AM (353) *Asymptotes of the Solution to an IVP of Ion Recombination of n Molecules. -ions: $dx/dt = -XA'y + Mx$; +ions: $dy/dt = -YAx$. Zero net charge is assumed and preserved: $\sum[x(i)] = \sum[y(i)]$; $x(i) \geq 0$; $y(i) \geq 0$.*
William M Wagner, CALYPSO; Amuse, OH (950-34-412)
- 9:00AM (354) *On almost periodicity of some solutions of the equation $x'(t) = Ax(t)$ in abstract spaces.* Preliminary report.
Gaston M N'Guerekata, Morgan State University (950-34-802)
- 9:15AM (355) *Universal scalings in homoclinic doubling cascades.*
Ale Jan Homburg, IPST, Univ. of Maryland, and **Todd R Young***, Ohio Univ. and IPST, Univ. of Maryland (950-34-983)
- 9:30AM (356) *Nonperiodic dissipative systems.*
Zhivko S Athanassov, Institute of Mathematics, Bulgarian Academy of Sciences, Sofia, Bulgaria (950-34-1020)
- 9:45AM (357) *Solvability of a Nonlinear Second Order Conjugate Eigenvalue Problem on a Measure Chain.* Preliminary report.
John M Davis, Baylor University, **Rajendra Prasad**, Andhra University, and **William K.C. Yin***, LaGrange College (950-34-1143)

- 10:00AM (358) *Generalized Quasilinearization Method for Differential Equations with Initial Time Difference.* Preliminary report.
Semen Köksal, Florida Institute of Technology (950-34-1283)
- ▶ 10:15AM (359) *On the exponential stability of semilinear stochastic differential equations with Markovian switching.* Preliminary report.
Patricia F. Giurgescu, Pace University (950-60-922)
- 10:30AM (360) *Diffusion-Driven Instability in Reaction-Diffusion Systems.*
Liancheng Wang* and **Michael Y Li**, Mississippi State University (950-35-163)
- ▶ 10:45AM (361) *Introducing DAEs in an ODEs course.* Preliminary report.
Wieslaw Marszalek, DeVry Institute, NJ (950-34-1171)

AMS Session on Applied Mathematics

8:00 AM – 10:55 AM

- ▶ 8:00AM (362) *On a Two-Stage Population Model with Space Limitations and State-Dependent Delay.* Preliminary report.
Sanjay Rai*, Jacksonville University, and **Robert L Robertson**, Huntingdon College (950-92-203)
- ▶ 8:15AM (363) *HOPS: Hybrid Optimizer of Protein Structure.* Preliminary report.
Sean L. Forman* and **Alberto M. Segre**, The University of Iowa (950-92-386)
- 8:30AM (364) *Optimal patterns for suturing wounds of arbitrary configuration - A numerical approach.*
Dawn A Lott-Crumpler*, New Jersey Institute of Technology, and **Hans R Chaudhry**, New Jersey Institute of Technology and University of Medicine and Dentistry of New Jersey (950-92-453)
- ▶ 8:45AM (365) *Orientational constraints and protein structure determination, I: the algorithm.* Preliminary report.
Jeffrey K Denny and **John R Quine***, Florida State University (950-92-558)
- ▶ 9:00AM (366) *Orientational Constraints and nuclear magnetic resonance, II: PISEMA wheels.* Preliminary report.
Jeffrey K Denny*, **J R Quine**, Florida State University, **J Wang** and **T A Cross**, National High Magnetic Field Laboratory (950-92-559)
- ▶ 9:15AM (367) *Discrete hierarchical age-structured model of competition.* Preliminary report.
Kbenesh W Blayneh, Florida A&M University (950-92-1230)
- ▶ 9:30AM (368) *Robust control for nonlinear systems with switching costs.* Preliminary report.
Joseph Ball, **Matrin Day** and **Jerawan Chudoung***, Virginia Tech (950-93-81)
- 9:45AM (369) *Study of Exponential Stability of Wave Systems Via Distributed Coupling Stabilizer.*
Mahmoud Najafi, Kent State University (950-93-139)
- 10:00AM (370) *An Algorithm for Solving Bond Pricing Problem.* Preliminary report.
Elias Deeba*, University of Houston-Downtown, **Ghassan Dibeh**, Lebanese American University, and **Shishen Xie**, University of Houston-Downtown (950-90-131)
- ▶ 10:15AM (371) *Sensitivity of Correlations for Expert Probability Distributions.*
Christopher J Lacke, Rowan University (950-90-1079)

- 10:30AM **A Simulation Model of Recall Operations at an Air Force Base.**
 ▶ (372) **L. Vincent Edmondson***, Central Missouri State University, and **Steven B. Burton**, Montgomery, AL (950-90-1154)
- 10:45AM **Completeness and the Jacobi Group.**
 (373) **Karen L Shuman**, Dartmouth College (950-94-591)

AMS Session on Operator Theory and Functional Analysis

8:00 AM – 10:55 AM

- 8:00AM **Restrictions of BK Spaces.** Preliminary report.
 (374) **Lyn I Phy**, Lehigh University (950-46-300)
- 8:15AM **On a class of Monge-Kantorovich Problem: Dual of $C^{k,\alpha}$.** Preliminary report.
 (375) **Yewande Olubummo**, Spelman College (950-46-355)
- 8:30AM **Generalized Backward Shifts On Banach Spaces $C(X,E)$.** Preliminary report.
 (376) **Rajagopalan Minakshisundaramm**, Tennessee State University, and **Sundaresan Kondagunta***, Cleveland State University (950-46-161)
- 8:45AM **Operators on $C(H,Y)$ that are pointwise limits of a sequence of weakly compact operators.**
 (377) **Elizabeth M Bator***, University of North Texas, and **Dawn R Salvens**, Midwestern State University (950-46-883)
- 9:00AM **On Ky Fan's best approximation and its applications.** Preliminary report.
 (378) **Sankatha P. Singh**, Memorial University of Newfoundland (950-47-224)
- 9:15AM **Commutants of Certain Composition Operators.**
 (379) **Tami S Worner**, Wayne State College (950-47-241)
- 9:30AM **Filling in the holes in the spectrum.** Preliminary report.
 (380) **Gabriel T Prajitura**, Bucknell University (950-47-746)
- 9:45AM **Composition Operators on Weighted Bergman Spaces with Subnormal Adjoint.** Preliminary report.
 (381) **Alexander E Richman**, University of Virginia (950-47-858)
- 10:00AM **The Product of a Composition Operator with the Adjoint of a Composition Operator Induced by Linear Fractional Maps on the Weighted Hardy Spaces.**
 (382) **John H Clifford**, University Michigan Dearborn (950-47-1182)
- 10:15AM **Blow-up Due to Moving Heat Sources of Various Shapes, Sizes and Intensities.** Preliminary report.
 (383) **Colleen M Kirk***, Montclair State University, and **W. E Olmstead**, Northwestern University (950-45-1249)
- 10:30AM **Asymptotic formulae for steady state voltage potentials in the presence of conductivity imperfections.**
 (384) **Arup Mukherjee**, Rutgers University (950-45-94)
- 10:45AM **Operators with bounded conjugation orbits.**
 (385) **Driss Drissi**, Kuwait University (950-47-1294)

AMS Session on Algebraic and General Topology

8:00 AM – 10:55 AM

- 8:00AM **Dimension associated with fractals, including the Julia Set.** Preliminary report.
 (386) **Margaret M. LaSalle**, University of Southwestern Louisiana (950-54-337)
- 8:15AM **Simplicial Complexes for Shephard Groups which are Stratified by the Corresponding Arrangement.**
 (387) **Stephen D Szydlík**, University of Wisconsin Oshkosh (950-54-501)

- 8:30AM **A non-metrizable collectionwise Hausdorff tree without ω_1 -subtrees.**
 (388) **Akira Iwasa*** and **Peter J Nyikos**, University of South Carolina (950-54-545)
- 8:45AM **Embedding of Biconvergence Group.** Preliminary report.
 (389) **Jamuna P. Ambasht**, Benedict College (950-54-628)
- 9:00AM **A continuous extension theorem in linearly ordered spaces.** Preliminary report.
 (390) **Guanshen Ren**, College of St. Scholastica (950-54-910)
- 9:15AM **Weak P-points of Stone Spaces.** Preliminary report.
 (391) **Joni E Baker**, University of Wisconsin- Madison (950-54-1172)
- 9:30AM **Mappings on Uniquely Arcwise Connected Spaces.**
 (392) **Lee K Mohler***, Saint Martin's College, and **Joseph B Fugate**, University of Kentucky (950-54-1193)
- 9:45AM **New characterizations of metrizable, semi-metrizable, and generalized metrizable spaces in terms of semi-open coverings.** Preliminary report.
 (393) **Gangadhar R Hiremath**, Miles College (950-54-1216)
- 10:00AM **Lefschetz coincidence theory for maps between spaces of different dimensions.**
 (394) **Peter Saveliev**, Wabash College (950-55-314)
- 10:15AM **The Hopf Rings for KO, KU, and bo.** Preliminary report.
 (395) **Dena S Cowen***, John Carroll University, and **Neil P Strickland**, University of Sheffield (950-55-909)
- 10:30AM **Product Structures on the Spectral Sequence of Arone and Goodwillie.** Preliminary report.
 (396) **Stephen T Ahearn**, University of Virginia (950-55-1104)
- 10:45AM **The topological fundamental group and generalized covering spaces.**
 (397) **Daniel Kalman Biss**, MIT (950-55-1297)

SIAM Minisymposium on Discrete Methods in Information Technology

8:00 AM – 9:55 AM

- Organizer: **Fan Chung Graham**, University of California San Diego
- 8:00AM **Sorting and Correlation: Mathematical Bridges in Action.** Preliminary report.
 ▶ (398) **William T Trotter**, Arizona State University (950-05-1033)
- 8:30AM **Two Combinatorial Line-Assignment Problems.**
 (399) **Peter Winkler**, Bell Labs, Lucent Technologies (950-05-951)
- 9:00AM **From Erdos to Algorithms.** Preliminary report.
 ▶ (400) **Joel H Spencer**, Courant Institute (950-05-157)
- 9:30AM **Distance realization problems with applications to Internet tomography.** Preliminary report.
 ▶ (401) **Fan Chung Graham***, **Ronald L. Graham**, UCSD, **Mark Garrett** and **David Shallcross**, Telcordia Technology (950-05-754)

SIAM Minisymposium on 3D Navier-Stokes and Euler Equations

8:00 AM – 9:55 AM

- Organizer: **Basil Nicolaenko**, Arizona State University
- 8:00AM **Incompressible macroscopic limits of kinetic equations.**
 (402) **Claude W. Bardos**, Ecole Normale Superieure de Cachan

- 8:30AM (403) *On the algebra of the curl operator and 3D Navier-Stokes equations.*
Ciprian Foias, Indiana University
- 9:00AM (404) *New regularity results for 3D Navier-Stokes equations with large uniform vorticity.*
Alex Mahalov, Arizona State University
- 9:30AM (405) *On the nonlinear stability of fluid flows: Arnold's approach.*
Vladimir Vladimirov, Hong Kong University of Science and Technology

- 8:00AM (415) *Integrating Mathematics and Science for Middle and High School Teachers.*
Susann M Mathews* and **Beth Basista**, Wright State University (950-B1-726)

- 8:15AM (416) *An integrated science and mathematics course for nonscience majors.* Preliminary report.
Peter Ehni, **Ted Erickson***, **Jon Lief** and **Ann C Rose**, Wheeling Jesuit University (950-B1-1112)

- 8:30AM (417) *The Effects of an Interdisciplinary Calculus/Physics Program on Student Performance and Attitude Toward Mathematics.*
Kelly Black, **Karen A Marrongelle*** and **Dawn Meredith**, University of New Hampshire (950-B1-302)

- 8:45AM (418) *The Effect on Attitudes Toward Mathematics when Integrating U.S. Studies and Mathematics.* Preliminary report.
Gerald L Marshall, Illinois State University (950-B1-673)

- 9:00AM (419) *What Mathematical Topics Do Business Majors Need to Learn in College Algebra, and What Applications Do They Have?*
Scott R Herriott, Maharishi University of Management (950-B1-665)

- 9:15AM (420) *Integrating Math, Business, and Social Sciences in a First Year Service Course.*
Morteza Shafii-Mousavi and **Paul Kochanowski***, Indiana University South Bend (950-B1-653)

- 9:30AM (421) *Probability and Statistics in the Legal Curriculum: A Case Study in Disciplinary Aspects of Interdisciplinarity.*
Mike Townsend, University of Washington (950-B1-732)

- 9:45AM (422) *Another Y2K Problem: Census and Reapportionment.*
Margaret Cibes, Trinity College (950-B1-680)

- 10:00AM (423) *A Mathematical Consulting Experience.*
Michael Bloxham, **Rick Cornez*** and **Steve Morics**, University of Redlands (950-B1-814)

- 10:15AM (424) *Business Mathematics with Excel and PowerPoint.*
Richard B Thompson, University of Arizona (950-B1-464)

- 10:30AM (425) *Mathematics and Decision-Making in the Public and Private Sector.*
Deborah Hughes Hallett, University of Arizona (950-B1-756)

- 10:45AM (426) *Interactive Economics and Finance Applications in Calculus.* Preliminary report.
Agnes Rash*, Saint Joseph's University, and **Jean M. McDill**, Cal Poly State University (950-B1-1260)

MAA Session on The Use of History in the Teaching of Mathematics, II

8:00 AM – 10:55 AM

Organizers: **V. Frederick Rickey**, United States Military Academy
Florence Fasanelli, College-University Resource Institute
Victor J. Katz, University of the District of Columbia

- 8:00AM (406) *Annotated Time Lines.* Preliminary report.
Scott H Hochwald, University of North Florida (950-A1-923)
- 8:20AM (407) *The History of Mathematics: A Contemporary Approach.*
Della D. Fenster, University of Richmond (950-A1-329)
- 8:40AM (408) *History of math for teachers in grades 4-9.* Preliminary report.
Robert G. Stein, California State University, San Bernardino (950-A1-1168)
- 9:00AM (409) *The Use of History of Mathematics to Motivate Students.* Preliminary report.
Claudia M Rankins, Hampton University (950-A1-462)
- 9:20AM (410) *Actively Preparing Teachers to Use History.*
Dick Jardine, Keene State College (950-A1-774)
- 9:40AM (411) *The Incorporation of the Biographies of Mathematicians into A Mathematics for Humanities Majors Course.* Preliminary report.
Katherine Safford-Ramus, St. Peter's College (950-A1-707)
- 10:00AM (412) *Some relations of Fermat's work on quadratic forms with the teaching of abstract algebra.*
Mysore S Jagadish, Barry University (950-A1-668)
- 10:20AM (413) *The Nature of Number: An Historical Investigation for Inservice Teachers.*
Daniel E Otero, Xavier University (950-A1-780)
- 10:40AM (414) *The Leibniz-Newton Class Action Suit.*
Jean Marie McDill, Cal Poly, San Luis Obispo (950-A1-933)

MAA Session on Integrating Mathematics and Other Disciplines, II

8:00 AM – 10:55 AM

Organizers: **William G. McCallum**, University of Arizona
Duff G. Campbell, United States Military Academy
Deborah Hughes Hallett, University of Arizona
David C. Lay, University of Maryland, College Park
Nicholas Losito, SUNY Farmingdale
Jim Rolf, United States Military Academy
Yajun Yang, SUNY Farmingdale

MAA Session on Innovative Uses of the World Wide Web in Teaching Mathematics, II

8:00 AM – 10:40 AM

Organizers: **Brian E. Smith**, McGill University
Marcelle Bessman, Jacksonville University

- 8:00AM (427) *Distance Learning from a Traditional Classroom: A Win-Win Proposition. Part I: Experiences.*
Jeremy Haefner* and **Gene Abrams**, University of Colorado (950-C1-216)
- 8:15AM (428) *Distance Learning from a Traditional Classroom: A Win-Win Proposition. Part II: A Live Demonstration.*
Gene Abrams* and **Jeremy Haefner**, University of Colorado (950-C1-215)
- 8:30AM (429) *Using the World Wide Web to Share Instructional Materials in a Large Undergraduate Department.*
Marcia Birken* and **Patricia Clark**, Rochester Institute of Technology (950-C1-660)

- 8:45AM ▶ (430) *Incorporating WWW Information into Business Statistics Classes.*
Sue B Schou, Idaho State University (950-C1-583)
- 9:00AM ▶ (431) *Lights, Camera, Calculus! Designing a TeleWeb Applied Calculus Course.*
Mary Ellen Davis* and **Virginia W. Parks**, Georgia Perimeter College (950-C1-339)
- 9:15AM ▶ (432) *An Online Model for Precalculus.* Preliminary report.
Hari Pulapaka* and **Denise T Reid**, Valdosta State University (950-C1-65)
- 9:30AM ▶ (433) *TI-Interactive Will Foster Student Interaction with the Web.*
Allan E Bellman, James Hubert Blake High School (950-C1-994)
- 9:45AM ▶ (434) *Freshman Advising and Placement via the World Wide Web.* Preliminary report.
Lothar A Dohse* and **Peter W Kendrick**, University of North Carolina at Asheville (950-C1-295)
- 10:00AM ▶ (435) *Online classroom interaction using the Web.*
Daniel H Steinberg, Oberlin College (950-C1-711)
- 10:15AM ▶ (436) *Using the Web and WebCT in "Explorations in Mathematics".*
Daniel L Dreibelbis, University of North Florida (950-C1-934)
- 10:30AM ▶ (437) *WebMath Status Report.* Preliminary report.
Philip B Yasskin*, **G. Donald Allen** and **Michael Stecher**, Dept of Math, Texas A&M Univ (950-C1-1145)

MAA Session on The Role of Mathematicians in the Development of Mathematics Teachers and Their Students, I

8:00 AM – 10:55 AM

Organizers: **Diane M. Spresser**, National Science Foundation
John S. Bradley, National Science Foundation
Alfred B. Manaster, University of California San Diego

- 8:00AM ▶ (438) *Mathematics for Inservice High School Teachers.* Preliminary report.
Scott H Hochwald, University of North Florida (950-G1-932)
- 8:15AM ▶ (439) *Mathematics, Physics, and Education: A Link-To-Learn Project Partnership.* Preliminary report.
Jon A Beal, Clarion University of Pennsylvania (950-G1-731)
- 8:30AM ▶ (440) *The Role of Mathematicians in a City under Siege by Algebra I Ignorance.*
Antonio M Lopez, Jr., Loyola University, New Orleans (950-G1-875)
- 8:45AM ▶ (441) *The MARS Mathematics Courses: A Series for Elementary Teachers in the Baltimore City Public Schools.*
Duane A Cooper, University of Maryland (950-G1-1219)
- 9:00AM ▶ (442) *Connecting Math Research to the Classroom.*
Tricia A Frantti, Chassell High School (950-G1-913)
- 9:15AM ▶ (443) *Developing an Advanced Master's Degree in Mathematics Education.* Preliminary report.
Holly P Hirst* and **Deborah A Crocker**, Appalachian State University (950-G1-1099)
- 9:30AM ▶ (444) *Collaborating on content, development, and assessment for in-service middle school teachers.*
Leonard J Lipkin, University of North Florida (950-G1-1089)

- 9:45AM ▶ (445) *What is that little n ? Recursion and subscript notation in middle school.* Preliminary report.
Deborah S. Franzblau*, College of Staten Island, CUNY, and **Lisa B. Warner**, Totten Intermediate School (950-G1-693)
- 10:00AM ▶ (446) *Partnership Program in Mathematics for Prospective and Practicing K-8 Teachers.*
Patricia M Baggett*, New Mexico State University, **Andrzej Ehrenfeucht**, University of Colorado, **Patrick Morandi**, New Mexico State University, **Karin Matray**, Las Cruces Public Schools, and **Patrick Scott**, New Mexico State University (950-G1-1098)
- 10:15AM ▶ (447) *Professional Development Workshops for K-12 Teachers.*
Cheryl L Olsen, Shippensburg University (950-G1-1224)
- 10:30AM ▶ (448) *Professional Development for Inservice Teachers.*
Wayne Patty, Virginia Tech (950-G1-416)
- 10:45AM ▶ (449) Discussion and closing comments led by organizer, John Bradley.

AMS Special Session on Geometric Analysis, III

8:05 AM – 10:50 AM

Organizers: **Paul C. Yang**, University of Southern California
Matthew J. Gursky, Indiana University

- 8:05AM ▶ (449) *Geometry of Hölder imbeddings, slices and quasiconformal equivalence.*
Stephen M. Buckley, National University of Ireland, and **Alexander Stanoyevitch***, University of Guam (950-46-93)
- 8:40AM ▶ (450) *Holomorphicity of proper harmonic maps.*
Lei Ni*, Purdue University, and **Songying Li**, University of California (950-58-861)
- 9:15AM ▶ (451) *Nonnegative Ricci Curvature, Small Linear Diameter Growth, and Finite Generation of Fundamental Groups.*
Christina A Sormani, Lehman College, City University of New York (950-53-153)
- 9:50AM ▶ (452) *On the best constant in the exceptional case of the Sobolev embedding theorem.* Preliminary report.
Caitlin Y Wang, University of California at Irvine (950-58-1178)
- 10:25AM ▶ (453) *Flow lines on a space of dual Legendrian curves.* Preliminary report.
Abbas Bahri, Rutgers University (950-58-72)

AMS Special Session on Nonlinear Eigenvalue Problems and Applications, III

8:30 AM – 10:50 AM

Organizers: **Alfonso Castro**, University of Texas at San Antonio
Maya Chhetri, Mississippi State University
Ratnasingham Shivaji, Mississippi State University

- 8:30AM ▶ (454) *On the Recovery of Geometric Data from the High Energy Spectrum of the Dirichlet to Neumann Operator.* Preliminary report.
Carl V. Lutzer, University of Kentucky (950-35-911)
- 9:00AM ▶ (455) *An Extension of the Krein-Rutman Theorem.*
Jon T Jacobsen, Penn State (950-35-1055)
- 9:30AM ▶ (456) *The effect growth in pattern formation.* Preliminary report.
Pablo Padilla*, University of Mexico, **Ramon Plaza**, Courant Insitute, and **Faustino Sanchez**, School of Science, UNAM (950-35-1267)

- 10:00AM *Structure of Solutions to Nonlinear Diffusion Equations in R^n* . Preliminary report.
(457) **Allan L Edelson**, University of California, Davis (950-35-981)
- 10:30AM *Symmetry properties of positive entire solutions of Yamabe type equations on groups of Heisenberg type*.
(458) **Nicola Garofalo** and **Dimiter N. Vassilev***, Purdue University (950-35-100)

AMS Special Session on Ergodic Theory and Topological Dynamics of Z^d and R^d Actions, III

8:30 AM – 10:50 AM

Organizers: **E. Arthur Robinson**, George Washington University
Ayse A. Sahin, North Dakota State University

- 8:30AM *Safe states can be so infrequent as to be negligible*.
(459) Preliminary report.
Robert Burton*, Oregon State University, and **Arthur E Robinson**, George Washington University (950-37-1048)
- 9:00AM *The Complete Description of Z^d Loosely Bernoulli Systems*.
(460) **Aimee Johnson***, Swarthmore College, and **Ayse A. Sahin**, North Dakota State University (950-37-480)
- 9:30AM *On the existence and non-existence of finitary codings for a class of random fields*.
(461) **Jeffrey E Steif***, Georgia Institute of Technology, and **Jacob van den Berg**, CWI (950-28-381)
- 10:00AM *Oscillation in Ergodic Theory: Higher Dimensional Results*.
(462) **Roger L Jones**, DePaul University, **Joseph M Rosenblatt***, University of Illinois at Urbana-Champaign, and **Mate Wierdl**, University of Memphis (950-28-421)
- 10:30AM *Invariant measures and entropy of Z^d shifts of finite type*. Preliminary report.
(463) **Arthur E Robinson, Jr.**, George Washington University, and **Ayse A Sahin***, North Dakota State University (950-37-1197)

AWM Emmy Noether Lecture

9:00 AM – 9:50 AM

- (464) *The mathematics of optimization*.
Margaret H. Wright, Lucent Technology

AMS-MAA Special Session on in Memory of Gian-Carlo Rota, I

9:00 AM – 10:50 AM

Organizers: **Richard P. Stanley**, MIT
Rodica Simion, The George Washington University

- 9:00AM *Recollections and Appreciations*.
▶ (465) **Herbert S Wilf**, University of Pennsylvania (950-05-317)
- 9:30AM *Remarks on Plethystic Algebras and Vector Symmetric Functions*.
(466) **Joel A Stein**, California State University San Bernardino (950-05-689)
- 10:00AM *Homology invariants for permutation representations of symmetric groups*. Preliminary report.
(467) **Andre Joyal***, UQAM, and **Terrence Bisson**, Canisius College (950-05-1240)

- 10:30AM *Multiple Left Regular Representations Associated with Alternants of the Symmetric Groups*.
(468) **Francois Bergeron***, Universite du Quebec a Montreal, **Adriano M Garsia** and **Glenn Tesler**, UCSD (950-05-311)

MAA-Project NExT Panel Discussion

9:00 AM – 10:20 AM

Making connections with faculty in other disciplines.

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

Organizer: **T. Christine Stevens**, Saint Louis University

Panelists: **Gregory S. Chirkjian**, Johns Hopkins University

Jan E. Holly, Colby College

Daniel P. Maki, Indiana University

Lee L. Zia, University of New Hampshire

MAA Women in Mathematics Poster Session

9:00 AM – 11:00 AM

Outreach programs for women and girls in mathematics.

Organizer: **Kathleen A. Sullivan**, Seattle University

Exhibits and Book Sale

9:30 AM – 5:30 PM

MAA Invited Address

10:05 AM – 10:55 AM

- (469) *Looking back: An historian's perspective on American mathematics*.
Karen H. Parshall, University of Virginia (950-01-11)

AMS-MAA-SIAM Invited Address

11:10 AM – NOON

- ▶ (470) *Ranks of elliptic curves*.
Karl Rubin, Stanford University (950-11-327)

Open House Reception at MAA Headquarters

NOON – 3:00 PM

MAA Session on Integrating Mathematics and Other Disciplines, III

12:45 PM – 3:40 PM

Organizers: **William G. McCallum**, University of Arizona
Duff G. Campbell, United States Military Academy
Deborah Hughes Hallett, University of Arizona
David C. Lay, University of Maryland, College Park
Nicholas Losito, SUNY Farmingdale
Jim Rolf, United States Military Academy
Yajun Yang, SUNY Farmingdale

- 12:45PM ▶ (471) *Steps Toward a Digital Library for Science, Mathematics, Engineering and Technology Education*. Preliminary report.
Eugene Klotz, Math Forum/Swarthmore College, **Alice Agogino***, **Flora McMartin**, **Brandon Muramatsu**, NEEDS/University of California, Berkeley, and **Robby Robson**, Math Metadata/Oregon State (950-B1-1232)
- 1:00PM ▶ (472) *A Beginning Mathematics Course for Art/Design Majors*. Preliminary report.
Doris J. Schattschneider, Moravian College (950-B1-513)
- 1:15PM ▶ (473) *Quantitative Literacy and English Literature*. Preliminary report.
Stephanos Gialamas*, The Illinois Institute of Art at Chicago, and **Sarah Keller**, Illinois Institute of Art at Chicago (950-B1-1264)
- 1:30PM ▶ (474) *Connecting with Other Disciplines in a Team Teaching Setting*.
Philip S Blau, Boston University, College of General Studies (950-B1-998)
- 1:45PM ▶ (475) *Intertwining Music and Mathematics in Modular Settings*. Preliminary report.
Satish C Bhatnagar, University of Nevada, Las Vegas (950-B1-1029)
- 2:00PM ▶ (476) *Functions of Number Theory in Music*.
Craig M Johnson, Marywood University (950-B1-599)
- 2:15PM ▶ (477) *Integrating the freshman year in math, chemistry, and engineering*. Preliminary report.
Robert L Wilson, Univ of Wisconsin - Madison (950-B1-491)
- 2:30PM ▶ (478) *A cross-listed course in fractals and chaotic dynamics*. Preliminary report.
Aaron Klebanoff, Rose-Hulman Institute of Technology (950-B1-1259)
- 2:45PM ▶ (479) *Pattern analysis and neural networks as a centerpiece for interdisciplinary courses*.
Douglas R Hundley, Whitman College (950-B1-514)
- 3:00PM (480) *Theory of Computation for Mathematics Majors*.
William A Marion, Valparaiso University (950-B1-664)
- 3:15PM ▶ (481) *The Communications Network Design Problem*.
Fred J Rispoli* and **Steve Cosares**, Dowling College (950-B1-1044)
- 3:30PM ▶ (482) *Integrating Mathematics into a Computational Science Curriculum at a Liberal Arts Environment*. Preliminary report.
Ignatios E Vakalis, Capital University (950-B1-697)

AMS Colloquium Lecture: Lecture II

1:00 PM – 2:00 PM

- (483) *Riemann surfaces in dynamics, topology, and arithmetic, Part II*.
Curtis T. McMullen, Harvard University

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

1:00 PM – 3:30 PM

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

- 1:00PM (484) *Learning to make a difference*.
Gail Burrill, Mathematical Sciences Education Board (950-98-768)
- 1:30PM ▶ (485) *Can one person make a difference? Yes!*
Virginia M Warfield, University of Washington (950-96-695)
- 2:00PM ▶ (486) *Mentoring: Myths and Realities, Dangers and Responsibilities*.
Bernice R Sandler, National Association for Women in Education (950-98-846)
- 2:30PM (487) *Rethinking K-12 Mathematics Education*.
Shirley M Malcom, AAAS (950-96-1157)
- 3:00PM Discussion

AMS-MAA Special Session on Mathematics in Business, Government and Industry, II

1:00 PM – 3:50 PM

- Organizers: **Mary Lynn Reed**, National Security Agency
Navah Langmeyer, National Security Agency

- 1:00PM ▶ (488) *Graph Partitioning and Clustering*. Preliminary report.
Arnaldo Horta, Department of Defense (950-05-1235)
- 1:30PM ▶ (489) *The Mathematics of Finding Information on the Web*.
Laura A Mather, Department of Defense (950-65-250)
- 2:00PM ▶ (490) *Phone Call Graphs: Models, Measurements, and Open Problems*. Preliminary report.
Joan Feigenbaum, AT&T Labs – Research (950-68-183)
- 2:30PM (491) *Continuous Methods for Bilinear and Quadratic Assignment Problems*.
John M Conroy, **Steven G Kratzer** and **Louis J Podrazik***, IDA Center for Computing Sciences (950-65-572)
- 3:00PM ▶ (492) *Biostatistical consulting at Mayo Clinic – Real math in a complex world*.
Kent R. Bailey, Mayo Clinic (950-62-783)
- 3:30PM (493) *Selling Out: Mathematicians as “Quants” in the Finance Industry*.
Brian K Boonstra, Bank One (950-90-892)

AMS Special Session on Mathematical Aspects of Consensus Theory, III

1:00 PM – 3:40 PM

- Organizer: **Melvin F. Janowitz**, University of Massachusetts, Amherst

- 1:00PM ▶ (494) *Voting Power when Using Preference Methods*.
Deanna B Haunsperger*, Carleton College, and **Duncan J Melville**, St. Lawrence University (950-91-1036)
- 1:35PM ▶ (495) *An Algorithm to Compute Nash Equilibria in Probabilistic, Multiparty Spatial Models of Electoral Competition*.
Samuel Merrill*, Wilkes University, and **James Adams**, University of California at Santa Barbara (950-91-1115)
- 2:10PM ▶ (496) *Converting the Masses: Modeling Opinion Formulation via Threshold Processes*.
Paul A. Dreyer, Jr., Rutgers University (950-05-843)
- 2:40PM (497) *A Mathematical Analysis of a Voting Procedure by Charles Dodgson (a.k.a. Lewis Carroll)*.
Michael A Jones*, Montclair State University, and **Diana M Thomas**, New Jersey City University (950-91-703)

- 3:15PM ▶ (498) *The Paradox of Disconnected Coalitions*. Preliminary report.
Steven J. Brams*, New York University, **Michael A. Jones**, Montclair state University, and **Marc Kilgour**, Wilfrid Laurier University (950-91-450)

AMS Special Session on Effective Methods and Commutative Algebra, III

1:00 PM – 3:50 PM

Organizers: **Anna Guerrieri**, Universita Degli Studi dell'Aquila
Irene Swanson, New Mexico State University

- 1:00PM (499) *Normal blow-ups and their expected defining equations*.
Mark Johnson*, University of Arkansas, and **Susan Morey**, Southwest Texas State University (950-13-606)
- 1:30PM (500) *Tight closure in cubical cone rings*. Preliminary report.
Adela N Vraciu, University of Michigan (950-13-430)
- 2:00PM (501) *Combinatorics of the toric Hilbert scheme*.
Diane Maclagan*, University of California, Berkeley, and **Rekha R Thomas**, Texas A&M (950-14-1234)
- 2:30PM (502) *Deciding when an element is in a tight closure*. Preliminary report.
Melvin Hochster, University of Michigan, Ann Arbor (950-13-1158)
- 3:00PM (503) *The Inverse Problem in Gröbner Basis Theory*. Preliminary report.
Amelia Taylor, University of Kansas (950-13-904)
- 3:30PM (504) *Special solutions of holonomic systems*. Preliminary report.
Uli Walther, MSRI (950-14-837)

AMS Special Session on Geometric Analysis, IV

1:00 PM – 3:50 PM

Organizers: **Paul C. Yang**, University of Southern California
Matthew J. Gursky, Indiana University

- 1:00PM (505) *Estimates and Existence Results for some Fully Nonlinear Elliptic Equations on Riemannian Manifolds*.
Jeff A Viaclovsky, The University of Texas at Austin (950-35-864)
- 1:35PM (506) *Conformal compactification and Kleinian group*. Preliminary report.
Alice Chang, Princeton University, **Jie Qing***, UCSC, and **Paul Yang**, Princeton University (950-53-1285)
- 2:10PM (507) *Eigenvalue estimates for Paneitz type operators*. Preliminary report.
Xingwang Xu, National University of Singapore (950-58-656)
- 2:45PM (508) *Manifolds with indefinite metrics whose skew-symmetric curvature operator has constant eigenvalues*. Preliminary report.
Tan Zhang, University of Oregon (950-53-229)
- 3:20PM ▶ (509) *Dirac Spinors and Surface Shape*.
George I Kamberov, Washington University (950-53-1092)

AMS Special Session on Beautiful Graph Theory, III

1:00 PM – 3:20 PM

Organizers: **Gary Chartrand**, Western Michigan University

Frank Harary, New Mexico State University

- 1:00PM ▶ (510) *Coloring Numbers for Knots and Links*.
Louis H Kauffman*, Univ of Illinois at Chicago, and **Frank Harary**, New Mexico State Univ (950-57-60)
- 1:30PM ▶ (511) *On the Shields-Harary Number of a Graph*.
Frank Harary, New Mexico State University, and **Peter D. Johnson, Jr.***, Auburn University (950-05-271)
- 2:00PM ▶ (512) *Generalized Vertex Covers in Graphs*. Preliminary report.
Stephen T Hedetniemi, Clemson University (950-05-868)
- 2:30PM ▶ (513) *On the fault-tolerance of meshes*. Preliminary report.
Daniela Ferrero, Academia Sinica (950-05-753)
- 3:00PM (514) *Complete Families of Graphs*.
Ralph Faudree, University of Memphis, **Ronald Gould**, Emory University, **Michael Jacobson**, University of Louisville, and **Linda Lesniak***, Drew University (950-05-1041)

AMS Special Session on Quantum Computation and Information, IV

1:00 PM – 3:45 PM

Organizers: **Samuel J. Lomonaco, Jr.**, University of Maryland, Baltimore County
Howard E. Brandt, Army Research Labs

- 1:00PM (515) *Quantum search and extensions*.
Lov K Grover, Bell Labs, Lucent (950-81-269)
- 1:35PM ▶ (516) *Trading entanglement for communication*.
Gilles Brassard*, Université de Montréal, **Richard Cleve**, University of Calgary, and **Alain Tapp**, University of Waterloo (950-81-556)
- 2:10PM (517) *Optimal signal ensembles*.
Benjamin W Schumacher*, Kenyon College, and **Michael D Westmoreland**, Denison University (950-81-88)
- 2:45PM (518) *Quantum Relative Entropy in Quantum Information Theory*.
Michael D Westmoreland*, Denison University, and **Benjamin W Schumacher**, Kenyon College (950-81-83)
- 3:20PM (519) *Decoherence, einselection, and the physics of information*. Preliminary report.
Wojciech H Zurek, Los Alamos National Laboratory (950-81-1035)

AMS Special Session on Nonlinear Eigenvalue Problems and Applications, IV

1:00 PM – 3:50 PM

Organizers: **Alfonso Castro**, University of Texas at San Antonio
Maya Chhetri, Mississippi State University
Ratnasingham Shivaji, Mississippi State University

- 1:00PM (520) *Periodic Traveling Waves for a Nonlocal Reaction-Diffusion Equation*.
Peter W Bates*, Brigham Young University, and **Fengxin Chen**, U. Texas San Antonio (950-35-589)
- 1:30PM (521) *Traveling Wave Solutions for a Nonlocal Field-Field System*.
Fengxin Chen*, University of Texas at San Antonio, and **Peter W. Bates**, Brigham Young University (950-35-675)

- 2:00PM
▶ (522) *Stabilization of Positive Solutions for Analytic Gradient-like Systems.*
Peter Takáč, Universität Rostock, Germany (950-35-567)
- 2:30PM
(523) *Nonlinear eigenvalue problems and dependence on higher order derivatives for Lidstone boundary value problems.*
Paul W Eloe, University of Dayton (950-34-156)
- 3:00PM
(524) *Solvability of Nonlinear Conjugate and Right Focal Eigenvalue Problems.*
John M Davis*, Baylor University, **Johnny Henderson**, Auburn University, **Rajendra Prasad**, Andhra University, and **William Yin**, LaGrange College (950-34-50)
- 3:30PM
(525) *Positive Solutions of Singular Nonlinear Boundary Value Problems.*
John V Baxley* and **Jenifer C Martin**, Wake Forest University (950-34-742)

AMS Special Session on Singularities in Algebraic and Analytic Geometry, IV

1:00 PM – 3:50 PM

Organizers: **Ruth I. Michler**, University of North Texas
Caroline Melles, U. S. Naval Academy

- 1:00PM
(526) *Monomialization of Morphisms.*
S. Dale Cutkosky, Univ. Missouri (950-14-376)
- 1:50PM
(527) *Inverse systems for singular subschemes of \mathbb{P}^n .*
Anthony A. Iarrobino, Jr., Northeastern University (950-14-1167)
- 2:30PM
(528) *Weak Subintegral Closure & Rees Valuations of Ideals.*
Marie A Vitulli, University of Oregon (950-14-1202)
- 3:10PM
▶ (529) *Planar Line Arrangements.* Preliminary report.
Eriko Hironaka, Florida State University (950-14-920)

AMS Special Session on Integral Equations and Applications, IV

1:00 PM – 3:50 PM

Organizers: **Constantin Corduneanu**, University of Texas at Arlington
Mehran Mahdavi, Bowie State University

- 1:00PM
(530) *Asymptotic behavior to Volterra partial integrodifference equation with noise.*
Yoshihiro Hamaya, Okayama University of Science (950-45-151)
- 1:30PM
(531) *Boundedness in Volterra integro-differential equations.*
Tetsuo Furumochi, Shimane University, Japan (950-34-165)
- 2:00PM
(532) *On some neutral equations with causal operators.*
Mehran Mahdavi, Bowie State University (950-45-621)
- 2:30PM
(533) *Stability of neutral stochastic functional differential equations with causal operators.* Preliminary report.
Zephyrinus C Okonkwo*, Albany State University, Albany, GA, and **Errol G Rowe**, North Carolina A & T State University (950-45-960)
- 3:00PM
(534) *Bounded Variation Regularization of Nonlinear Integral Equations of the First Kind.* Preliminary report.
M. Zuhair Nashed, University of Delaware (950-45-1298)
- 3:30PM
(535) *Existence results for nonlinear Volterra integrodifferential equations.*
Sergiu Aizicovici, Ohio University (950-45-52)

AMS Special Session on Operator Algebras, III

1:00 PM – 3:50 PM

Organizers: **May M. Nilsen**, University of Nebraska, Lincoln, and Texas A & M University
David R. Pitts, University of Nebraska, Lincoln

- 1:00PM
(536) *Random unitaries in non-commutative tori, and an asymptotic model for q -circular systems.* Preliminary report.
James A Mingo, Queen's University, Kingston, Ontario, Canada, and **Alexandru M Nica***, University of Waterloo, Waterloo, Ontario, Canada (950-47-1059)
- 1:30PM
(537) *Noncommutative complex analysis and Bargmann-Segal multipliers.*
Nik Weaver* and **Richard Rochberg**, Washington University (950-47-172)
- 2:00PM
(538) *Cartan G -spaces and their transformation-group C^* -algebras.*
Astrid an Huef, University of Denver (950-46-129)
- 2:30PM
(539) *Norms of Inner Derivations of TAF Algebras.* Preliminary report.
Timothy D Hudson*, East Carolina University, and **Douglas W. B. Somerset**, University of Aberdeen (950-47-898)
- 3:00PM
(540) *On the Classification of Binary Shifts of Minimal Commutant Index.*
Geoffrey L Price, United States Naval Academy (950-46-119)
- 3:30PM
(541) *Involutions of nonselfadjoint operator algebras.* Preliminary report.
Justin R Peters, Iowa State University (950-47-322)

MAA Minicourse #11: Part A

1:00 PM – 3:00 PM

Discrete dynamical systems: Mathematics, methods, and models.

Organizers: **David C. Arney**, U. S. Military Academy
John S. Robertson, Georgia College and State University

MAA Minicourse #14: Part A

1:00 PM – 3:00 PM

Modern physics and the mathematical world.

Organizer: **George DeRise**, Thomas Nelson College

MAA Minicourse #5: Part A

1:00 PM – 3:00 PM

Exploring abstract algebra topics through interactive labs.

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

AMS Session on Combinatorics, I

1:00 PM – 3:40 PM

- 1:00PM
▶ (542) *Reconstruction Conjecture for Graphs Having Exactly one Unicyclic Subgraph.*
Shyam Kumar Gupta* and **Gagan Singla, Jr.**, Indian Institute of Technology, New Delhi (950-05-19)
- 1:15PM
▶ (543) *A reluctant colonial mathematician.*
Paul C Pasles, Villanova University (950-01-98)

- 1:30PM *Tutte polynomials of q -cones.*
(544) **Hongxun Qin*** and **Joseph E Bonin**, The George Washington University (950-05-110)
- 1:45PM *Triangle-Free Polyconvex Graphs.*
▶ (545) **Beth C Robinson**, Carleton College (950-05-188)
- 2:00PM *Toughness of Generalized Petersen Graphs.*
▶ (546) **Kevin K Ferland**, Bloomsburg University (950-05-202)
- 2:15PM *Rainbow Ramsey Numbers.* Preliminary report.
(547) **Linda L Eroh**, Western Michigan University (950-05-398)
- 2:30PM *Some almost sure results in probabilistic Ramsey theory.* Preliminary report.
▶ (548) **Tze Y Chan**, Cambridge University, and **Anant P Godbole***, Michigan Tech University (950-05-420)
- 2:45PM *Factorizations of and by powers of complete graphs.*
(549) **Darryn E Bryant**, The University of Queensland, **Saad I El-Zanati** and **Charles L Vanden Eynden***, Illinois State University (950-05-425)
- 3:00PM *Neighborhood Unions and Factor Critical Graphs.*
(550) **Hikoe Enomoto**, Keio University, **Michael D. Plummer***, Vanderbilt University, and **Akira Saito**, Nihon University (950-05-442)
- 3:15PM *$C(n, n, 1)$ designs obtained from codes.* Preliminary report.
(551) **Chester J. Salwach**, Lafayette College (950-05-472)
- 3:30PM *On the decomposition of orthogonal arrays.* Preliminary report.
(552) **Wiebke S. Diestelkamp***, University of Dayton, and **Jay H. Beder**, University of Wisconsin – Milwaukee (950-05-481)

AMS Session on Mechanics

1:00 PM – 2:40 PM

- 1:00PM *Asymptotic analysis of the nonlinearly elastic Boussinesq problem.* Preliminary report.
(553) **Paul G Warne***, Maryville College, and **Debra A Polignone Warne**, University of Tennessee (950-73-502)
- 1:15PM *Variational principles for elastic bodies with fractal holes.*
(554) **Feodor M Borodich***, The University of Liverpool, and **Alexey Y Volovikov**, Steklov Mathematical Institute (950-73-1062)
- 1:30PM *Oscillations of a Viscous Density-Stratified Fluid Layer.*
(555) **Katharine F Gurski***, CESDIS/USRA NASA/Goddard Space Flight Center, and **Robert L Pego**, University of Maryland (950-76-328)
- 1:45PM *A Efficient Numerical Method for the Incompressible Variable Density Navier-Stokes Equation in the Velocity-Pressure Formulation.* Preliminary report.
(556) **Hans E Johnston**, Temple University (950-76-930)
- 2:00PM *On the dispersion and damping of waves in blood circulation.* Preliminary report.
(557) **Radu C Cascaval**, University of Memphis (950-76-1000)
- 2:15PM *Dynamics of the Ginzburg-Landau Vortices.*
(558) **Mahmoud Affouf**, Penn State/Scranton Campus (950-82-1005)
- 2:30PM *Electrons and Positrons in an External Field.* Preliminary report.
(559) **Andrew Vogt**, Georgetown University (950-81-1221)

SIAM Minisymposium on Analysis of Krylov Space Methods in Numerical Linear Algebra

1:00 PM – 2:55 PM

- Organizer: **Anne Greenbaum**, University of Washington
- 1:00PM *Multiple Recursion Conjugate Gradient Algorithms.*
(560) **Teri L Barth***, TRW, and **Tom A Manteuffel**, University of Colorado at Boulder (950-15-658)
- 1:30PM *Analyzing Krylov Subspace Methods by Their Projections.* Preliminary report.
(561) **Eric de Sturler**, University of Illinois at Urbana-Champaign (950-65-1248)
- 2:00PM *Computable convergence bounds for GMRES.*
(562) **Joerg Liesen**, University of Bielefeld, Germany (950-65-759)
- 2:30PM *When Loss of Orthogonality Means Convergence.*
(563) **Zdenek Strakos**, Emory University (950-65-282)

MAA Session on Interdisciplinary Applications for College Algebra, II

1:00 PM – 3:45 PM

- Organizers: **Donald B. Small**, United States Military Academy
Della D. Bell, Texas Southern University
Ahmad Kamalvand, Houston-Tillotson College
- 1:00PM *College algebra reform should be a friend and not a foe.* Preliminary report.
▶ (564) **William P. Fox**, Francis Marion University (950-E1-209)
- 1:20PM *Applying Algebra to Fairness and Equity Problems.*
▶ (565) **Joseph Malkevitch**, York College (CUNY) (950-E1-343)
- 1:40PM *Enriching College Algebra with Concepts from Music Theory, Engineering, and Euler's Algebra.*
▶ (566) **Anton Glaser**, Pennsylvania State University (950-E1-220)
- 2:00PM *Re-entry: A Small-Group Project for the College Algebra Curriculum.* Preliminary report.
▶ (567) **Carl V Lutzer**, University of Kentucky (950-E1-899)
- 2:20PM *Fitting Functions to Data in a Precalculus Course.* Preliminary report.
▶ (568) **Todd M Swanson**, Hope College (950-E1-390)
- 2:40PM *A Team Test Approach in College Algebra.*
▶ (569) **William J. Shipley**, Mount Saint Mary's College (950-E1-233)
- 3:00PM *The South Dakota Native American Mathematics and Ornithology program at Northern State University.*
▶ (570) **A. S. Elkhader*** and **Dan A Tallman**, Northern State University (950-E1-244)
- 3:20PM *The Contemporary College Algebra Program.* Preliminary report.
▶ (571) **Della D Bell***, Texas Southern University, and **Ahmad Kamalvand**, Huston-Tillotson College (950-E1-845)

MAA Session on The Role of Mathematicians in the Development of Mathematics Teachers and Their Students, II

1:00 PM – 3:15 PM

- Organizers: **Diane M. Spresser**, National Science Foundation
John S. Bradley, National Science Foundation

Alfred B. Manaster, University of California San Diego

- 1:00PM *Learning and Teaching Mathematics: A Summer Institute for Elementary School Teachers.*
(572) **Debra K. Borkovitz*** and **Pat Willott**, Wheelock College (950-G1-896)
- 1:15PM *Getting a Mathematics Department Involved in Middle Grades Mathematics: A California Case Study.*
(573) **Joseph R Fiedler*** and **Javier Trigos-Arrieta**, CSU Bakersfield (950-G1-916)
- 1:30PM *CalcLab for Teachers: Synthesizing In-Depth Learning of High School Calculus with Issues of Teaching and Learning.*
(574) **Stephen Monk**, University of Washington (950-G1-1156)
- 1:45PM *What Works in Professional Development for K-12 Teachers of Mathematics.*
▶ (575) **Gloria A. White**, Texas Higher Education Coordinating Board and Austin Community College (950-G1-854)
- 2:00PM *Lessons from an Outreach Program: MENI, Mathematical Experiences in Northwest Indiana.*
▶ (576) Preliminary report.
Mary T Treanor, Valparaiso University (950-G1-947)
- 2:15PM *Innovations resulting from collaboration between university and K-12 teachers of mathematics.*
▶ (577) **Reginald D Traylor***, University of the Incarnate Word, and **Ellen C Szecsy**, Northeast ISD (950-G1-670)
- 2:30PM *Providing inservice training and curricular support for K-12 math teachers through local science centers.*
▶ (578) **Daniel H Steinberg**, Oberlin College (950-G1-714)
- 2:45PM Discussion and closing comments led by organizer, Alfred Manaster.

MAA Panel Discussion

1:00 PM – 2:20 PM

CBMS mathematics education of teachers report.
Organizer: **Ronald C. Rosier**, CBMS
Panelists: **Alan C. Tucker**, SUNY at Stony Brook
W. James Lewis, University of Nebraska

MAA CRAFTY-CUPM-Committee on Two-Year Colleges Panel Discussion

1:00 PM – 2:20 PM

What does algebra mean in the twenty-first century?
Organizers: **Sheldon P. Gordon**, SUNY at Farmingdale
Linda A. Klme, University of Massachusetts at Boston
Ray E. Collings, Georgia Perimeter College
Panelists: **Linda H. Boyd**, Georgia Perimeter College
Wade Ellis, West Valley College
Carole B. Lacampagne, U.S. Department of Education
Zalman P. Usiskin, University of Chicago

AMS-MAA Special Session on in Memory of Gian-Carlo Rota, II

2:00 PM – 3:50 PM

Organizers: **Richard P. Stanley**, MIT
Rodica Simion, The George Washington University

- 2:00PM *On synthetic flag varieties.* Preliminary report.
(579) **Sergey Fomin***, University of Michigan, and **Michael Z Shapiro**, KTH Stockholm (950-05-886)
- 2:30PM *Kazhdan-Lusztig Polynomials for 321-Hexagon-avoiding Permutations.*
(580) **Gregory S Warrington***, Harvard University, and **Sara C Billey**, Massachusetts Institute of Technology (950-05-1053)
- 3:00PM *Q-Hopf Algebras.*
(581) **William Chen***, Los Alamos National Laboratory and Nankai University, **Gian-Carlo Rota**, MIT, and **Joel Stein**, USA (950-05-751)
- 3:30PM *On certain determinants.* Preliminary report.
(582) **Rodica Simion**, The George Washington Univ. (950-05-996)

AMS Special Session on Ergodic Theory and Topological Dynamics of Z^d and R^d Actions, IV

2:00 PM – 3:50 PM

Organizers: **E. Arthur Robinson**, George Washington University
Ayse A. Sahin, North Dakota State University

- 2:00PM *Spatial determinism for a free Z^2 -action.*
(583) **Kyewon Koh Park***, Ajou University, and **Robert Burton**, Oregon State University (950-28-364)
- 2:30PM *Algebraic Z^d -actions and knot theory.*
(584) **Daniel S Silver** and **Susan G Williams***, University of South Alabama (950-28-728)
- 3:00PM *Mappings between group shifts.*
(585) **Anthony N Quas** and **Paul Trow***, The University of Memphis (950-37-747)
- 3:30PM *Conjugacy in tiling dynamics.*
(586) **Charles Radin**, University of Texas at Austin (950-54-359)

MAA-Project NExT-YMN Poster Session

2:00 PM – 3:45 PM

Organizers: **Kenneth A. Ross**, University of Oregon
Kevin E. Charlwood, Washburn University

MAA Student Workshop

2:00 PM – 3:45 PM

Theorems in stone and bronze.
Organizer: **Helaman Ferguson**, Laurel, Maryland

AMS Retiring Presidential Address

2:15 PM – 3:05 PM

- (587) *Reflections and twists.*
Arthur M. Jaffe, Harvard University

MAA Special Presentation

2:30 PM – 3:50 PM

Great theorems of mathematics.

Organizers: **Douglas E. Ensley**, Shippensburg University
Cheryl Olson, Shippensburg University
Presenters: **Farhad Jafari**, University of Wyoming
Elena A. Marchisotto, California State University Northridge
Daniel Velleman, Amherst College
Roger A. Wiegand, University of Nebraska, Lincoln

AMS-MAA-MSEB Joint Panel Discussion

2:30 PM – 3:45 PM

Projects of the Mathematical Sciences Education Board.

Organizer: **James D. Gates**, MSEB
Presenters: **Deborah Loewenberg Ball**, University of Michigan
Jay Lebov, Center for Science, Mathematics, and Engineering Education
Harvey B. Keynes, University of Minnesota, Minneapolis

Joint Prize Session and Reception

4:00 PM – 6:00 PM

MAA Video Presentation

5:15 PM – 6:00 PM

The Four Color Conjecture Theorem.

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

MAA Session on Innovative Uses of the World Wide Web in Teaching Mathematics, III

5:20 PM – 7:00 PM

Organizers: **Brian E. Smith**, McGill University
Marcelle Bessman, Jacksonville University

5:20PM ▶ (588) *A Real World Calculus Laboratory – Interactive Web Based Labs Designed with Java.* Preliminary report. **Carol G. Crawford** and **Mark D. Meyerson***, U.S. Naval Academy (950-C1-375)

5:35PM ▶ (589) *Learning Online at Virginia Tech's Math Emporium.* **Robert F Olin***, **John Rossi**, **Chris Beattie** and **Kenneth Hannsgen**, Virginia Tech (950-C1-243)

5:50PM (590) *WeBWork, An Internet-Based System for Generating and Delivering Homework Problems.* Preliminary report. **Arnold K Pizer***, **Michael Gage** and **Vicki Roth**, University of Rochester (950-C1-342)

6:05PM (591) *Interactive Fractal Web Sites - Even The Flaws Can Be Useful.* **Patricia L Hale**, University of Montana (950-C1-825)

6:20PM ▶ (592) *Putting (Almost) Everything Online: Using the Web in an Undergraduate ODE Course.* Preliminary report. **James R Hughes**, Elizabethtown College (950-C1-876)

6:35PM ▶ (593) *Experimenting with Web-based Calculus at the University of Kentucky.* Preliminary report. **Jody L Fast**, University of Kentucky (950-C1-831)

6:50PM (594) *Virtual Office Hours using AOL Instant Messenger.* **Darren A. Narayan**, Lehigh University (950-C1-1194)

MAA Minicourse #6: Part A

5:30 PM – 7:30 PM

Teaching with Web-based interactive modular materials.

Organizers: **David A. Smith**, Duke University
Lawrence C. Moore, Duke University

MAA Committee on Industrial and Governmental Mathematics Welcome Reception

5:30 PM – 6:30 PM

MAA Two-Year College Reception

5:30 PM – 7:00 PM

MAA Special Presentation

6:30 PM – 7:20 PM

Stamping through the millennium.

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

MAA Special Presentation

7:00 PM – 8:30 PM

The number years: A mathematical game show.

Organizers: **Arthur T. Benjamin**, Harvey Mudd College
Eric J. Libicki, University of Southern California
Jennifer J. Quinn, Occidental College

Friday, January 21

Pi Mu Epsilon and MAA Student Chapter Advisors' Breakfast

7:00 AM – 8:00 AM

Joint Meetings Registration

7:30 AM – 4:00 PM

AMS-MAA Special Session on Innovative Development Programs for Teaching Assistants and Part-Time Instructors, I

8:00 AM – 10:55 AM

Organizers: **Teri Jo Murphy**, University of Oklahoma
Neil Calkin, Clemson University
Ethel Wheland, University of Akron

8:00AM ▶ (595) *Preparing Teaching Assistants to Assist Teachers.* Preliminary report. **Andrew Nestler**, University of Southern California & Scripps College (950-98-90)

8:35AM (596) *TA Training at UW-Milwaukee.* **Julia M Wilson**, University of Wisconsin, Milwaukee (950-98-1042)

- 9:10AM (597) *An active approach to preparing graduate students to teach workshop-style discussion sections.*
Natasha M Speer, University of California at Berkeley (950-98-1136)
- 9:45AM (598) *Connecting teaching assistants with the talent of their own students as a fundamental teaching and learning resource.* Preliminary report.
Paul R McCreary, Xavier University of Louisiana (950-98-871)
- 10:20AM (599) *Instituting a Seminar on the Teaching of Mathematics at the University of Illinois.* Preliminary report.
William B Branson and **Susan M Plisch***, University of Illinois, Urbana-Champaign (950-98-91)

AMS Special Session on Mathematical Aspects of Consensus Theory, IV

8:00 AM – 10:45 AM

- Organizer: **Melvin F. Janowitz**, University of Massachusetts, Amherst
- 8:00AM (600) *When are the usual set representations injective?* Preliminary report.
Richard Cramer-Benjamin, Niagara University, **Gary D Crown**, Wichita State University, and **Melvin F Janowitz***, University of Massachusetts (950-90-492)
- 8:30AM (601) *Attaining a Consensus List Coloring.*
Fred S Roberts, Rutgers University (950-05-748)
- 9:05AM (602) *Consensus Phylogenetic Trees: Character and Taxonomic Congruence Revisited.*
Francois-Joseph Lapointe, Universite de Montreal (950-92-842)
- 9:35AM (603) *Consensus supertrees and subtrees.*
David J Bryant, CRM Universite de Montreal (950-05-489)
- 10:15AM (604) *About NP-hard problems for the consensus in numerical taxonomy.*
Jean-Pierre Barthélemy* and **François Brucker**, ENST Bretagne (950-05-479)

AMS Special Session on Effective Methods and Commutative Algebra, IV

8:00 AM – 10:50 AM

- Organizers: **Anna Guerrieri**, Universita Degli Studi dell'Aquila
Irene Swanson, New Mexico State University
- 8:00AM (605) *Computation of Multivariable Hilbert Polynomials.*
Alexander B Levin, The Catholic University of America (950-13-179)
- 8:30AM (606) *Invariants of ideals having principal reductions.* Preliminary report.
Marco D'Anna*, Universita' di Catania, **Anna Guerrieri**, Universita' di L'Aquila, and **William Heinzer**, Purdue University (950-13-483)
- 9:00AM (607) *On the associated graded ring of Cohen-Macaulay local rings.*
Hsin-Ju Wang, Taiwan (950-13-564)
- 9:30AM (608) *On multilinear forms, Jacobian ideals and hyperdeterminants.*
Giandomenico Boffi, University of Trieste (950-13-569)
- 10:00AM (609) *Computation using Macaulay's inverse systems.* Preliminary report.
Anthony A. Iarrobino, Jr., Northeastern University (950-13-1122)

- 10:30AM (610) *Free resolutions for polynomial functors.*
Alexandre B Tchernev*, University at Albany, SUNY, and **Jerzy Weyman**, Northeastern University (950-13-838)

AMS Special Session on Recent Advances in Complex and Harmonic Analysis, I

8:00 AM – 10:50 AM

- Organizers: **Carlos A. Berenstein**, University of Maryland, College Park
Stephen D. Casey, American University
Bao Qin Li, Florida International University
David F. Walnut, George Mason University
C. C. Yang, Hong Kong University of Science and Technology

- 8:00AM (611) *Wavelet frames for square-summable sequences.* Preliminary report.
John J Benedetto*, University of Maryland, and **Goetz E Pfander**, University of Hohenheim (950-42-1109)
- 8:30AM (612) *Determinacy in truncated trigonometric moment problems and the extension property.*
Jean-Pierre Gabardo, McMaster University (950-42-939)
- 9:00AM (613) *Positive Sampling Series.*
Gilbert G Walter, Univ Wisc-Milwaukee (950-41-478)
- 9:30AM (614) *Paley-Wiener-type and Boas-type theorems for a class of integral transforms.*
Ahmed I Zayed*, University of Central Florida, and **Tuan Vu-Kim**, University of Kuwait (950-42-332)
- 10:00AM (615) *Complex and harmonic approximation.* Preliminary report.
Paul M Gauthier, Universite de Montreal (950-32-476)
- 10:30AM (616) *Normality and shared values.*
Lawrence Zalcman*, Bar Ilan University, and **Xuecheng Pang**, East China Normal University (950-30-1081)

AMS Special Session on Holomorphic Dynamics and Related Issues, IV

8:00 AM – 10:50 PM

- Organizers: **Mikhail Lyubich**, SUNY at Stony Brook
Kevin Pilgrim, University of Missouri at Rolla
Michael Yampolsky, Institut des Hautes Études
- 8:00AM (617) *Symmetry and Renormalization.*
Marco Martens, IBM-Watson Research Center (950-37-822)
- 8:50AM (618) *Divergence groups have Bowen's property.*
Christopher J Bishop, SUNY at Stony Brook (950-30-1004)
- 9:50AM (619) *A Universal Parabolic Map.* Preliminary report.
Michael Yampolsky, IHES (950-58-773)
- 10:20AM (620) *Periodic orbits and external rays.*
John W Milnor, SUNY Stony Brook (950-37-1173)

AMS Special Session on Invariants of Knots and 3-Manifolds, IV

8:00 AM – 10:50 AM

- Organizers: **Dubravko Ivansic**, George Washington University

- Mark E. Kidwell**, U.S. Naval Academy
Jozef H. Przytycki, George Washington University
Yongwu Rong, George Washington University
Ted Stanford, U. S. Naval Academy
- 8:00AM *Thicknesses of Knots.*
 (621) **Yuanan Diao***, UNC at Charlotte, **Claus Ernst**, Western Kentucky University, and **Buks Rensburg**, York University (950-57-1034)
- 8:30AM *Deloup invariants, Dichromatic skein module, and periodic 3-manifolds.*
 (622) **Maxim V Sokolov**, George Washington University (950-55-752)
- 9:00AM *Mahler measure, links and homology growth.*
 (623) **Daniel S Silver*** and **Susan G Williams**, University of South Alabama (950-57-722)
- 9:30AM *Virtual Knot Theory.* Preliminary report.
 ► (624) **Louis H Kauffman**, Univ. Ill. at Chicago (950-57-57)
- 10:00AM *The fourth skein module, the Montesinos-Nakanishi conjecture and n-algebraic links.* Preliminary report.
 (625) **Józef H Przytycki**, George Washington University, and **Tatsuya Tsukamoto***, George Washington University (and Waseda Univ.) (950-57-1047)
- 10:30AM *Almost modular structure of Ohtsuki invariants.*
 (626) **Ruth J. Lawrence**, University of Michigan (950-57-1242)

AMS Special Session on Quantum Computation and Information, V

8:00 AM – 10:45 AM

Organizers: **Samuel J. Lomonaco, Jr.**, University of Maryland, Baltimore County
Howard E. Brandt, Army Research Labs

- 8:00AM *Quantum Robots.*
 (627) **Paul Benioff**, Physics Division, Argonne National Laboratory (950-81-75)
- 8:35AM *Pauli Exchange Errors in Quantum Computation.*
 ► (628) **Mary Beth Ruskai**, University of Massachusetts Lowell (950-81-76)
- 9:10AM *On relations between quantum computers and classical computers.* Preliminary report.
 ► (629) **John M Myers***, Harvard University, and **F. Hadi Madjid**, Concord, MA (950-81-813)
- 9:45AM *Simulations of Quantum Logic Operations in a Nuclear-Spin Quantum Computer with Large Number of Qubits.*
 (630) **Gennady P Berman***, **Gary D Doolen**, Los Alamos National Laboratory, **Gustavo V Lopez**, Departamento de Fisica, Universidad de Guadalajara,, and **Vladimir I Tsifrinovich**, Polytechnic University (950-81-592)
- 10:20AM *Geometric Algebra Methods in Ensemble Quantum Computing by NMR.*
 ► (631) **Timothy F Havel**, Harvard Medical School, Boston, MA (950-81-53)

AMS Special Session on Homotopy Theory, I

8:00 AM – 10:50 AM

Organizers: **W. Stephen Wilson**, Johns Hopkins University
Jack Morava, Johns Hopkins University

- 8:00AM *Algebraic theories in homotopy theory.*
 (632) **Bernard Badzioch**, University of Notre Dame (950-55-235)

- 8:30AM *A Model Structure on the Category of Pro-Simplicial Sets.*
 (633) **Daniel C Isaksen**, Universitaet Bielefeld (950-55-105)
- 9:00AM *Numerical Invariants of Phantom Maps.* Preliminary report.
 (634) **Jeffrey A. Strom***, Dartmouth College, and **Charles A. McGibbon**, Wayne State University (950-55-389)
- 9:30AM *The Gray Filtration on Phantom Maps.*
 (635) **Ha M Le***, Wayne State University, and **Jeffrey A Strom**, Dartmouth College (950-55-593)
- 10:00AM *Generalized Bousfield Classes and Localizing Model Categories.* Preliminary report.
 (636) **Mark W Johnson**, University of Notre Dame (950-55-602)
- 10:30AM *Cotor for modules; a new look at Eilenberg-Moore.*
 (637) **Lowell Abrams*** and **Charles Weibel**, Rutgers University (950-18-429)

AMS Special Session on Operator Algebras, IV

8:00 AM – 10:50 AM

Organizers: **May M. Nilsen**, University of Nebraska, Lincoln, and Texas A & M University
David R. Pitts, University of Nebraska, Lincoln

- 8:00AM *Investigating some prewavelets by using Ruelle transfer operators.* Preliminary report.
 (638) **Beth P Peterson**, Lamar University (950-47-249)
- 8:30AM *Groupoids and C*-algebras for infinite graphs.*
 (639) **Jack Spielberg**, Arizona State University (950-46-1201)
- 9:00AM *The Radical of Semi-crossed Product Algebras.* Preliminary report.
 (640) **Allan P Donsig***, University of Nebraska-Lincoln, and **Aristides Katavolos**, University of Athens (950-46-893)
- 9:30AM *Hecke C*-Algebras.*
 (641) **Rachel W Hall**, St. Joseph's University (950-16-305)
- 10:00AM *A simple approach to limit distributions of Haar unitary systems.* Preliminary report.
 (642) **Michal Dostal**, Prague, and **Don Hadwin***, University of New Hampshire (950-47-1019)
- 10:30AM *Locally Inner Actions on C₀(X)-Algebras.*
 (643) **Siegfried Echterhoff**, Westfälische Wilhelms-Universität Münster, and **Dana P Williams***, Dartmouth College (950-46-440)

MAA Minicourse #12: Part B

8:00 AM – 10:00 AM

Transforming anxiety into hatred: Rethinking this standard model of reaching liberal arts students and the general public.

Organizers: **Edward B. Burger**, Williams College
Michael Starbird, University of Texas at Austin

MAA Minicourse #1: Part B

8:00 AM – 10:00 AM

Mathematical finance.

Organizer: **Walter R. Stromquist**, Berwyn, PA

MAA Minicourse #7: Part B

8:00 AM – 10:00 AM

Getting students involved in undergraduate research.

Organizers: **Joseph A. Gallian**, University of Minnesota-Duluth
Aparna W. Higgins, University of Dayton
Stephen G. Hartke, Rutgers University

AMS Session on Number Theory, I

8:00 AM – 9:55 AM

- 8:00AM *Multiplier Systems on Hecke Groups.*
(644) **Abdul Hassen**, Rowan University (950-11-32)
- 8:15AM *Small limit points of the set of algebraic integers with two conjugates outside the unit circle.* Preliminary report.
(645) **David R Garth**, Kansas State University (950-11-64)
- 8:30AM *Linear equivalence of algebraic number fields.*
(646) **Marius M Somodi**, Louisiana State University (950-11-114)
- 8:45AM *Vanishing Theorems in the Witt Ring.* Preliminary report.
(647) **Thomas C Palfrey**, Xavier University of Louisiana (950-11-180)
- 9:00AM *On the Crosscorrelation of Sequences with the Decimation Factor $d = \frac{p^{n+1}}{p+1} - \frac{p^n-1}{2}$.* Preliminary report.
(648) **Donald D Mills***, Southeastern Louisiana University, **Eva-Nuria Mueller** and **Wolfgang Willems**, Otto-von-Guericke Universitaet (950-11-186)
- 9:15AM *The isotropy of 4-dimensional torsion quadratic forms over $\mathbb{R}(x, y)$ and $\mathbb{C}(x, y)$.* Preliminary report.
(649) **Anthony J Bevelacqua**, University of Kentucky (950-11-239)
- 9:30AM *Universal ternary forms in totally real number fields.* Preliminary report.
(650) **Azar N Khosravani**, University of Wisconsin Oshkosh (950-11-344)
- 9:45AM *Cardan Polynomials and the Reduction of Radicals.*
(651) **Thomas J Osler**, Rowan University (950-11-497)

SIAM Minisymposium on Applications of Inverse Problems in Partial Differential Equations

8:00 AM – 9:55 AM

Organizer: **C. Maeve McCarthy**, Murray State University

- 8:00AM *Stability and Reconstruction for an Inverse Problem in Thermal Imaging.*
(652) **Lester F Caudill**, University of Richmond (950-35-1139)
- 8:30AM *Finding discontinuous shallow water seabed properties.* Preliminary report.
(653) **Joyce R McLaughlin**, Rensselaer Polytechnic Institute (950-35-1085)
- 9:00AM *Inverse Problems for Anisotropic Elastic Media.*
(654) **Lizabeth V Rachele**, Tufts University (950-35-941)
- 9:30AM *Inverse Scattering Problems in Layered Backgrounds.*
(655) **Peter B Monk**, University of Delaware (950-35-840)

MAA Session on Teaching Statistical Reasoning

8:00 AM – 10:15 AM

Organizers: **K. L. D. Gunawardena**, University of Wisconsin Oshkosh
Nkechi M. Agwu, Borough of Manhattan Community College
Mary Sullivan, Rhode Island College

- 8:00AM Introduction by K.L.D. Gunawardena.
- 8:05AM *In-Class Projects for Teaching Probability and Statistics.*
(656) **Carol E Marchetti**, Rochester Institute of Technology (950-M1-579)
- 8:20AM *Statistical reasoning and the prospective elementary teacher.*
(657) **Mary Sullivan**, Rhode Island College
- 8:35AM *Labs and Projects for an Introductory Statistics Course that Promote Statistical Reasoning.* Preliminary report.
(658) **Laura A McSweeney**, Fairfield University (950-M1-776)
- 8:50AM *A Data-Oriented, Active Learning, Post-Calculus Introduction to Statistical Concepts, Methods, and Theory.*
(659) **Allan J Rossman***, Dickinson College, **Beth L Chance**, Cal Poly, and **Karla V Ballman**, Mayo Clinic (950-M1-298)
- 9:05AM *Team Projects and a Poster Session Final Exam - Second Trial.*
(660) **Melvin A Nyman**, Alma College (950-M1-458)
- 9:20AM *Teaching Statistical Reasoning at West Point.*
(661) **Steven B Horton*** and **Dennis J Day**, United States Military Academy (950-M1-571)
- 9:35AM *Statistical Reasoning for Business and Economics Students.*
(662) **John D. McKenzie, Jr.**, Babson College (950-M1-1190)
- 9:50AM *R.J. Boscovich and the line of best fit.*
(663) **Radoslav M. Dimitric**, City College of San Francisco (950-M1-320)
- 10:05AM *Internet Resources for Teaching Statistics: The "Chance" Website.* Preliminary report.
(664) **Jason D Rosenhouse**, Dartmouth College (950-M1-679)

MAA Student Papers

8:00 AM – 9:25 AM

Graduate student paper session.
Organizer: **Howard L. Penn**, U.S. Naval Academy

PME Council

8:00 AM – 11:00 AM

MAA Session on Looking to Our Future: Recruiting and Preparing the Next Generation of Mathematics Teachers, I

8:05 AM – 10:55 AM

Organizers: **Jay A. Malmstrom**, Oklahoma City Community College
Gary L. Britton, University of Wisconsin-Washington County
Marjorie Enneking, Portland State University
James Loats, Metropolitan State College of Denver

Mary Robinson, University of New Mexico

- 8:05AM
▶ (665) *A Statewide Approach To Addressing Two-Year College Teacher Preparation Issues (Virginia).*
Susan S Wood, J. Sargeant Reynolds Community College (950-H1-1198)
- 8:35AM
▶ (666) *A Community College Approach to Mathematics Education for Future Teachers.* Preliminary report.
Suzanne Feldberg* and **Arnold R Silverman**, Nassau Community College (950-H1-952)
- 9:05AM
▶ (667) *Teaching as a Service Component of a Liberal Arts Mathematics Course.*
Sandra Fillebrown, St. Joseph's University (950-H1-392)
- 9:35AM
(668) *A Mathematics and Education Course Sequence for Prospective Teachers of Grades K-6.* Preliminary report.
Gregory D. Foley*, **Pamela W. Schram**, **Deborah A. Crocker** and **Carol Lynn Hancock**, Appalachian State University (950-H1-1125)
- 10:05AM
▶ (669) *Recruiting, Preparing, and Supporting Effective Teachers of Mathematics in a Poor Urban Hispanic Environment.* Preliminary report.
David Dennis, Univ. of Texas at El Paso (950-H1-957)
- 10:35AM
(670) *Designing a foundational course in abstract mathematics.*
Marcela D Perlwitz* and **Peter Turbek**, Purdue University Calumet (950-H1-1220)

AMS-AWM-SIAM Special Session on Linear Algebra and Optimization, I

8:15 AM – 10:50 AM

Organizers: **Dianne P. O'Leary**, University of Maryland, College Park
Margaret H. Wright, Bell Laboratories

- 8:15AM
▶ (671) *Computing and Displaying Confidence Intervals for Images.* Preliminary report.
Dianne P O'Leary*, University of Maryland, and **James G Nagy**, Emory University (950-65-299)
- 9:00AM
(672) *On the Local Convergence Properties of Pattern Search Methods for Nonlinear Optimization.* Preliminary report.
Elizabeth D Dolan, Argonne National Laboratory, **Robert Michael Lewis**, Institute for Computer Applications in Science and Engineering, and **Virginia Torczon***, College of William & Mary (950-49-961)
- 9:40AM
(673) *An Asynchronous Direct Search Method for Optimization on Parallel Computers.*
Tamara G Kolda*, **Patricia D Hough**, Sandia National Laboratories, and **Virginia Torczon**, College of William and Mary (950-65-530)
- 10:20AM
(674) *Pricing The American Option Using An Interior-Point Method.* Preliminary report.
Yuying Li, Cornell University (950-65-771)

Mathematical Sciences Employment Center

8:15 AM – 7:30 PM

8:15 a.m.–4:40 p.m. Interviews.
8:15 a.m.–7:30 p.m. Interview Center open.

MAA Session on Innovations in the Use of Technology in Teaching Ordinary and Partial Differential Equations, I

8:20 AM – 10:45 AM

Organizers: **Timothy J. McDevitt**, Millersville University
Elias Deeba, University of Houston-Downtown
Richard J. Marchand, United States Military Academy

- 8:20AM
▶ (675) *An Eight-Compartment Model For Beginning ODE Students.*
Henry J Ricardo, Medgar Evers College (CUNY) (950-K1-686)
- 8:45AM
(676) *Technology-Based Projects in an Introductory ODE Course.*
Thomas L LaFramboise, Marietta College (950-K1-1229)
- 9:10AM
(677) *Real time dynamics: Why it makes a difference.*
Beverly H West*, Cornell University, and **Jean M McDill**, Cal Poly State University (950-K1-1214)
- 9:35AM
▶ (678) *Coffee Cooling on a CBL unit and in Maple.* Preliminary report.
William C Bauldry* and **Sarah J Greenwald***, Appalachian State U (950-K1-1064)
- 10:00AM
▶ (679) *Ordinary Differential Equations Using the Method of Four.*
William P Fox, Francis Marion University (950-K1-371)
- 10:25AM
▶ (680) *Teaching Differential Equations with a Spreadsheet.*
Deane E Arganbright, University of Papua New Guinea (950-K1-810)

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

8:30 AM – 10:50 AM

Organizers: **Karen H. Parshall**, University of Virginia
David E. Zitarelli, Temple University

- 8:30AM
▶ (681) *An analytical society? In search of nineteenth-century British analysts.*
Adrian C Rice, Randolph-Macon College (950-01-388)
- 9:00AM
▶ (682) *Individuals and Institutions in the Emergence of a Modern Mathematical Community in China.*
Joseph W Dauben, CUNY Graduate Center (950-01-546)
- 9:30AM
▶ (683) *Patronage from Dukes to Foundations and the Development of Mathematical Fields.*
Florence D. Fasanelli, College-University Resource Institute (950-01-889)
- 10:00AM
▶ (684) *International Contributions to British Mathematical Journals, 1800-1900.* Preliminary report.
Sloan E Despeaux, University of Virginia (950-01-634)
- 10:30AM
▶ (685) *A Sideways Look at Hilbert's 23 Problems of 1900.*
Ivor Grattan-Guinness, Middlesex University (UK) (950-01-516)

AMS Special Session on Beautiful Graph Theory, IV

8:30 AM – 10:50 AM

Organizers: **Gary Chartrand**, Western Michigan University
Frank Harary, New Mexico State University

- 8:30AM (686) *Sphere-of-Attraction Graphs.*
Fred R McMorris*, Illinois Institute of Technology, and **Chi Wang**, University of Louisville (950-05-334)
- 9:00AM (687) *Transit functions on graphs.* Preliminary report.
Henry Martyn Mulder, Erasmus Universiteit (950-05-505)
- 9:30AM (688) *Lifting Algebraic Specifications of Networks.*
Jonathan L. Gross*, Columbia University, and **Jianer Chen**, Texas A&M University (950-05-1147)
- 10:00AM (689) *Some beautiful graphs.*
Robin J Wilson, Open University, UK (950-05-581)
- 10:30AM (690) *Forcing concepts in graph theory.*
Frank Harary, New Mexico State University (950-05-812)

AMS Session on Complex Variables

8:30 AM – 9:55 AM

- 8:30AM (691) *On the Maximum Modulus of a Polynomial.* Preliminary report.
Mohammed A Qazi, University of Central Florida (950-30-698)
- 8:45AM (692) *Domains with a prescribed number of minimum points of the hyperbolic metric.* Preliminary report.
Brian T Gill*, Seattle Pacific University, and **Thomas H MacGregor**, University at Albany, SUNY (950-30-919)
- 9:00AM (693) *Examples from a Class of Meromorphic Harmonic Polynomials.* Preliminary report.
John W Thompson, University of Pittsburgh at Johnstown (950-30-1023)
- 9:15AM (694) *A Jensen-Type Theorem.* Preliminary report.
Catherine A Beneteau*, Seton Hall University, and **Boris Korenblum**, The University at Albany (950-30-1103)
- 9:30AM (695) *Linear Fractional Transformations in Complex Euclidean Space.*
Jerry R Muir, Jr.*, Rose-Hulman Institute of Technology, and **Ted J Suffridge**, University of Kentucky (950-32-387)
- 9:45AM (696) *On n -concavity of covering spaces with parameters.*
Cezar Joita, SUNY at Buffalo (950-32-1111)

MAA Committee on Student Chapters Presentation

8:30 AM – 10:00 AM

Mathematical experiences for students outside the classroom
 Organizers: **Tom Kelley**, Metropolitan State College of Denver
Richard L. Poss, St. Norbert College

AMS Invited Address

9:00 AM – 9:50 AM

- (697) *Higher order elliptic equations in conformal geometry.*
Sun-Yung Alice Chang, Princeton University (950-35-07)

ASL Invited Address

9:00 AM – 9:25 AM

- (698) *Title to be announced.*
Manuel Lerman, University of Connecticut

AMS-MAA Special Session on in Memory of Gian-Carlo Rota, III

9:00 AM – 10:50 AM

Organizers: **Richard P. Stanley**, MIT
Rodica Simion, The George Washington University

- 9:00AM (699) *Random Variables, Umbral Calculus, and Polynomial Sequences.*
Brian D Taylor, Wayne State University (950-05-1277)
- 9:30AM (700) *Applications of the classical umbral calculus.* Preliminary report.
Ira M Gessel, Brandeis University (950-05-1007)
- 10:00AM (701) *Umbral Methods and Bailey Chains.*
George E Andrews, Pennsylvania State University (950-05-510)
- 10:30AM (702) *The Umbral Transfer Matrix Method.* Preliminary report.
Doron Zeilberger, Temple University (950-05-338)

AMS Session on Linear Algebra

9:00 AM – 10:55 AM

- 9:00AM (703) *Free product $Z_3 * Z_3$ of rotations with rational entries.*
Guoyang Liu*, The Catholic University of America, and **Lewis C Robertson**, Wesleyan University (950-15-79)
- 9:15AM (704) *Limiting Values of the Variance and the Moments of the Dimension of a Sum or Intersection of Random Vector Subspaces.*
Geoffrey D. Dietz*, University of Dayton, and **David E. Dobbs**, University of Tennessee (950-15-113)
- 9:30AM (705) *Applying Linear algebra and set theoretic heuristics founding the basis for System Availability Analysis under the Kalinowski Algorithm.* Preliminary report.
Kevin M Kalinowski, General Dynamics Land Systems (950-15-578)
- 9:45AM (706) *More Preconditioners via Subspace Projection.*
Eugene C Boman, Penn State University, DuBois Campus (950-15-585)
- 10:00AM (707) *A Probabilistic Method for Redundancy Detection in the Löwner Ellipsoid Semidefinite Programming Problem.* Preliminary report.
Shafiu Jibrin*, University of Minnesota, Morris, and **Irwin S. Pressman**, The Fields Institute, Toronto (950-90-515)
- 10:15AM (708) *Patterns of Matrices that Do Not Have P -completion.* Preliminary report.
Luz M DeAlba*, Drake University, and **Leslie Hogben**, Iowa State University (950-15-733)
- 10:30AM (709) *A Construction of Orthogonal Matrices that Extend Helmer's Matrix.* Preliminary report.
Constantine Georgakis, DePaul University (950-15-891)
- 10:45AM (710) *Closest Matrices in the Space of Doubly Stochastic Matrices.*
Raja N Khoury, Collin County Community College (950-15-28)

MAA Poster Session

9:00 AM – 11:00 AM

Environmental mathematics.
 Organizers: **Ahalm Tannouri**, Morgan State University
William D. Stone, New Mexico Institute of Mining and Technology

**MAA Committee on Computers in Mathematics
Education Panel Discussion**

9:00 AM – 10:50 AM

Pedagogical use of computer algebra in mathematics teaching.

Organizers: **Bert K. Waites**, Ohio State University
V. S. Ramamurthi, University of North Florida

Panelists: **John W. Kenelly**, Clemson University
Jeanette R. Palmiter, Portland State University
Bernhard Kutzler, University of Linz, Austria
Wade Ellis, West Valley College
L. Carl Leinbach, Gettysburg College

MAA Panel Discussion

9:00 AM – 10:20 AM

Quantitative literacy: National questions and local solutions.

Organizer: **Richard A. Gillman**, Valparaiso University

Panelists: **Steven F. Bauman**, University of Wisconsin
Judith F. Moran, Trinity College
Linda R. Sons, Northern Illinois University
Lynn A. Steen, St. Olaf College
Janet E. Teeguarden, DePauw University

ASL Invited Address

9:30 AM – 9:55 AM

- (711) *Symmetry and the Ramsey degree of finite relational structures.*
Willem L. Fouche, University of Pretoria

Exhibits and Book Sale

9:30 AM – 5:30 PM

ASL Invited Address

10:05 AM – 10:30 AM

- (712) *Title to be announced.*
Zachary Robinson, East Carolina University

SIAM Invited Address

10:05 AM – 10:55 AM

- (713) *Natural patterns.*
Alan Newell, University of Warwick and University of Arizona (950-35-126)

ASL Invited Address

10:35 AM – 11:00 AM

- (714) *Forced expansions.*
Meir Buzaglo, Hebrew University of Jerusalem

AMS-MAA-SIAM Invited Address

11:10 AM – NOON

- (715) *Stochastic differential equations in financial mathematics: From Black-Scholes to the present.*
George C. Papanicolaou, Stanford University

Retirement Luncheon in honor of H. Hope Daly

NOON – 2:00 PM

AMS Colloquium Lecture: Lecture 3

1:00 PM – 2:00 PM

- (716) *Riemann surfaces in dynamics, topology, and arithmetic, Part III.*
Curtis T. McMullen, Harvard University

ASL Invited Address

1:00 PM – 1:45 PM

- (717) *Title to be announced.*
Timothy J. Carlson, Ohio State University

AMS-MAA Special Session on Innovative Development Programs for Teaching Assistants and Part-Time Instructors, II

1:00 PM – 4:55 PM

Organizers: **Teri Jo Murphy**, University of Oklahoma
Neil Calkin, Clemson University
Ethel Wheland, University of Akron

- 1:00PM (718) *Shaping the Preparation of Future Mathematics Faculty.* Preliminary report.
Luise-Charlotte Kappe, SUNY at Binghamton (950-98-108)
- 1:35PM (719) *Case Studies for Mathematics Graduate Student Teaching Preparation and Development.* Preliminary report.
Solomon Friedberg, Boston College, and **Lee L. Zia***, University of New Hampshire (950-98-1131)
- 2:10PM (720) *The LaCEPT model for instructional leadership.* Preliminary report.
James J Madden, Louisiana State University (950-00-408)
- 2:45PM (721) *TA development at Iowa.* Preliminary report.
David Manderscheid, University of Iowa (950-97-103)
- 3:20PM (722) *Two-Stage TA Training at Oklahoma State University: Combining a Mentorship with Academic Coursework.* Preliminary report.
Lisa A. Mantini, Oklahoma State University (950-98-1184)
- 3:55PM (723) *The Developmental Mathematics Program at California State University, Northridge.* Preliminary report.
Elena A Marchisotto, California State University, Northridge (950-98-929)
- 4:30PM (724) *Focusing on Attitudes and Beliefs to Improve Instruction.* Preliminary report.
Jodie D Novak, University of Northern Colorado (950-98-171)

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

1:00 PM – 2:50 PM

Organizers: **Karen H. Parshall**, University of Virginia

David E. Zitarelli, Temple University

- 1:00PM **A Tenth-century Iranian Treatise on Problem-solving Methods in Geometry.**
▶ (725) **Jan P Hogendijk**, University of Utrecht (950-01-366)
- 1:30PM **Materialist Dialectics and Mathematics: Chinese Research in the Foundations of the Calculus during the Cultural Revolution (1966-1976).**
(726) **Yibao Xu**, Graduate Center of CUNY (950-01-1011)
- 2:00PM **Four centuries of spherical trigonometry in Sanskrit.** Preliminary report.
▶ (727) **Kim Plofker**, Brown University (950-01-955)
- 2:30PM **Historical Reflections on the Role of Discovery Learning During the “New Math” Era: Rhetoric and Reality.** Preliminary report.
▶ (728) **David L Roberts**, Laurel, MD (950-01-490)

AMS-AWM-SIAM Special Session on Linear Algebra and Optimization, II

1:00 PM – 4:50 PM

Organizers: **Dianne P. O’Leary**, University of Maryland, College Park
Margaret H. Wright, Bell Laboratories

- 1:00PM **Results on Iterative Regularization.**
(729) **Misha E Kilmer**, Tufts University, Medford, MA (950-65-1024)
- 1:40PM **Approximating large systems by small systems: Some theorems and some open questions.**
▶ (730) **Jane K Cullum**, Los Alamos National Laboratory (950-15-881)
- 2:20PM **The Unreasonable Effectiveness of the BiCG Algorithm.** Preliminary report.
(731) **Anne Greenbaum**, University of Washington (950-65-730)
- 3:00PM **How Non-Normality Can Affect the Solution of Linear Systems.**
(732) **Ilse Ipsen**, North Carolina State University (950-65-214)
- 3:40PM **Structure preserving low rank approximation of linearly structured matrices.**
(733) **Haesun Park***, **Ben Rosen** and **Lei Zhang**, Univ. of Minnesota (950-65-1149)
- 4:20PM **Spectral Encounters of the Quaternion Kind.**
(734) Preliminary report.
Niloufer Mackey*, Western Michigan University, and **D. Steven Mackey**, Kalamazoo College (950-15-944)

AMS Special Session on The Feynman Integral and Applications, I

1:00 PM – 5:50 PM

Organizers: **Gerald W. Johnson**, University of Nebraska

Michel L. Lapidus, University of California, Riverside

- 1:00PM **Feynman’s Operational Calculi for Noncommuting Systems of Operators.**
(735) **Brian Jefferies**, University of New South Wales, Kensington, Australia (950-47-647)

- 1:30PM **Representation Space for the Feynman Operator Calculus and Path-Integral.** Preliminary report.
(736) **Tepper L. Gill*** and **Woodford W. Zachary**, Howard University (950-81-82)
- 2:00PM **An Application of a Feynman Functional to the Global Positioning System.**
(737) **Brian DeFacio*** and **Arjuna Flenner**, University of Missouri-Columbia (950-85-455)
- 2:30PM **Feynman’s operational calculus for noncommuting operators.**
(738) **Michel L. Lapidus***, University of California, Riverside, and **Gerald W. Johnson**, University of Nebraska - Lincoln (950-81-289)
- 3:00PM **Polylogarithms and Feynman path integrals.** Preliminary report.
(739) **Pierre E Cartier**, Ecole Normale Supérieure de Paris and Institut des Hautes Etudes Scientifiques (950-81-378)
- 3:30PM **Three approaches to the Feynman integral and their connection with the unitary group.**
(740) **Gerald W. Johnson***, University of Nebraska - Lincoln, and **Michel L. Lapidus**, University of California, Riverside (950-81-291)
- 4:00PM **What stochastic analysis can teach us about the geometry of quantum dynamics ?**
(741) **Jean-Claude Zambrini**, University of Lisbon, Portugal (950-60-423)
- 4:30PM **Metrical Quantization and Path Integrals with Continuous-time Regularization.**
(742) **John R Klauder**, University of Florida (950-81-406)
- 5:00PM **Renormalization of Path Integrals and Absolute Continuity.**
▶ (743) **Sarada G Rajeev**, University of Rochester (950-28-435)
- 5:30PM **The Schrödinger and Black-Scholes equations: A common path integral approach using Henstock’s non-absolute integration.**
(744) **Patrick Muldowney**, University of Ulster (950-28-627)

AMS Special Session on Algebraic Geometry and Commutative Algebra, I

1:00 PM – 6:00 PM

Organizers: **Irena Peeva**, Cornell University
Hema Srinivasan, University of Missouri, Columbia

- 1:00PM **A Remark on Local Uniformization.** Preliminary report.
(745) **Christel Rotthaus**, Michigan State University (950-13-584)
- 1:30PM **Liaison and Castelnuovo-Mumford regularity.**
(746) **Marc F Chardin**, CNRS and Université Paris 6 (950-14-469)
- 2:00PM **Cohomology of sheaves and free resolutions over exterior algebras.** Preliminary report.
(747) **David Eisenbud**, MSRI and UC Berkeley (950-14-155)
- 2:30PM **Direct sums of modules over local rings.** Preliminary report.
(748) **Roger A Wiegand**, University of Nebraska (950-13-380)
- 3:00PM **The LCM lattice.**
(749) **Vesselin N. Gasharov***, **Irena V. Peeva**, Cornell University, and **Volkmar Welker**, Technische Universität Berlin (950-13-1001)
- 3:30PM Break
- 3:40PM **Induced Formal Deformations of Normal Local Domains.**
(750) **Phillip A Griffith**, University of Illinois (950-13-548)

4:10PM (751) *Inverse Systems, Tensor Rank and Secant Varieties of Embedded Multiprojective Spaces.* Preliminary report.

Anthony V. Geramita*, Queen's University, (Kingston, Ont., Canada), **Marvi Catalisano**, Universita' di Genova, Genova, Italy, and **Alessandro Gimigliano**, Univ. di Bologna, Bologna, Italy (950-13-333)

4:40PM (752) *On the complexity of the integral closure.* Preliminary report.

Bernd Ulrich, Michigan State University, and **Wolmer V Vasconcelos***, Rutgers University (950-13-218)

5:10PM (753) *Jet spaces of rational singularities.* Preliminary report.

David Eisenbud, **Edward Frenkel**, **Mircea Mustata*** and **Matthew Szczesny**, University of California, Berkeley (950-14-466)

5:40PM (754) *Strongly Koszul Algebras.*

Juergen Herzog, University of Essen, **Takayuki Hibi**, Osaka University, and **Gaetana Restuccia***, University of Messina (950-13-326)

AMS Special Session on Recent Advances in Complex and Harmonic Analysis, II

1:00 PM – 5:50 PM

Organizers: **Carlos A. Berenstein**, University of Maryland, College Park
Stephen D. Casey, American University
Bao Qin Li, Florida International University
David F. Walnut, George Mason University
C. C. Yang, Hong Kong University of Science and Technology

1:00PM (755) *A New Result about the Dimensions of Automorphism Groups.*
Steven Krantz, Washington University in St. Louis (950-32-691)

1:30PM (756) *Sampling and Interpolation for Bandlimited Functions.*
Yura Lyubarskii, NTNU (950-42-1237)

▶ 2:00PM (757) *Entire functions of exponential type, sampling, splines, and summability.* Preliminary report.
W. R. Madych, University of Connecticut (950-40-851)

2:30PM (758) *Proper Holomorphic Maps From B_n to B_{2n-1} .*
Shanyu Ji, University of Houston (950-32-1077)

3:00PM (759) *A second main type inequality for holomorphic curves intersecting hyperplanes.*
Min Ru*, University of Houston, and **Julie Tzu-Yueh Wang**, Academia Sinica (950-32-1074)

3:30PM (760) *Functional Differential Equations.*
Fred Gross, University of Maryland, and **Charles Osgood***, National Security Agency (950-30-619)

4:00PM (761) *Some advances in the value distribution theory and its applications.*
Chung-Chun Yang, The Hong Kong University of Science and Technology (950-30-620)

4:30PM (762) *On the $\bar{\partial}$ -equation in a Banach space.*
Imre Patyi, Purdue University, W. Lafayette, IN (950-32-1066)

5:00PM (763) *Fatou-Julia Theory on transcendental semigroups.*
Kin-Keung Poon, The Hong Kong Institute of Education (950-30-692)

5:30PM (764) *Correlations between zeros of sections of line bundles on complex manifolds and on symplectic manifolds.*

Bernard Shiffman* and **Steve Zelditch**, Johns Hopkins University (950-32-1241)

AMS Special Session on Control Theory for Partial Differential Equations, I

1:00 PM – 5:50 PM

Organizer: **Robert Triggiani**, University of Virginia

▶ 1:00PM (765) *Feedback stabilization: Open loop and closed loop.* Preliminary report.
Thomas I Seidman, UMBC (950-93-705)

1:30PM (766) *Wave Motion in a Supported Elastic Beam.* Preliminary report.
David L Russell, Virginia Tech (950-35-877)

2:00PM (767) *Domain Decomposition in Optimal Boundary Control of the Maxwell System.*
John E Lagnese, Georgetown University (950-93-1180)

2:30PM (768) *Unique continuation for solutions to systems of PDE.*
Matthias M Eller, Tennessee Technological University (950-35-595)

3:00PM (769) *Shape sensitivity analysis for hyperbolic equations with Lipschitz-continuous domains.*
John Cagnol*, University of Virginia, and **Jean-Paul Zolesio**, Ecole des Mines de Paris / CNRS (950-35-616)

3:30PM Break

▶ 4:00PM (770) *Decay rates in Interactive Hyperbolic-Parabolic PDE Models with Thermal Effects on the Interface.*
Irena M Lasiecka, University of Virginia (950-35-361)

4:30PM (771) *Continuous observability inequalities for hyperbolic equations with variable coefficients.*
Roberto Triggiani, University of Virginia (950-35-405)

5:00PM (772) *Modelling and Control Problems for Thin Shells.*
Pengfei Yao, Institute of Systems Science, The Chinese Academy of Science (950-35-648)

5:30PM (773) *Closed Range Weak or Mild Solution Operators and Nonconvex Optimal Control in terms of Generalized Gradients.*
Nicolae H Pavel, Ohio University (950-35-887)

AMS Special Session on Difference Equations and Their Applications in Social and Natural Sciences, I

1:00 PM – 5:50 PM

Organizers: **Hassan Sedaghat**, Virginia Commonwealth University
Abdul Aziz Yakubu, Howard University
Gerry Ladas, University of Rhode Island
Saber Elaydi, Trinity University

▶ 1:00PM (774) *Hamiltonian Systems on Time Scales.*
Calvin D Ahlbrandt*, University of Missouri-Columbia, **Martin Bohner**, University of Missouri-Rolla, and **Jerry Ridenhour**, Utah State University (950-39-167)

▶ 1:30PM (775) *Riccati equation for a differential equation on a measure chain.* Preliminary report.
Allan C Peterson, University of Nebraska-Lincoln (950-34-313)

2:00PM (776) *Asymptotic formula for solutions of asymptotically diagonal linear delay difference systems.*
Shangbing Ai, University of Pittsburgh (950-39-523)

- 2:30PM (777) *On persistence and stability of some discrete models.* Preliminary report.
Saber N Elaydi, Trinity University (950-39-1128)
- 3:00PM (778) *Some open problems related to the equation $x_{n+1} = A/x_n + 1/x_{n-2}$.* Preliminary report.
Richard C DeVault*, Northwestern State University of Louisiana, **Gerry Ladas**, University of Rhode Island, and **Steven W Schultz**, Providence College (950-39-395)
- 3:30PM (779) *Existence of solutions for certain singular difference equations.*
Hassan Sedaghat, Virginia Commonwealth University (950-39-230)
- 4:00PM (780) *Boundedness of solutions of a nonlinear second order nonautonomous equation.* Preliminary report.
Vlajko L Kocic, Xavier University of Louisiana (950-39-290)
- 4:30PM (781) *The Role of Tangencies in Chain Explosions.*
Kathleen Alligood, George Mason University (950-39-1134)
- 5:00PM (782) *Complete Automation of the Continuous Multi-WZ Method.* Preliminary report.
Akalu Tefera, Temple University (950-05-213)
- 5:30PM (783) *The Askey - Wilson operators and their inverses.*
Sergei K Suslov, Arizona State University (950-33-292)

- 1:45PM (787) *Application of Upper and Lower Bounds for the Domination Number to Vizing's Conjecture.*
W. Edwin Clark*, **Mourad E. H. Ismail** and **Stephen Suen**, University of South Florida (950-05-663)
- 2:00PM (788) *Taut Distance-Regular Graphs.*
Mark S MacLean, University of Wisconsin-Madison (950-05-674)
- 2:15PM (789) *The Isoperimetric Constants of Certain Cayley Graphs Associated with $PSL(2, Z_n)$.* Preliminary report.
Jason D. Rosenhouse, Dartmouth College (950-05-683)
- 2:30PM (790) *Minimum cardinality dominating sets of a tree: A linear programming approach.* Preliminary report.
Teresa M Contenza, University of Kentucky (950-05-718)
- 2:45PM (791) *Cycle bases for 3-connected graphs.*
Paul C Kainen, Georgetown University (950-05-720)
- 3:00PM (792) *Bounded Automorphisms on Planar Graphs with Positive Excess.* Preliminary report.
Eric W Aurand, Texas A&M - Commerce (950-05-777)
- 3:15PM (793) *Maximal Divisors of Codeword Weights in Projective Reed-Muller Codes.*
Christopher M Boner, University of Virginia (950-05-903)

MAA Minicourse #13: Part B

1:00 PM – 3:00 PM

Teaching contemporary statistics with active learning.

Organizers: **Beth L. Chance**, California Polytechnic State University
Robin H. Lock, St. Lawrence University
Mary R. Parker, Austin Community College
Allan J. Rossman, Dickinson College

- 3:30PM (794) *Regular matroids and the sticky conjecture.* Preliminary report.
David L Neel, Dartmouth College (950-05-908)
- 3:45PM (795) *A block-size bound for Steiner 6-wise balanced designs.*
Michael S Ira* and **Earl S Kramer**, University of Nebraska at Lincoln (950-05-926)
- 4:00PM (796) *Perfect Matchings and the Blow-up Lemma.* Preliminary report.
Vojtech Rodl, **Andrzej Rucinski**, Emory University, and **Michelle Wagner***, University of Wisconsin-La Crosse (950-05-980)

MAA Minicourse #2: Part B

1:00 PM – 3:00 PM

Projects in precalculus, calculus, and differential equations using biology and chemistry applications.

Organizers: **Meghan A. Burke**, Kennesaw State University
Sean F. Ellermeyer, Kennesaw State University

- 4:15PM (797) *Reading Frame Invariant Cycles.*
Kevin F McDougal, University of Wisconsin-Oshkosh (950-05-992)
- 4:30PM (798) *Irregular Networks On Cylinders.*
Dan B. Johnston, Washington University (950-05-1018)
- 4:45PM (799) *A lattice path approach to counting partitions with minimum rank t .*
Alexander Burstein*, George Washington University, **Sylvie Corteel**, Laboratoire de Recherche en Informatique, **Alexander Postnikov**, Massachusetts Institute of Technology, and **Carla D Savage**, North Carolina State University (950-05-1065)

MAA Minicourse #8: Part B

1:00 PM – 3:00 PM

Facilitating active learning: Concrete ways to foster student participation.

Organizer: **Sandra L. Rhoades**, San Diego State University

- 5:00PM (800) *Embedding incomplete idempotent latin squares of order n in idempotent latin squares of order $2n$.* Preliminary report.
Atif A Abueida* and **Chris A Rodger**, Auburn University (950-05-1069)

AMS Session on Combinatorics, II

1:00 PM – 5:55 PM

- 1:00PM (784) *The Lattice Polynomial of a Graph.*
Jonathan J Wiens, University of Alaska Fairbanks (950-05-493)
- 1:15PM (785) *The Mod Sum Number of the Wheel W_n .*
Anna D Draganova, Pomona College, CA (950-05-561)
- 1:30PM (786) *The Reversing Number of a Digraph.*
Darren A. Narayan, Lehigh University (950-05-644)

- 5:15PM (801) *The Structure of Optimal Colorings for Rado Numbers.* Preliminary report.
Daniel Schaal*, South Dakota State University, and **Adam Roesch**, Augsburg College (950-05-1113)
- 5:30PM (802) *Improvements of Some Results on Cyclable Graphs.* Preliminary report.
Irina Goia, MIT (950-05-1121)
- 5:45PM (803) *Rado Numbers for Some Nonhomogeneous Equations.*
Kate Rendall, St. Norbert College (950-05-1127)

AMS Session on Number Theory, II

1:00 PM – 4:55 PM

- 1:00PM (804) *On the reductive dual pair $(U(1), U(2))$.* Preliminary report.
Manouchehr Misaghian, The University of Iowa, Iowa City, IA (950-11-560)
- 1:15PM (805) *Explicit families of elliptic curves with prescribed mod 6 representations.* Preliminary report.
Joel P Roberts, Bowdoin College (950-11-565)
- 1:30PM (806) *Universal Higher Order Bernoulli Polynomials.* Preliminary report.
Arnold M Adelberg, Grinnell College (950-11-576)
- 1:45PM (807) *On the Digital Sum and Length of 2^n .*
Robert E Kennedy* and **Curtis N Cooper**, Central Missouri State University (950-11-781)
- 2:00PM (808) *Finding Moments of the Large Digit Function Using Delange's Method.*
Curtis N Cooper* and **Robert E Kennedy**, Central Missouri State University (950-11-784)
- 2:15PM (809) *Decompositions of a Class of Matrices Involving Generalized Geometric Progressions.* Preliminary report.
Johann K Leida* and **Peter Yang**, University of St. Thomas (950-11-798)
- 2:30PM (810) *Power bases for cyclotomic fields of conductor 2^m .* Preliminary report.
Leanne D Robertson, Smith College (950-11-844)
- 2:45PM (811) *On Optimal Subset Representations of Integer Sets.*
Michael L Develin, Harvard University (950-11-869)
- 3:00PM (812) *Fractal dimension of generalized binomial coefficients modulo a prime.* Preliminary report.
John M Holte, Gustavus Adolphus College (950-11-950)
- 3:15PM (813) *Sums of powers of integers using L'Hopital's Rule.* Preliminary report.
Carl A Libis, Antioch College (950-11-993)
- 3:30PM (814) *Class numbers of cyclotomic function fields.*
Joseph Palen, University of Michigan (950-11-1088)
- 3:45PM (815) *A Generalization of Jacobi's Derivative Formula.* Preliminary report.
Gwynneth G Coogan, Hood College (950-11-1120)
- 4:00PM (816) *Systems of Diagonal Equations over p -adic Fields.*
Michael P Knapp, University of Michigan (950-11-1227)
- 4:15PM (817) *An arithmetic property of certain rational powers.* Preliminary report.
Gerry Myerson, Centre for Number Theory Research (950-11-1245)
- 4:30PM (818) *Heisenberg graphs over the ring of integers modulo 2^r .* Preliminary report.
Michelle R DeDeo, University of North Florida (950-11-1270)
- 4:45PM (819) *Classification of Greedy Subset-Sum-Distinct Sequences.*
Joshua S Von Korff, Harvard University (950-11-1296)
- 1:30PM (822) *Integral Properties for Solutions to the A-Harmonic Equation.* Preliminary report.
Shusen Ding, Seattle University (950-35-549)
- 1:45PM (823) *Existence, Regularity and Homogenization of Solutions to a Coupled Ginzburg-Landau System for Layered Superconductors.* Preliminary report.
Patricia Bauman and **Yangsuk Ko***, Purdue University (950-35-270)
- 2:00PM (824) *A geometric look at the volcano-shape of a functional for a family of elliptic PDEs.* Preliminary report.
Joel W Fish, Northern Arizona University (950-35-310)
- 2:15PM (825) *A New Model for Porosity Evolution in Chemical Vapor Infiltration.*
Shi Jin and **Xuelei Wang***, Georgia Institute of Technology (950-35-324)
- 2:30PM (826) *Determination of conductivity in a heat equation.* Preliminary report.
Ping Wang*, Penn State University, and **Kewang Zheng**, Hebei University of Science and Technology (950-35-346)
- 2:45PM (827) *On Radiating Solutions to the Helmholtz Equation and Inverse Scattering.*
Peter A. McCoy, U.S. Naval Academy (950-35-422)
- 3:00PM (828) *Liouville Theorem for Generalized Harmonic Functions.*
Alexander I Kheyfits, Bronx Community College of the City University of New York (950-31-306)
- 3:15PM (829) *Nonlinear Degenerate Elliptic problems in Transonic Gas Dynamics.*
Suncica Canic and **Eun Heui Kim***, University of Houston (950-35-855)
- 3:30PM (830) *Existence and Uniqueness Theorems for Singular Anisotropic Quasilinear Elliptic Boundary Value Problems.*
S. Hill, Rowan University, **Kristen S Moore***, University of Michigan, and **W. Reichel**, Universitat Basel (950-35-967)
- 3:45PM (831) *The inverse scattering problem for acoustic waves in unbounded inhomogeneous medium.*
Andrzej W Kedzierawski, SUNY Geneseo (950-35-970)
- 4:00PM (832) *The Perturbed Toda Lattice.*
Russell L Herman, UNC Wilmington (950-35-1123)
- 4:15PM (833) *A Remark on the Comparison Between the Spaces $L^1 BV(\mathbb{R}^n)$ and $BV(\mathbb{R}^n)$.* Preliminary report.
Yudi Soeharyadi, The University of Memphis (950-35-1124)
- 4:30PM (834) *Abstract Finite Time Extinction Problems.* Preliminary report.
Mark E Oxley, Air Force Institute of Technology (950-35-1188)
- 4:45PM (835) *A model for heat transfer in grinding.* Preliminary report.
Kevin T Andrews*, **Meir Shillor** and **Steve Wright**, Oakland University (950-35-1256)
- 5:00PM (836) *Defect of Partially Invariant Solutions of Partial Differential Equations.*
Terrance Quinn*, Texas A&M International University, **Sanjay Rai**, Jacksonville University, and **C.C.A. Sastri**, Dalhousie University (950-35-248)

AMS Session on Partial Differential Equations

1:00 PM – 5:10 PM

- 1:00PM (820) *A link between solutions of linear partial differential equations.*
Danny Arrigo*, University of Central Arkansas, and **West Vayo**, University of Toledo (950-35-43)
- 1:15PM (821) *Diffusion Tensor and Continuous Approach of Neural Networks In Image Restoration.* Preliminary report.
Stacey E Chastain* and **Yunmei Chen**, University of Florida (950-35-87)

AMS Session on Probability and Stochastic Processes

1:00 PM – 5:55 PM

- 1:00PM *Random Sperner Systems*. Preliminary report.
▶ (837) **Jayadev S. Athreya***, Iowa State University, **Michelle K. Bylund**, Brigham Young University, **Anant P. Godbole**, Michigan Technological University, and **Jessica M. Maia**, University Of Washington (950-60-104)
- 1:15PM *Stochastic Models for Seismic Records*.
▶ (838) **Reza G Dargahi-Noubary**, Bloomsburg University (950-60-185)
- 1:30PM *Change Points with Linear Trend for the Exponential Distribution*.
(839) **Asoka Ramanayake***, Univ of Wisconsin Oshkosh, and **Arjun Gupta**, Bowling Green State Univ (950-62-195)
- 1:45PM *Asymptotics for Classical Proximity Graphs*. Preliminary report.
▶ (840) **Daniel J Rose**, Lehigh University (950-60-227)
- 2:00PM *Some Properties of Brownian Motion via Wavelets*. Preliminary report.
(841) **Lisa E Marano*** and **Vladimir T Dobric**, Lehigh University (950-60-285)
- 2:15PM *Measures of the asymptotic rate of dependence for some infinite-variance processes*. Preliminary report.
(842) **Joshua Levy**, University of Central Oklahoma (950-60-486)
- 2:30PM *Generalized Threshold Behavior for the Sidon Property*.
▶ (843) **Lukas Fidkowski***, Harvard University, **Anant Godbole**, Michigan Technological University, **Fumei Lam**, Berkeley, and **Donald Ying**, Stanford (950-60-527)
- 2:45PM *Stability in Distribution of Forward Stochastic Flows*.
(844) **Dan Kannan**, University of Georgia, and **Hong Zhang***, University of Wisconsin (950-60-550)
- 3:00PM *Compositions of random Möbius transformations*. Preliminary report.
(845) **Satyajit Karmakar**, Gordon College (950-60-588)
- 3:15PM *Phase Transition of the Partition Function for Random Walks in a Random Potential*. Preliminary report.
(846) **Lester N Coyle***, Loyola College in Maryland, and **Anand N Vidyashankar**, University of Georgia (950-60-739)
- 3:30PM *How to Stop Well on the Average: Applications of Random Probability Measure Constructions to Optimal Stopping Problems*. Preliminary report.
(847) **Michael G Monticino***, University of North Texas, and **Theodore Hill**, Georgia Institute of Technology (950-60-806)
- 3:45PM *Dilation of Random Graphs*. Preliminary report.
▶ (848) **Anita Balaji**, Wellesley College, **Erin Boyer**, Bard College, **Anant P. Godbole**, Michigan Technological University, **Fumei Lam**, University of California, Berkeley, and **Donald Ying***, Stanford University (950-60-873)
- 4:00PM *Random Walk in an Alcove of an Affine Weyl Group*.
(849) **David J Grabiner**, Bowling Green State University (950-60-990)
- 4:15PM *On the minimum number of even submatrices of a random matrix*. Preliminary report.
▶ (850) **Ashwani Sastry***, California Institute of Technology, and **Anant P Godbole**, Michigan Tech University (950-60-1032)

- 4:30PM *On the Lower Bound of the Van der Waerden Numbers*.
▶ (851) **Erin M Boyer***, Bard College, **Anitashree Balaji**, Wellesley College, **Tze Yi Chan**, Cambridge University, **Tricia Frantti**, Chassell, MI, and **Anant P Godbole**, Michigan Technological University (950-60-1052)
- 4:45PM *General asymptotics of the density of a restricted coalescing random walk system*.
(852) **Elaine T McDonald**, Sonoma State University (950-60-1076)
- 5:00PM *Branching Processes in Varying Environment and a Carcinogenesis Model*.
▶ (853) **Thomas W Polaski***, Winthrop University, and **Julia Kimbell**, Chemical Industry Institute of Toxicology (950-60-1153)
- 5:15PM *Almost Sure Behavior of the Dominating Number of a Random Graph*.
▶ (854) **Benjamin D Wieland**, MIT (950-60-1155)
- 5:30PM *Detecting randomness by recurrent patterns*. Preliminary report.
▶ (855) **Yung-Pin Chen**, Smith College (950-60-1206)
- 5:45PM *Cordiality of a Random Graph*. Preliminary report.
▶ (856) **Michelle K Bylund***, Brigham Young University, **Tricia Frantti**, Chassell, MI, and **Anant P Godbole**, Michigan Technological University (950-60-467)

SIAM Minisymposium on Nonlinear Dynamics Theory for the Scientist

1:00 PM – 3:00 PM

- Organizers: **James A. Yorke**, University of Maryland
Kathleen T. Alligood, George Mason University
- 1:00PM *Chaotic Piecewise-Linear Transformations*.
▶ (857) **Lora Billings***, University of Delaware, and **Erik Bollt**, U.S. Naval Academy (950-37-764)
 - 1:30PM *Spurious Lyapunov Exponents Computed From Data*.
(858) **Joshua A Tempkin**, Institute for Physical Science and Technology, University of Maryland (950-37-1187)
 - 2:00PM *Title: How basins of attraction evolve as a parameter is varied*.
▶ (859) **James A. Yorke***, University of Maryland, and **Helena E. Nusse**, University of Groningen (950-37-1043)
 - 2:30PM *Projections, Embedding, and Fractal Dimensions*.
(860) **Brian R Hunt***, University of Maryland, and **Vadim Yu Kaloshin**, Princeton University (950-28-850)

MAA Session on Establishing and Maintaining Undergraduate Research Programs in Mathematics

1:00 PM – 3:20 PM

- Organizers: **Emelie Kenney**, Siena College
Joseph A. Gallian, University of Minnesota-Duluth
Daniel J. Schaal, South Dakota State University
- 1:00PM *The College of Wooster Applied Mathematics Research Experience*.
▶ (861) **John R Ramsay**, The College of Wooster (950-J1-1119)
 - 1:30PM *Nonlinear Dynamics in Biology: Undergraduate Research Training in a Multi- and Inter-disciplinary Environment*. Preliminary report.
▶ (862) **Eric S Marland*** and **Carole Hom**, University of California, Davis (950-J1-827)

2:00PM *Undergraduate Research in Math and CS at the University of Richmond.*

(863) **Michael G Kerckhove*** and **James A Davis**, University of Richmond VA 23173 (950-J1-485)

2:30PM *Finding Funding for Undergraduate Research Programs.*

(864) **Daniel Schaal**, South Dakota State University (950-J1-403)

3:00PM *The Grand Valley State University Summer Undergraduate Research Program.*

▶ (865) **Edward F Aboufadel**, **Paul E Fishback*** and **Steven J Schlicker**, Grand Valley State University (950-J1-382)

MAA Panel Discussion

1:00 PM – 2:20 PM

Changing the academic culture.

Moderator: **David C. Arney**, U.S. Military Academy

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

Panelists: **Laurette B. Foster**, Prairie View A&M University

John L. Scharf, Carroll College

Robert W. Case, Northeastern University

Maynard Thompson, Indiana University

MAA CUPM-CRAFTY Panel Discussion

1:00 PM – 2:30 PM

Curricular reforms in client disciplines: Implications for post-calculus mathematics

Moderators: **David C. Lay**, University of Maryland

Sheldon P. Gordon

Organizers: **Sheldon P. Gordon**, SUNY at Farmingdale

David C. Lay, University of Maryland, College Park

Panelists: **Peter B. Henderson**, SUNY at Stony Brook

John Prados, University of Tennessee

James Stith, American Institute of Physics

Michael Ruane, Boston University

MAA Committee on the Mathematical Education of Teachers Poster Session

1:00 PM – 3:00 PM

Innovations in mathematics programs which benefit future teachers.

Organizer: **Marjorie Enneking**, Portland State University

MAA Committee on the Undergraduate Program in Mathematics Panel Discussion

1:00 PM – 2:20 PM

Mathematics and mathematical sciences in 2010: What should graduates know?

Moderator: **D. J. Lewis**, University of Michigan, Ann Arbor

Organizer: **Thomas R. Berger**, Colby College

Panelists: **George W. Cobb**, Mount Holyoke College

Joyce R. McLaughlin, Rensselaer Polytechnic Institute

J. Douglas Faires, Youngstown State University

AMS Special Session on the History of Topology (in honor of Ralph Krause)

1:30 PM – 4:50 PM

Organizer: **Jack Morava**, Johns Hopkins University

1:30PM *The evolution of mathematical logic in America.*

▶ (866) **Anil Nerode**, Cornell University (950-03-1265)

2:00PM *Topology since 1962.*

▶ (867) **William Browder**, Princeton University (950-57-1281)

2:30PM *The influence of algebraic geometry in stable homotopy theory.* Preliminary report.

(868) **Mark Mahowald**, Northwestern University (950-01-804)

3:00PM *The development of cohomological physics.*

(869) **Jim Stasheff**, University of North Carolina at Chapel Hill (950-18-1287)

3:30PM *Non-commutative Topology.*

(870) **Paul Baum**, The Pennsylvania State University (950-01-1061)

4:00PM *Geometric topology in this half-century.*

▶ (871) **Robion C Kirby**, University of California at Berkeley (950-57-974)

4:30PM *On the applications of topology.*

▶ (872) **Robert D MacPherson**, Institute for Advanced Study (950-57-972)

ASL Invited Address

2:00 PM – 2:45 PM

(873) *The collapse of the Hilbert Program: Variations on the Godelian theme.*

Saul A. Kripke, Princeton University

AMS-MAA Special Session on in Memory of Gian-Carlo Rota, IV

2:00 PM – 5:50 PM

Organizers: **Richard P. Stanley**, MIT

Rodica Simion, The George Washington University

2:00PM *Some Enumeration Problems Related to Counting Cache Misses.*

(874) **Phil Hanlon***, University of Michigan, **Sid Chatterjee**, University of North Carolina, Chapel Hill, **Dean Chung**, Amazon.com, and **Alvy Lebeck**, Duke University (950-05-1282)

2:30PM *Writing backwards: A little space can save a lot of time.* Preliminary report.

▶ (875) **Daniel E Loeb**, Daniel H. Wagner Associates (950-05-335)

3:00PM *Generalized Rook Theory.* Preliminary report.

▶ (876) **Jay R Goldman***, University of Minnesota, Minneapolis, and **James Haglund**, University of California at San Diego (950-05-446)

3:30PM *Quintic transformations generalizing the Rogers-Ramanujan identities.*

(877) **Dennis Stanton**, University of Minnesota (950-05-393)

4:00PM *Quasi-minuscule quotients and reduced words for reflections.*

(878) **John R Stembridge**, University of Michigan (950-05-594)

4:30PM (879) *Confluent symmetric functions*. Preliminary report.
Luis Verde-Star, Universidad Autonoma Metropolitana, Mexico City (950-05-1090)

5:00PM (880) *Analogies and Correspondences: Matroids on Graphs for $3|V| - 6$* . Preliminary report.
Walter J. Whiteley, York University (950-05-699)

5:30PM (881) *Orthogonal Matroids*.
Andrew Vince, Univeristy of Florida, and **Neil L White***, University of Florida (950-05-712)

AMS Special Session on Sixty Years of Mathematical Reviews

2:00 PM – 5:00 PM

Organizer: **Jane E. Kister**, *Mathematical Reviews*

2:00PM (882) *Mathematical Reviews at Sixty*.
Jane E Kister, Mathematical Reviews (950-00-853)

2:25PM (883) *The History of the First Sixty Years of Mathematical Reviews, a Magnificent Monument to Mathematical Research*. Preliminary report.
V. Frederick Rickey, U. S. Military Academy (950-01-1218)

3:10PM (884) *The next 60 years of Mathematical Reviews*. Preliminary report.
Andrew Odlyzko, AT&T Labs - Research (950-00-1022)

4:00PM Reception

AMS Special Session on Analytic Aspects of Jordan Theory, I

2:00 PM – 5:30 PM

Organizers: **C. Martin Edwards**, Oxford University
Kevin McCrimmon, University of Virginia

Bernard Russo, University of California, Irvine

Gottfried Ruettiman, University of Bern

2:00PM (885) *3-graded Lie superalgebras and Jordan superpairs (preliminary report)*. Preliminary report.
Erhard Neher, University of Ottawa (950-17-1290)

3:00PM (886) *Jordan pairs and Hopf algebras*.
John R Faulkner, University of Virginia (950-17-488)

4:00PM (887) *All the moments and inverse moments of the Wishart distribution*.
Helene M Massam, University of Virginia (950-62-1292)

4:50PM (888) *Jordan tori*. Preliminary report.
Yoji Yoshii, University of Ottawa (950-17-654)

AMS Special Session on Operator Theory, Systems Theory, and Interpolation in Several Complex Variables, I

2:00 PM – 5:50 PM

Organizers: **Joseph A. Ball**, Virginia Polytech Institute & State University
Cora S. Sadosky, Howard University

2:00PM (889) *Interpolating sequences on the bidisk*. Preliminary report.
Jim Agler, U.C. San Diego, and **John E McCarthy***, Washington University (950-46-927)

2:30PM (890) *Function theory on the polydisk, scattering systems with several evolutions and multidimensional linear systems*.

Joseph A. Ball, Virginia Tech, **Cora Sadosky***, Howard University, and **Victor Vinnikov**, Weizmann Institute (950-47-723)

3:00PM (891) *A New Application of Interpolation in Two Complex Variables to Control*.
J W Helton, UCSD (950-47-439)

3:30PM (892) *Title: Interpolation and Computability*.
James P Solazzo, Univ. of Houston (950-47-452)

4:00PM (893) *Commuting Nonunitary Operators and Their Discriminant Curves*.
Joseph A. Ball, Virginia Tech, and **Victor Vinnikov***, Ben-Gurion University of the Negev (950-47-456)

4:30PM (894) *Multivariable linear systems, scattering and operator models for row contractions*. Preliminary report.
Joseph A. Ball, Virginia Tech, Blacksburg, Virginia (950-47-303)

5:00PM (895) *Isometric dilations of non-commuting n -tuples and representations of the Cuntz-Toeplitz algebra*.
Kenneth R. Davidson*, **David W. Kribs** and **Miron Shpigel**, University of Waterloo (950-47-287)

5:30PM (896) *The curvature invariant of multivariable operator theory*.
William B Arveson, UC Berkeley (950-47-1116)

MAA Invited Address

2:15 PM – 3:05 PM

(897) *Prime numbers: What we still don't know*.
Carl Pomerance, Bell Laboratories and Lucent Technologies

NAM's Granville-Browne Session of Presentations by Recent Doctoral Recipients in the Mathematical Sciences

2:15 PM – 4:00 PM

Moderator: **William A. Massey**, Lucent Technologies

RMMC Board of Directors

2:15 PM – 4:15 PM

AMS Special Session on Complex Hyperbolic Geometry and Conformal Geometry of the Heisenberg Group, I

2:30 PM – 5:20 PM

Organizers: **William M. Goldman**, University of Maryland
Hanna M. Sandler, American University
Richard Schwartz, University of Maryland

2:30PM (898) *Hyperbolic Surfaces via Loop Groups*. Preliminary report.
Josef F. Dorfmeister and **Magdalena D. Toda***, The University of Kansas (950-53-1191)

3:00PM (899) *Automorphic forms on the 4-ball and moduli of cubic surfaces*.
Daniel J Allcock*, Harvard University, and **Eberhard Freitag**, University of Heidelberg (950-11-1030)

3:30PM (900) *Complex hyperbolic geometry and fundamental groups of some discriminant complements*.
Daniel Allcock, Harvard University, **James A Carlson** and **Domingo Toledo***, University of Utah (950-14-1016)

- 4:00PM *Nonarithmeticity of nonelementary groups in complex hyperbolic space.*
(901) **Inkang Kim**, KAIST (950-51-651)
- 4:30PM *On geometric finiteness of complete Kahler manifolds.* Preliminary report.
(902) **Mohan Ramachandran**, SUNY at Buffalo (950-32-815)
- 5:00PM *Existence of Riemann surface quotients.*
(903) **Terrence Napier***, Lehigh University, and **Mohan Ramachandran**, SUNY at Buffalo (950-32-794)

MAA Session on Math and Math Sciences in 2010: What Should Graduates Know?, I

2:30 PM – 3:10 PM

Organizers: **Herbert E. Kasube**, Bradley University
Harriet Pollatsek, Mount Holyoke College

- 2:30PM Introduction
- 2:35PM *What Did Graduates Know in 1910?: Patterns of Curricular Changes in Mathematics.*
▶ (904) **Lawrence A D'Antonio**, Ramapo College (950-L1-870)
- 2:55PM *A model that works but still needs fixing.*
(905) **Peter G Hinman**, University of Michigan (950-L1-1027)

AMS Committee on Science Policy Panel Discussion

2:30 PM – 4:00 PM

ASL Invited Address

3:00 PM – 3:45 PM

- (906) *Complexity theoretic algebra and model theory.*
Jeffrey B. Remmel, University of California, San Diego

SIAM Minisymposium on Dispersive Waves and Stability

3:15 PM – 5:10 PM

- Organizer: **Robert L. Pego**, University of Maryland
- 3:15PM *Asymptotic and Modulational Stability of Patterns in the Optical Parametric Oscillator.*
(907) **Keith S Promislow***, Simon Fraser University, and **J. Nathan Kutz**, University of Washington (950-35-700)
- 3:45PM *Stability, and instability, of spiral waves.*
(908) **Bjorn Sandstede***, Ohio State University, and **Arnd Scheel**, FU Berlin (950-35-765)
- 4:15PM *Spatial wave dynamics and killer solitary waves.*
(909) Preliminary report.
Robert L Pego*, University of Maryland, and **Mariana Haragus-Courcelle**, Université de Bordeaux (950-76-682)
- 4:45PM *Convective Stability of Shock Profile Solutions of a Modified KdV-Burgers Equation.*
(910) **Jeff J Dodd**, Jacksonville State University (950-35-204)

MAA Presentations by Teaching Award Recipients

3:30 PM – 5:00 PM

ASL Contributed Paper Session

4:00 PM – 6:10 PM

MAA Informal Session

5:00 PM – 7:00 PM

Actuarial education.
Organizer: **James W. Daniel**, University of Texas at Austin

MAA-ARUME Special Presentation

5:00 PM – 7:00 PM

Research on undergraduate mathematics education.
Organizer: **Julie Clark**, Emory and Henry College

MAA Panel Discussion

5:00 PM – 6:30 PM

A guided tour of Project INTERMATH application projects.
Organizer: **David C. Arney**, U.S. Military Academy

MAA Workshop

5:00 PM – 7:00 PM

A workshop for teaching-assistant trainers.
Organizer: **Thomas W. Rishel**, Cornell University

MAA-CUPM Poster Session

5:00 PM – 7:30 PM

Undergraduate research student poster session.
Organizer: **Mario Martelli**, CSU Fullerton

University of Illinois Gathering

5:00 PM – 7:00 PM

MAA Minicourse #3: Part B

6:00 PM – 8:00 PM

The curves and surfaces of the digital age.
Organizers: **Colm K. Mulcahy**, Spelman College
Jeffrey A. Ehme, Spelman College

MAA Minicourse #9: Part B

6:00 PM – 8:00 PM

Generating functions: Techniques and tricks.
Organizer: **Louis W. Shapiro**, Howard University

MAA Committee on Mathematics and the Environment Dramatic Presentations

6:00 PM – 7:20 PM

Unintended Consequences; The Adventures of Supermath; Hamlet, Prince of Modeling.
Presenters: **Ben Fusaro**, Florida State University
Barry Schiller, Rhode Island College
Patricia C. Kenschaft, Montclair State University

NAM Reception

6:00 PM – 8:00 PM

Isolated Teachers of Statistics Annual Meeting

7:00 PM – 9:30 PM

MAA Student Lecture

7:30 PM – 8:20 PM

- (911) *Interactive geometry on the Internet.*
Thomas F. Banchoff, Brown University

Saturday, January 22

Joint Meetings Registration

7:30 AM – 2:00 PM

AMS Special Session on Algebraic Geometry and Commutative Algebra, II

8:00 AM – 10:50 AM

Organizers: **Irena Peeva**, Cornell University
Hema Srinivasan, University of Missouri, Columbia

- 8:00AM *Filtrations and Valuations.* Preliminary report.
(912) **Edward C Mosteig*** and **Moss E Sweedler**, Cornell University (950-13-146)
- 8:30AM *A Semiregularity Map and Applications to Deformations.*
(913) **Ragnar O Buchweitz*** and **Hubert Flenner**, Professor (950-14-872)
- 9:00AM *Noetherian Hereditary Categories.* Preliminary report.
(914) **Idun Reiten***, NTNU, and **Michel Van den Bergh**, Limburgs Universitair Centrum (950-13-772)
- 9:30AM *Asymptotic Regularity.*
(915) **S. Dale Cutkosky**, Univ. Missouri (950-13-379)
- 10:00AM *Intersection Theorems for Modules and Complexes.*
(916) **Hans-Bjørn Foxby**, University of Copenhagen (950-13-791)
- 10:30AM *A generalized Krull height theorem, order ideals, and ideals of minors.* Preliminary report.
(917) **David Eisenbud**, MSRI, **Craig Huneke**, University of Kansas, and **Bernd Ulrich***, Michigan State University (950-13-193)

AMS Special Session on Recent Advances in Complex and Harmonic Analysis, III

8:00 AM – 10:50 AM

Organizers: **Carlos A. Berenstein**, University of Maryland, College Park
Stephen D. Casey, American University
Bao Qin Li, Florida International University
David F. Walnut, George Mason University
C. C. Yang, Hong Kong University of Science and Technology

- 8:00AM *The local Phragmen-Lindelof condition on varieties.* Preliminary report.
(918) **Rudiger W Braun**, Heinrich-Heine Universität, Düsseldorf, **Reinhold Meise**, Heinrich-Heine Universität, Düsseldorf, and **B. A Taylor***, University of Michigan (950-32-570)
- 8:30AM *On Complex Hyperbolic Manifolds.*
(919) **Pit-Mann Wong**, University of Notre Dame (950-32-614)

- 9:00AM *Imprimitive parametrizations of analytic curves and factorizations of entire functions.*
(920) **Tuen Wai Ng**, University of Cambridge (950-31-615)
- 9:30AM *Analogies in Diophantine Approximation for Nevanlinna theory.*
(921) **Zhuan Ye**, Northern Illinois University (950-32-613)
- 10:00AM *On the harmonic components in the double series expansion of holomorphic functions.*
(922) **Keiko Fujita**, Saga University (950-32-623)
- 10:30AM *An analytic function of slow radial growth not in A.* Preliminary report.
(923) **David Drasin***, Purdue University, and **J.M. Wu**, University of Illinois (950-30-1233)

AMS Special Session on Modular Forms and Elliptic Curves, and Related Topics, I

8:00 AM – 10:50 AM

Organizers: **Sharon Frechette**, Wellesley College
Tamara Veenstra, University of Northern Iowa

- 8:00AM *Elliptic curves and modular forms.*
▶ (924) **Ken Ono**, Penn State University and the University of Wisconsin, Madison (950-11-200)
- 9:00AM *Traces of Division Polynomials.*
▶ (925) **Antonia W. Blucher**, National Security Agency (950-11-177)
- 9:30AM *Selmer groups of quadratic twists of elliptic curves.*
(926) **Kevin James***, Penn State, and **Ken Ono**, Penn State University (950-11-150)
- 10:00AM *Local zeta functions for elliptic curves.* Preliminary report.
▶ (927) **Diane Meuser**, Boston University, and **Margaret Robinson***, Mount Holyoke College (950-11-792)
- 10:30AM *The Degree of Modular Parametrization of \mathbb{Q} -curves.*
(928) **Mark Douglas Morgan**, Center for Computing Sciences (950-11-143)

AMS Special Session on Complex Hyperbolic Geometry and Conformal Geometry of the Heisenberg Group, II

8:00 AM – 10:20 AM

Organizers: **William M. Goldman**, University of Maryland
Hanna M. Sandler, American University
Richard Schwartz, University of Maryland

- 8:00AM *Rigidity in complex hyperbolic and other symmetric rank one spaces.*
(929) **Boris Apanasov**, University of Oklahoma (950-51-117)
- 8:30AM *Generalized isometric spheres of elements of $PU(1, n : C)$.* Preliminary report.
(930) **Shigeyasu Kamiya**, Okayama University of Science (950-22-821)
- 9:00AM *Geometry of hypersurfaces in quaternionic manifolds.* Preliminary report.
▶ (931) **Yoshinobu Kamishima**, Tokyo Metropolitan University (Tokyo, Japan) (950-51-659)
- 9:30AM *The ends of hyperbolic 3-manifolds and 2-convexity.* Preliminary report.
(932) **Suhyoung Choi**, Seoul National University (950-51-468)
- 10:00AM *Curvature properties of positively curved Eschenburg spaces.* Preliminary report.
(933) **William C Dickinson**, University of Pennsylvania (950-53-262)

AMS Special Session on Homotopy Theory, II

8:00 AM – 10:50 AM

Organizers: **W. Stephen Wilson**, Johns Hopkins University
Jack Morava, Johns Hopkins University

- 8:00AM *Topological gravity in dimensions two and four.*
▶ (934) Preliminary report.
Jack Morava, The Johns Hopkins University (950-83-86)
- 8:30AM *Compactified Spaces of Holomorphic Curves in Complex Grassmann Manifolds.*
(935) **David E Hurtubise***, Penn State University, and **Marc D Sanders**, Stanford University (950-55-116)
- 9:00AM *Some applications of the stable homotopy Seiberg-Witten invariants to the connected sum of 4 manifolds.* Preliminary report.
(936) **Mikio Furuta**, RIMS, Kyoto University, **Yukio Kametani**, Keio University, and **Norihiko Minami***, Nagoya Institute of Technology (950-55-1238)
- 9:30AM *On certain elements in the real and motivic Adams-Novikov spectral sequences.* Preliminary report.
(937) **Po Hu**, University of Chicago (950-55-400)
- 10:00AM *Some Calculations Involving the Beta Genus of Spin Hypersurfaces.* Preliminary report.
(938) **Jody L Fast**, University of Kentucky (950-55-432)
- 10:30AM *Equivariant Chern Character.*
(939) **Paul Baum**, The Pennsylvania State University (950-19-600)

AMS Special Session on Difference Equations and Their Applications in Social and Natural Sciences, II

8:00 AM – 10:50 AM

Organizers: **Hassan Sedaghat**, Virginia Commonwealth University
Abdul Aziz Yakubu, Howard University
Gerry Ladas, University of Rhode Island
Saber Elaydi, Trinity University

- 8:00AM *Exploring Population Models, Drug Dosage and Pollution with Difference Equations and Technology.*
▶ (940) **Mary Ann Connors**, United States Military Academy, West Point, NY (950-92-688)
- 8:30AM *Probabilities of Extinction, Weak Extinction, Permanence, and Mutual Exclusion in Discrete, Competitive Lotka-Volterra Systems.* Preliminary report.
(941) **David M Chan***, NCSSM, and **John E Franke**, North Carolina State University (950-37-1222)
- 9:00AM *Intraspecific competition in discrete-time patchy environments.* Preliminary report.
▶ (942) **Carlos Castillo-Chavez**, Cornell University, and **Abdul-Aziz Yakubu***, Howard University (950-92-268)
- 9:30AM *On a difference model of disease transmission in homogeneous and uniformly mixed populations.* Preliminary report.
▶ (943) **Alma Virginia Lara Sagahon**, FES-Cuautitlan, Universidad Nacional Autónoma de México. (950-92-976)
- 10:00AM *Pulse Vaccination in a Discrete Epidemic Model.* Preliminary report.
(944) **Ronald E. Mickens**, Clark Atlanta University (950-39-642)
- 10:30AM *Data from HIV/AIDS Epidemic Modeled Using Difference Equations.*
▶ (945) **James A Yorke*** and **Frederick Suppe**, University of Maryland (950-39-1063)

AMS Special Session on Research in Mathematics by Undergraduates, I

8:00 AM – 10:50 AM

Organizers: **Darin R. Stephenson**, Hope College
Leonard A. VanWyk, James Madison University

- 8:00AM *Matings of the airplane with the 2/5 limb of the Mandelbrot set.*
▶ (946) **Scott O Wilson**, Ithaca College (950-30-441)
- 8:30AM *Rado Numbers.*
▶ (947) **Scott Jones***, University of Montana, **Mary Joyce Plott**, Western Carolina University, and **Kate Rendall**, St. Norbert College (950-05-407)
- 9:00AM *Expected Areas of Randomly Generated Triangles.*
▶ (948) **Andrea Douglass***, Hope College, **Courtney Fitzgerald**, Niagara University, and **Scott Mihalik**, Hope College (950-60-799)
- 9:30AM *Certain Classes of Type I Trees.*
▶ (949) **Lon H Mitchell*** and **Sivaram K Narayan**, Central Michigan University (950-15-89)
- 10:00AM *Semi-transitive Orientations of Circulant Graphs.*
▶ (950) **George L Yuhasz***, Virginia Tech, and **Quinn B Saner**, Boston University (950-05-1269)
- 10:30AM *Perfect One Error Correcting Codes on Iterated Complete Graphs.*
▶ (951) **Be Birchall***, Reed College, and **Jason Tedor**, University of Alaska, Fairbanks (950-05-563)

AMS Special Session on Philosophies in Mathematics Education, I

8:00 AM – 10:55 AM

- Organizer: **Seymour Lipschutz**, Temple University
- 8:00AM *The TI-92 in the teaching of calculus.*
▶ (952) **Anthony M Gaglione**, Naval Academy (950-98-622)
- 8:30AM *Will this be on the exam?*
▶ (953) **William G McCallum**, University of Arizona (950-98-428)
- 9:00AM *Interweaving traditional calculus and technology.*
▶ (954) **Anthony Hughes**, Temple University (950-98-447)
- 9:30AM *A Cyber-TA named COW (Calculus on the Web).*
▶ (955) **Dan Reich**, Temple University (950-98-424)
- 10:00AM *Calculus in the next decade.*
(956) **Daniel Reich***, **Anthony Hughes***, Temple University, **William McCallum***, University of Arizona, and **Anthony M. Gaglione***, U.S. Naval Academy (950-98-484)

MAA Minicourse #10: Part B

8:00 AM – 10:00 AM

- Interdisciplinary lively applications projects.*
Organizers: **Richard D. West**, U. S. Military Academy
Laurette B. Foster, Prairie View A & M University
Marie M. Vanisko, Carroll College

MAA Minicourse #15: Part B

8:00 AM – 10:00 AM

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

MAA Minicourse #4: Part B

8:00 AM – 10:00 AM

Computer-based modeling with difference equations and matrices.

Organizers: **Mazen Shahin**, College Misericordia
Richard E. Bayne, Howard University

AMS Session on Combinatorics, III

8:00 AM – 10:55 AM

- 8:00AM ▶ (957) *Extremal Graphs with Independent Common Neighborhoods.* Preliminary report.
Kenneth J Roblee, Auburn University (950-05-1137)
- 8:15AM ▶ (958) *Zero Sum Rado Numbers.*
Mary Joyce Plott, Western Carolina University (950-05-1142)
- 8:30AM ▶ (959) *On the Crossing Number of Complete and Complete Bipartite Graphs.* Preliminary report.
John F Mackey, Dartmouth College (950-05-1164)
- 8:45AM ▶ (960) *The speed and size of graph properties.*
David Weinreich*, **Jozsef Balog**, The University of Memphis, and **Bela Bollobas**, The University of Memphis and Cambridge University (950-05-1195)
- 9:00AM (961) *Oscillation of the Speed of Hereditary Properties of Graphs.*
Jozsef Balogh*, **Bela Bollobas** and **David E Weinreich**, University of Memphis (950-05-1196)
- 9:15AM (962) *A Combinatorial Volume.*
Susan L Foege, Eastern Kentucky University (950-05-1199)
- 9:30AM ▶ (963) *Orientations of Biased Graphs and Their Matroids.* Preliminary report.
Daniel C Sliaty, Binghamton University (950-05-1217)
- 9:45AM (964) *Irreducible Triangulations of Pseudosurfaces.*
Serge Lawrencenko* and **Michael D Plummer**, Vanderbilt University (950-05-1239)
- 10:00AM (965) *Fair Division via a Generalized Tucker's Lemma.*
Francis Edward Su*, Harvey Mudd College and Cornell University, and **Forest W Simmons**, Portland Community College (950-05-1252)
- 10:15AM ▶ (966) *The word posed and insertion-deletion codes.* Preliminary report.
Peter L. Erdos, A. Renyi Mathematics Institute, and **David C Torney***, Los Alamos National Lab (950-05-1275)
- 10:30AM ▶ (967) *On the Bandwidth of Graphs.* Preliminary report.
Fumei Lam*, U.C. Berkeley, and **Donald Ying**, Stanford (950-05-1276)
- 10:45AM ▶ (968) *The Minimum Forcing Number for the Torus and Hypercube.*
Matthew E. Riddle, Carleton College (950-05-1295)

MAA Session on Looking to Our Future: Recruiting and Preparing the Next Generation of Mathematics Teachers, II

8:05 AM – 10:55 AM

Organizers: **Jay A. Malmstrom**, Oklahoma City Community College
Gary L. Britton, University of Wisconsin-Washington County
Marjorie Enneking, Portland State University
James Loats, Metropolitan State College of Denver
Mary Robinson, University of New Mexico

8:05AM ▶ (969) *Activity-based Mathematics Courses for Future K-8 Teachers at New Mexico State University.*
Patrick Morandi* and **Patricia M Baggett**, New Mexico State University (950-H1-1117)

8:35AM ▶ (970) *Recruiting, preparing and supporting mathematics teachers: A view from Ontario.* Preliminary report.
Eric Muller*, Brock University, and **Walter J. Whiteley**, York University (950-H1-1021)

9:05AM (971) *Preparing Elementary Mathematics Specialists.*
Judy S O'Neal, North Georgia College & State University (950-H1-762)

9:35AM ▶ (972) *Accepting the challenge: K-8 teacher education mathematics majors.*
Helen Gerretson, University of Northern Colorado (950-H1-309)

10:05AM ▶ (973) *A Seminar Exploring the Connections Between Abstract Algebra and Secondary School Algebra for Pre-service Teachers.* Preliminary report.
Dorothee J Blum and **Michael G Wismer***, Millersville University (950-H1-888)

10:35AM (974) *Creating a stronger mathematics preparation for future elementary school teachers by working with College of Education faculty.*
Sybilla Beckmann, University of Georgia (950-H1-1268)

AWM Workshop

8:20 AM – 4:10 PM

This session consists of several parts, including research talks by recent women Ph.D.s, posters by women graduate students, and a panel discussion.

Organizers: **Gail Ragcliff**, University of Missouri
Sue Geller, Texas A&M University
Catherine Roberts, Northern Arizona State University

AMS-MAA Special Session on The History of Mathematics, III

8:30 AM – 10:50 AM

Organizers: **Karen H. Parshall**, University of Virginia
David E. Zitarelli, Temple University

8:30AM ▶ (975) *Mathematics in Latvia through the centuries.*
Daina Taimina* and **Ingrida Henina**, University of Latvia, Riga (950-01-263)

9:00AM ▶ (976) *Modular miracles.*
John C Stillwell, Monash University (950-01-134)

9:30AM ▶ (977) *Quadrilaterals from the Egyptians to Euler.*
William W Dunham, Muhlenberg College (950-01-26)

10:00AM ▶ (978) *Plagiarism and piracy: Isaac Todhunter and his mathematical textbooks.*
June E Barrow-Green, The Open University, Milton Keynes, UK (950-01-178)

10:30AM ▶ (979) *An Historical Lecture about Ramanujan Arranged in 3 Acts, an Interact, and an Exodion.*
Bruce C. Berndt, University of Illinois at Urbana-Champaign (950-01-35)

AMS Special Session on Control Theory for Partial Differential Equations, II

8:30 AM – 10:50 AM

Organizer: **Robert Triggiani**, University of Virginia

- 8:30AM (980) *Numerical Approximation of Control by Time-Dependent Potentials*. Preliminary report.
Katherine A Kime, University of Nebraska at Kearney (950-93-562)
- 9:00AM (981) *Some global uniqueness theorems in partial differential equations*.
Walter Littman, University of Minnesota (950-35-383)
- 9:30AM (982) *Observability, controllability, and stabilization for the one dimensional wave equation with bouncing point sensors and actuators*.
Alexander Y Khapalov, Washington State University (950-93-819)
- 10:00AM (983) *Control problem for thermo-elastic equations*.
George Avalos, Texas Tech University (950-35-1192)
- 10:30AM (984) *Optical wavefront control for laser beam propagation and image applications*. Preliminary report.
Mikhail Vorontsov, Army Research Lab (950-35-404)

AMS Special Session on Operator Theory, Systems Theory, and Interpolation in Several Complex Variables, II

8:30 AM – 10:50 AM

Organizers: **Joseph A. Ball**, Virginia Polytech Institute & State University
Cora S. Sadosky, Howard University

- 8:30AM (985) *Similarity Problems for Weighted Bergman Shifts*.
Sarah H Ferguson, Wayne State University, and **Srdjan Petrovic***, Western Michigan University (950-47-1037)
- 9:00AM (986) *Toeplitz Operators and Almost Periodic Factorization of Multivariable Matrix Functions*.
Leiba Rodman*, **Ilya M. Spitkovsky** and **Hugo Woerdeman**, College of William and Mary (950-47-166)
- 9:30AM (987) *Spectral properties of Toeplitz operators with semi almost periodic symbols*.
Albrecht Boettcher, TU Chemnitz, **Sergei M Grudskii**, Rostov-on-Don State University, and **Ilya M Spitkovsky***, The College of William and Mary (950-47-617)
- 10:00AM (988) *Positive Extensions and Riesz-Fejer Factorization for Two-Variable Trigonometric Polynomials*. Preliminary report.
Jeffrey S Geronimo, Georgia Institute of Technology, and **Hugo J Woerdeman***, The College of William and Mary (950-47-162)
- 10:30AM (989) *Higher order Hilbert-Schmidt Hankel forms and tensors of analytic kernels*. Preliminary report.
Sarah H. Ferguson*, Wayne State University, and **Richard Rochberg**, Washington University at St. Louis (950-47-1132)

AMS Session on Field Theory

8:30 AM – 9:40 AM

- 8:30AM (990) *Quadratic Descent for Quaternion Algebras*.
John R Swallow, Davidson College (950-12-474)
- 8:45AM (991) *Generic Galois Extensions of Order p^3* . Preliminary report.
Meredith P Blue, University of Texas at Austin (950-12-631)

- 9:00AM (992) *Rationality of certain linear automorphisms on rational function fields*.
Mowaffaq A Hajja*, American University of Sharjah, **Hamza Ahmad**, Armstrong Atlantic State University, and **Ming-chang Kang**, National Taiwan University (950-12-757)
- 9:15AM (993) *A generic Picard-Vessiot extension for GL_n and the inverse differential Galois problem*.
Lourdes Juan, University of Oklahoma (950-12-901)
- 9:30AM (994) *Relative Negligibility and Linear Automorphisms of Rational Function Fields*.
Hamza Ahmad*, Lincoln University, **Mowaffaq Hajja**, The American University at Sharja, and **Ming-chang Kang**, National Taiwan University (950-12-1231)

AMS Session on Topological Groups

8:30 AM – 9:40 AM

- 8:30AM (995) *Pure and topologically pure bounded subgroups of LCA groups*. Preliminary report.
Peter Loth, Sacred Heart University (950-22-49)
- 8:45AM (996) *The Existence of Disjoint Smallest Ideals in the Two Natural Products on βS* .
Shea D. Burns, Howard University (950-22-629)
- 9:00AM (997) *Stone-Ćech Compactification on Convergence Semigroups Defined by Nets*.
Shing S So, Central Missouri State University (950-22-793)
- 9:15AM (998) *The smallest ideal of $(\beta(\omega \times \omega), +)$* . Preliminary report.
Gugu Moche, Howard University (950-22-824)
- 9:30AM (999) *Piecewise syndeticity in a partial semigroup*. Preliminary report.
Jillian E. McLeod, Howard University (950-22-841)

AWM Presentations by Recent Women Ph.D.s, I

8:30 AM – 10:20 AM

- 8:30AM (1000) *Sub-Riemannian Geometry: The Martinet Case*.
Monique Chyba, Princeton University
- 9:00AM (1001) *Milnor's Conjecture on Fundamentals Groups*.
Christina Sormani, Lehman College, CUNY
- 9:30AM (1002) *When is a noncompact manifold almost compact, an introduction to L^2 -cohomology*.
Eugenie Hunsicker, Lawrence University
- 10:00AM (1003) *Polygonal knot theory and stuck unknots*.
Heather Johnston, University of Massachusetts, Amherst

MAA Session on Innovations in the Use of Technology in Teaching Ordinary and Partial Differential Equations, II

8:45 AM – 10:45 AM

Organizers: **Timothy J. McDevitt**, Millersville University
Elias Deeba, University of Houston-Downtown
Richard J. Marchand, United States Military Academy

- 8:45AM (1004) *Analytical and Numerical Solutions of PDEs Using CAS*.
Dick Jardine, Keene State College (950-K1-766)
- 9:10AM (1005) *Eigenfunction Visualizations For The H Atom*.
Kelley B Mohrmann and **Joseph D Myers***, US Military Academy (950-K1-345)

- 9:35AM (1006) *DE Projects Involving the Biological Sciences.*
Martha L. Abell* and **James P. Braselton**, Georgia Southern University (950-K1-808)
- 10:00AM (1007) *Ordinary Differential Equations with the TI-89.*
Mary Ann Connors, United States Military Academy (950-K1-687)
- 10:25AM (1008) *The frequent use of modeling projects in an ODE class.* Preliminary report.
C. M. McCarthy, Murray State University (950-K1-1189)

MAA Invited Address

9:00 AM – 9:50 AM

- (1009) *The Y2.1K Problem: What can the research and teaching community do to inspire a song other than "Math Sucks"?*
Edward B. Burger, Williams College

AMS-MAA Special Session on in Memory of Gian-Carlo Rota, V

9:00 AM – 10:50 AM

Organizers: **Richard P. Stanley**, MIT
Rodica Simion, The George Washington University

- 9:00AM (1010) *Euler Measure for Polyhedral Sets.*
James G Propp, University of Wisconsin - Madison (950-05-969)
- 9:30AM (1011) *Lattice point counting problems and characters of S_n .* Preliminary report.
Curtis Greene, Haverford College (950-05-1050)
- 10:00AM (1012) *Extending the valuation for subspace arrangements to polyhedral sets.* Preliminary report.
Richard Ehrenborg*, Royal Institute of Technology, and **Margaret A. Readdy**, University of Stockholm (950-05-767)
- 10:30AM (1013) *Acyclic flow polytopes and Kostant's partition function.*
Richard P. Stanley, M.I.T. (950-05-419)

AMS Special Session on The Feynman Integral and Applications, II

9:00 AM – 10:50 AM

Organizers: **Gerald W. Johnson**, University of Nebraska
Michel L. Lapidus, University of California, Riverside

- 9:00AM (1014) *Functional Integrals, Kontsevich Integrals and Vassiliev Invariants.* Preliminary report.
Louis H Kauffman, Univ of Illinois at Chicago (950-57-59)
- 9:30AM (1015) *A contribution of $U(1)$ -reducible connections to the Witten-Reshetikhin-Turaev invariant of links in 3-manifolds.*
Lev Rozansky, Yale University (950-57-608)
- 10:00AM (1016) *On the Temperley-Lieb-Jones algebra representation of the braid group.* Preliminary report.
Xiao-Song Lin*, University of California, Riverside, and **Zhengan Wang**, Indiana University (950-57-1012)
- 10:30AM (1017) *Certain Functional Integrals in Geometric QFTs.* Preliminary report.
Ambar N Sengupta, Louisiana State University (950-81-284)

AMS Session on Numerical Analysis

9:00 AM – 10:55 AM

- 9:00AM (1018) *Random Sampling from Low-Discrepancy Sequences.* Preliminary report.
Giray Okten, Ball State University (950-65-130)
- 9:15AM (1019) *Definite integrals of band-limited signals.*
Yan Wu* and **Dale H Mugler**, University of Akron (950-65-385)
- 9:30AM (1020) *Convergence order and computational cost in solving nonlinear systems.* Preliminary report.
Yixun Shi, Bloomsburg University of Pennsylvania (950-65-426)
- 9:45AM (1021) *Multigrid Methods Using Wavelet Operators.* Preliminary report.
Doreen DeLeon, University of California, Los Angeles (950-65-833)
- 10:00AM (1022) *A polynomial iterative method for certain asymmetric linear systems.*
Katherine A Porter and **James F Epperson***, University of Alabama in Huntsville (950-65-863)
- 10:15AM (1023) *Modeling Non-Symmetric Josephson Junctions and Superconducting Weak Links.*
Joan C Remski, University of Michigan-Dearborn (950-65-1067)
- 10:30AM (1024) *A Version of Simpson's Rule for Multiple Integrals.*
Alan L Horwitz, Penn State University (950-65-1071)
- 10:45AM (1025) *Numerical Approximation of the Product of the Square Root of a Matrix with a Vector.* Preliminary report.
James Baglama*, Ball State University, **Edward J Allen** and **Sarah K Boyd**, Texas Tech University (950-65-1148)

ASL Contributed Paper Session

9:00 AM – 9:50 AM

MAA-CRAFTY Panel Discussion

9:00 AM – 10:20 AM

Compromise and calculus reform: Calculus reform in the long run.

Panelists: **Michael C. Reed**, Duke University
William J. Davis, Ohio State University
Morton Brown, University of Michigan, Ann Arbor
Barbara A. Holland, John Wiley and Sons
Susan L. Ganter, Clemson University

MAA-CRUME Panel Discussion

9:00 AM – 10:20 AM

Improving mathematics education in the new century: Learning from the past, looking to the future.

Organizer: **Joan Ferrini-Mundy**, Michigan State University
Panelists: **Carolyn A. Maher**, Rutgers University
Judith Jacobs, California State Polytechnic University, Pomona
M. Kathleen Heid, The Pennsylvania State University

NAM Panel Discussion

9:00 AM – 9:50 AM

Trends and assessments of minority students studying mathematics at the graduate level.

Mathematical Sciences Employment Center

9:00 AM – 2:00 PM

Interview Center open.

Exhibits and Book Sale

9:00 AM – NOON

NAM Business Meeting

10:00 AM – 10:50 AM

AMS Invited Address

10:05 AM – 10:55 AM

- (1026) *Dynamics of quadratic polynomials.*
Mikhail Lyubich, State University of New York at Stony Brook (950-58-08)

ASL Invited Address

10:05 AM – 10:30 AM

- (1027) *Automorphisms and noninvariant properties of the computably enumerable sets.*
Kevin Wald, University of Connecticut

AWM Graduate Student Poster Session

10:30 AM – 11:00 AM

- 10:30AM Light refreshments will be served.
- (1028) *Geometric Methods in Classical Invariant Theory.*
Irina A. Berchenko, University of Minnesota
- (1029) *High-Order Finite Difference Methods for Wave Equations.*
Michelle L. Ghrist, University of Colorado
- (1030) *Definability of coefficients in solutions of linear systems over p -adic power series rings.*
Concetta Maria Gomez, University of California, Berkeley
- (1031) *Combinatorics of the Toric Hilbert Schemes.*
Diane Maclagan, University of California, Berkeley
- (1032) *Contact Processes on Trees in Random Environment.*
Oana Mocioalca, University of Florida
- (1033) *Continuous Methods for Solving Nonlinear Ill-Posed Operator Equations with Application to Gravitational Sounding Problem.*
Alexandra Smirnova, Kansas State University
- (1034) *An Intersection Multiplicity in Terms of Ext-modules.*
C-Y. Jean Chan, University of Utah
- (1035) *Existence of Rainbow Ramsey Numbers.*
Linda Eroh, Western Michigan University
- (1036) *Normal Ideals of Graded Rings.*
Sara Faridi, University of Michigan
- (1037) *Square Trees.*
Susan Hollingsworth, University of Wisconsin, Madison
- (1038) *Formal Patching and Deformation of Wildly Ramified Covers of Curves.*
Rachel J. Pries, University of Pennsylvania

- (1039) *On Pointwise Dimension of Non-hyperbolic Measures.*
Victoria Sadovskaya, The Pennsylvania State University
- (1040) *Making Gradient Materials: A Model for Interfacial Gel Polymerization.*
Cynthia A. Spade, Northwestern University
- (1041) *Nonlinear Wave Equations on the Two Dimensional Sphere.*
Theresa A. Strei, University of Nebraska, Lincoln
- (1042) *The Inverse Problem in Gröbner Basis Theory.*
Amelia Taylor, University of Kansas
- (1043) *Mod p Cohomology of Symplectic Groups.*
Jennifer Joy Ziebarth, University of Wisconsin, Madison

ASL Invited Address

10:45 AM – 11:10 AM

- (1044) *Title to be announced.*
James Cummings, Carnegie Mellon University

MAA Business Meeting

11:10 AM – 11:40 AM

AMS Business Meeting

11:45 AM – 12:15 PM

AWM Panel Discussion

12:30 PM – 2:00 PM

- Launching a career in mathematics.*
Moderator: **Sue Geller**, Texas A&M University
Panelists: **L. Pam Cook**, University of Delaware
Helen G. Grundman, Bryn Mawr College
Jennifer L. McGreevey, Department of Defense
Jodie Novak, University of Northern Colorado

NAM William W.S. Claytor Lecture

1:00 PM – 2:00 PM

- (1045) *Notes on quantum electrodynamics on a negatively curved surface and the Selberg-Maass trace formula.*
Floyd Williams, University of Massachusetts, Amherst

AMS-MAA Special Session on The History of Mathematics, IV

1:00 PM – 4:50 PM

- Organizers: **Karen H. Parshall**, University of Virginia
David E. Zitarelli, Temple University
- 1:00PM *From group representations to simple algebras: Richard Brauer and Emmy Noether, 1926-1933.*
(1046) Preliminary report.
Charles W. Curtis, University of Oregon (950-01-449)
- 1:30PM *Connections, Context, and Community: Abraham Wald and the Sequential Probability Ratio Test.*
▶ (1047) **Patti W Hunter**, Naperville, IL (950-01-649)

- 2:00PM *Why Quadratic Equations?* Preliminary report.
 ► (1048) **Victor J Katz**, University of the District of Columbia (950-01-374)
- 2:30PM *Eberhard Hopf: The ergodic theorist who went back to Germany in 1936.*
 ► (1049) **Matthew Frank**, University of Chicago (950-01-132)
- 3:00PM *Mathematics in France, 1870-1890: A View Via Doctoral Theses.* Preliminary report.
 ► (1050) **Thomas Archibald**, Acadia University (950-01-370)
- 3:30PM *Religious women and algebraic geometry at the Catholic University of America.* Preliminary report.
 ► (1051) **Judy Green***, Marymount University, and **Jeanne LaDuke**, DePaul University (950-01-836)
- 4:00PM *Roth, Faulhaber, and Descartes.*
 ► (1052) **Kenneth L Manders**, University of Pittsburgh (950-01-1291)
- 4:30PM *Florian Cajori and the practice of history.*
 ► (1053) **John Fauvel**, Open University (950-01-368)

AMS Special Session on The Feynman Integral and Applications, III

1:00 PM – 4:50 PM

Organizers: **Gerald W. Johnson**, University of Nebraska
Michel L. Lapidus, University of California, Riverside

- 1:00PM *Infinite dimensional oscillatory integrals: Their asymptotics and some applications.*
 (1054) **Anne Boutet de Monvel**, Universite Paris 7 (950-81-1015)
- 1:30PM *Feynman type integral representation for propagators of self-interacting quantum fields in even spacetime dimensions.* Preliminary report.
 (1055) **Alexander Dynin**, Ohio State University (950-81-350)
- 2:00PM *Traces: A useful tool on path spaces.*
 (1056) **Sylvie Paycha**, Université Blaise Pascal, Clermont-Ferrand, France (950-58-418)
- 2:30PM *Transforms and Convolution Products in Function Space.*
 (1057) **David L Skoug**, University of Nebraska-Lincoln (950-28-169)
- 3:00PM *Integration Formulas Involving Fourier-Feynman Transforms via a Fubini Theorem.*
 (1058) **Timothy K Huffman**, Northwestern College (IA), **M.K. Im**, Han Nam University, **David L Skoug**, University of Nebraska, and **David A Storvick***, University of Minnesota (950-60-194)
- 3:30PM *Integral transform and convolution of analytic functionals on abstract Wiener space.*
 (1059) **Kun S Chang***, Yonsei University, Seoul, Korea, **Il Yoo**, Yonsei University, Wonju, Korea, and **Byoung S Kim**, Yonsei University, Seoul, Korea (950-28-325)
- 4:00PM *Path distributions.* Preliminary report.
 (1060) **Erik G.F. Thomas**, University of Groningen (950-81-704)
- 4:30PM *A Paley-Wiener Theorem for White Noise Analysis.*
 (1061) **Aurel I Stan**, Northwestern University (950-46-140)

AMS Special Session on Algebraic Geometry and Commutative Algebra, III

1:00 PM – 5:00 PM

Organizers: **Irena Peeva**, Cornell University
Hema Srinivasan, University of Missouri, Columbia

- 1:00PM *Resolution of Weyl Modules: The Rota Touch.*
 (1062) **David A Buchsbaum**, Brandeis University (950-18-181)

- 1:30PM *Homological properties of quotients of exterior algebras and lower central series of groups.*
 (1063) **Jan-Erik I Roos**, Stockholm University (950-14-266)
- 2:00PM *Hilbert-Kunz multiplicity of two-dimensional local rings.*
 (1064) **Kei-ichi Watanabe**, Nihon University (950-13-252)
- 2:30PM *Prime ideals and decompositions of modules.* Preliminary report.
 (1065) **Roger A Wiegand** and **Sylvia M Wiegand***, University of Nebraska (950-13-596)
- 3:00PM Break
- 3:10PM *Equivariant twisted inverse functors without equivariant compactifications.*
 (1066) **Mitsuyasu Hashimoto**, Graduate School of Mathematics, Nagoya University (950-14-208)
- 3:40PM *On the Rees algebra of certain codimension 2 perfect ideals.*
 (1067) **Huy Tai Ha**, Queen's University (950-14-411)
- 4:10PM *A Conjecture of Kurano and Roberts Related to Positivity of the Intersection Multiplicity of Serre.* Preliminary report.
 (1068) **Sean M Sather-Wagstaff**, University of Utah (950-13-494)
- 4:40PM *Hilbert's Theorem on Ternary Quartic Forms.* Preliminary report.
 (1069) **Bruce Reznick***, University of Illinois at Urbana-Champaign, and **Victoria Powers**, Emory University (950-14-56)

AMS Special Session on Recent Advances in Complex and Harmonic Analysis, IV

1:00 PM – 4:50 PM

Organizers: **Carlos A. Berenstein**, University of Maryland, College Park
Stephen D. Casey, American University
Bao Qin Li, Florida International University
David F. Walnut, George Mason University
C. C. Yang, Hong Kong University of Science and Technology

- 1:00PM *On Fractional Calculus on Spaces of Homogeneous Type: L_p -theory.* Preliminary report.
 (1070) **Eduardo A Gatto*** and **Stephen Vagi**, DePaul University (950-44-1039)
- 1:30PM *Sampling in Multiresolution Spaces.* Preliminary report.
 (1071) **Joseph D Lakey***, New Mexico State University, and **Jeff Hogan**, Macquarie University (950-42-639)
- 2:00PM *Results in Sampling and Deconvolution.* Preliminary report.
 (1072) **David F Walnut**, George Mason University (950-42-902)
- 2:30PM *Composition of pseudodifferential operators.*
 (1073) **Demetrio Labate**, Georgia Tech (950-42-1207)
- 3:00PM *Multivariate Refinable Interpolating Functions.*
 (1074) **Josip Derado**, SAAC- Georgia Institute of Technology (950-41-1080)
- 3:30PM *Bellman functions and Harmonic Analysis.*
 ► (1075) **Janine Wittwer**, University of Chicago (950-42-304)
- 4:00PM *Remarks on the local integrability of iterated maximal functions.*
 (1076) **Paul A Hagelstein**, University of Chicago (950-42-308)
- 4:30PM *Analytic Bezout Equations, Sampling, and the Strongly Coprime Condition.*
 (1077) **Stephen D Casey**, American University (950-41-966)

AMS Special Session on Modular Forms and Elliptic Curves, and Related Topics, II

1:00 PM – 4:50 PM

Organizers: **Sharon Frechette**, Wellesley College
Tamara Veenstra, University of Northern Iowa

- 1:00PM *Elliptic Curve Cryptography with Maple.*
▶ (1078) **Neil P Sigmon**, Chowan College (950-20-894)
- 1:30PM *Ramanujan Type Buildings.*
(1079) **Cristina M Ballantine**, Bowdoin College (950-11-391)
- 2:00PM *Hecke Operators and Buildings.* Preliminary report.
(1080) **Thomas R Shemanske**, Dartmouth College (950-11-148)
- 2:30PM *Hecke Structure of Spaces of Half Integral Weight Cusp Forms: Decomposition Theorems and Applications.*
(1081) **Sharon M Frechette**, Wellesley College (950-11-964)
- 3:00PM *Theta Series over Function Fields.* Preliminary report.
(1082) **Holly J Rosson**, Dartmouth College (950-11-417)
- 3:30PM *Eisenstein Series, Dedekind symbols, and p -adic L -functions.*
(1083) **Duff G Campbell**, United States Military Academy (950-11-1118)
- 4:00PM *Computational Advances in the Classification of Hilbert Modular Threefolds.* Preliminary report.
(1084) **Helen G. Grundman*** and **Lisa E. Lippincott**, Bryn Mawr College (950-11-552)
- 4:30PM *Modular forms of nonreal weight.*
(1085) **Paul C Pasles**, Villanova University (950-11-97)

AMS Special Session on Operator Theory, Systems Theory, and Interpolation in Several Complex Variables, III

1:00 PM – 4:50 PM

Organizers: **Joseph A. Ball**, Virginia Polytech Institute & State University
Cora S. Sadosky, Howard University

- 1:00PM *Some new results in the similarity problem.*
▶ (1086) **Sergei Treil**, Michigan State University (950-47-463)
- 1:30PM *Interpolation on an Annulus.*
(1087) **Scott A McCullough**, University of Florida (950-47-786)
- 2:00PM *A counterexample to the infinite-dimensional version of the matrix Hunt-Muckenhoupt-Wheeden Theorem: Operator BMO and factorizations of $H^1(c^1)$.*
(1088) **Thomas Alastair Gillespie**, University of Edinburgh, **Fedor Nazarov**, Michigan State University, **Sandra Pott***, University of Edinburgh, **Serguei Treil** and **Alexander Volberg**, Michigan State University (950-47-652)
- 2:30PM *Hilbert spaces contractively included in the Hardy space of the bidisk.*
(1089) **Daniel D Alpay***, Ben-Gurion University, **Vladimir Bolotnikov**, College of William and Mary, **Aad Dijkma**, Groningen University, and **Cora Sadosky**, Howard University (950-46-281)
- 3:00PM *Invariant Subspaces and Concrete Model Theory.* Preliminary report.
(1090) **Tavan T Trent**, University of Alabama (950-47-779)
- 3:30PM *On an Extension Problem for Polynomials.*
(1091) **Mihaly Bakonyi***, Georgia State University, and **Dan Timotin**, Institute of Mathematics of the Romanian Academy (950-47-968)

- 4:00PM *Pairs of Commuting Contractions.* Preliminary report.
(1092) **George R Exner***, Bucknell University, **Young S Jo**, Kyemyung University, and **Il Bong Jung**, Kyungpook National University (950-47-369)
- 4:30PM *Sharp estimates in Vector Carleson Embedding theorem.* Preliminary report.
(1093) **Alexander Volberg***, **Fedor Nazarov**, **Sergei Treil**, MSU, and **Gilles Pisier**, Université Paris VI (950-47-635)

AMS Special Session on Homotopy Theory, III

1:00 PM – 4:50 PM

Organizers: **W. Stephen Wilson**, Johns Hopkins University
Jack Morava, Johns Hopkins University

- 1:00PM *On the nonexistence of Smith-Toda complexes.*
(1094) **Lee S Nave**, Massachusetts Institute of Technology (950-55-245)
- 1:30PM *Topological realization of level structure over E_n and its stable splitting by Steinberg idempotent.*
(1095) **Takeshi Torii**, Johns Hopkins University (950-55-678)
- 2:00PM *Deformation theory of multiplicative spectra and complex-oriented cohomology theories.*
(1096) **Andrey Lazarev**, University of Virginia (950-55-37)
- 2:30PM *The K -theory completion.*
(1097) **Martin Bendersky*** and **Robert Thompson**, Hunter College/CUNY (950-55-222)
- 3:00PM *Toward the v_1 -periodic homotopy groups of $SO(n)$.*
(1098) **Martin Bendersky**, CUNY, Hunter College, and **Donald M Davis***, Johns Hopkins University (950-55-85)
- 3:30PM *Decomposition of the loops on a two-cell complex.*
(1099) **Brayton Gray**, University of Illinois at Chicago (950-55-42)
- 4:00PM *eO_2 resolutions and the comparison with EO_2 resolutions.* Preliminary report.
(1100) **Mark Mahowald**, Northwestern University (950-55-809)
- 4:30PM *Higher limits via subgroup complexes.*
(1101) **Jesper Grodal**, Massachusetts Institute of Technology (950-55-1100)

AMS Special Session on Difference Equations and Their Applications in Social and Natural Sciences, III

1:00 PM – 4:50 PM

Organizers: **Hassan Sedaghat**, Virginia Commonwealth University
Abdul Aziz Yakubu, Howard University
Gerry Ladas, University of Rhode Island
Saber Elaydi, Trinity University

- 1:00PM *Existence and Behavior of Solutions of a Rational System Part I.*
(1102) **Edward A Grove**, **Gerasimos Ladas**, **Lynn C McGrath** and **Christopher T Teixeira***, University of Rhode Island (950-39-135)
- 1:30PM *On the Recursive Sequence $x(n+1) = (a + bx(n) + cx(n-1))/(A + Bx(n) + Cx(n-1))$.* Preliminary report.
▶ (1103) **M.R.S. Kulenovic***, **G Ladas** and **N R Prokup**, University of Rhode Island (950-39-34)
- 2:00PM *On a Rational Recursive Sequence with Even Delays.*
(1104) **Edward A Grove***, **Gerasimos Ladas** and **Hamdi El-Mitwalli**, University of Rhode Island (950-39-109)

- 2:30PM (1105) *Eventually Periodic Solutions of $x[n+1]=\max A[n]/x[n], 1/x[n-1]$* . Preliminary report. **William J Briden**, **Edward A Grove**, **Gerry Ladas**, University of Rhode Island, and **Candace M Kent***, Virginia Commonwealth Univ. (950-99-36)
- ▶ 3:00PM (1106) *On a nonautonomous max equation*. Preliminary report. **Soudabeh Valicenti***, University of Rhode Island, **Jeff Feuer**, St. Michael's College, **Gerry Ladas** and **Kim Cunningham**, University of Rhode Island (950-39-261)
- 3:30PM (1107) *On the difference equation $x[n+1]=\max 1/x[n], A[n]/x[n-1]$ with a period 3 parameter*. **Michael A Radin***, **Edward A Grove**, **Gerasimos Ladas**, Univ. of Rhode Island, and **Candace M Kent***, Virg. Commonwealth Univ. (950-39-158)
- 4:00PM (1108) *Continued fractions expansion of rotation numbers for plane maps*. **Timothy D Sauer**, George Mason University (950-39-1086)
- 4:30PM (1109) *Analysis of a Two-Age Climax Species Population Model*. Preliminary report. **Shurron M Farmer**, Howard University (950-39-62)

AMS Special Session on Research in Mathematics by Undergraduates, II

1:00 PM – 4:50 PM

Organizers: **Darin R. Stephenson**, Hope College
Leonard A. VanWyk, James Madison University

- ▶ 1:00PM (1110) *Igusa Local Zeta Functions for Elliptic Curves*. Preliminary report. **Mariana E Campbell***, University of California, San Diego, **Michael Joyce**, Tulane University, **Anushka Krishnachander**, Amherst College, and **Kimberly Schneider**, Bowdoin College (950-11-191)
- ▶ 1:30PM (1111) *Modeling Turbulence on a Torus*. **Emily C Clark**, Clark University, Worcester MA, **Lubomira Ivanova**, Mount Holyoke College, South Hadley MA, **Aaron Koll**, UC Berkeley, Berkeley CA, **Jennifer Ross**, Wellesley College, Wellesley MA, **Yanir A Rubinstein***, Technion, Haifa, Israel, and **Mark A Peterson**, Mount Holyoke College, South Hadley MA (950-76-800)
- ▶ 2:00PM (1112) *Songs of Splitting and Systoles: An Odyssey of Triangular Tiling Groups*. Preliminary report. **Jason Deblois***, University of Chicago, **Lisa J Powell**, Harvard University, **Nicholas R Baeth**, Pacific Lutheran University, and **Kevin M Woods**, Wake Forest University (950-20-1174)
- ▶ 2:30PM (1113) *Alternating Knots on Surfaces*. Preliminary report. **Tom R. Fleming***, Williams College, **Michael Levin**, Harvard University, and **Ari Turner**, Princeton University (950-57-508)
- ▶ 3:00PM (1114) *Close Encounters with Curves of the Spherical Kind*. Preliminary report. **Michael R Munn**, University of Notre Dame (950-53-632)
- ▶ 3:30PM (1115) *Explicit Representation Theory of the Quantum Weyl Algebra at Roots of 1*. **J. Boyette**, **M. Leyk**, Texas A&M University, **T. Plunkett***, University of Illinois at Urbana-Champaign, **K. Sipe**, Houston, TX, and **J. Talley**, Texas A&M University (950-16-554)
- ▶ 4:00PM (1116) *The Search For Tri-Operate Fields*. **Brett A Enge**, James Madison University (950-12-667)

- ▶ 4:30PM (1117) *Characterization of Completions of Reduced Noetherian Local Rings*. **Dan A Lee**, Williams/Harvard, **Leanne Leer**, Williams/Bucknell, **Shara Pilch**, Williams, and **Yu Yasufuku***, Williams/Harvard (950-13-512)

AMS Special Session on Philosophies in Mathematics Education, II

1:00 PM – 4:00 PM

- Organizer: **Seymour Lipschutz**, Temple University
- ▶ 1:00PM (1118) *How Set Theoretic Thinking Affects Teaching*. **Harold M Edwards**, New York Univ. (950-98-431)
- ▶ 1:30PM (1119) *Following Descartes's advice and teaching to the gut*. **J. J. Uhl**, Univ of Illinois at Urbana-Champaign (950-98-685)
- ▶ 2:00PM (1120) *On teaching linear algebra*. **James Milgram**, Stanford (950-98-433)
- ▶ 2:30PM (1121) *An abstract framework in teaching linear algebra*. **Seymour Lipschutz**, Temple University (950-98-427)
- ▶ 3:00PM (1122) *Linear algebra in the next decade*. **Seymour Lipschutz***, Temple University, **Harold M Edwards***, NYU/Courant, **James Milgram***, Stanford University, and **J. J. Uhl***, University of Illinois at Urbana-Champaign (950-98-487)

MAA Minicourse #11: Part B

1:00 PM – 3:00 PM

Discrete dynamical systems: Mathematics, methods, and models.

Organizers: **David C. Arney**, U. S. Military Academy
John S. Robertson, Georgia College and State University

MAA Minicourse #14: Part B

1:00 PM – 3:00 PM

Modern physics and the mathematical world.

Organizer: **George DeRise**, Thomas Nelson College

MAA Minicourse #5: Part B

1:00 PM – 3:00 PM

Exploring abstract algebra topics through interactive labs.

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

AMS Session on Statistics

1:00 PM – 2:40 PM

- ▶ 1:00PM (1123) *Comparison of operating characteristics of quality control plans*. **Raymond N Greenwell***, Hofstra University, **Stephen J Finch**, State University of New York at Stony Brook, **John Whitbread**, Cytometrix International, and **Ann Tucker**, State University of New York at Stony Brook (950-62-231)
- ▶ 1:15PM (1124) *Distribution functions of copulas: A class of bivariate probability integral transforms*. **Roger B Nelsen***, Lewis & Clark College, **Juan Quesada-Molina**, Universidad de Granada, **José Antonio Rodríguez-Lallena** and **Manuel Úbeda-Flores**, Universidad de Almería (950-62-237)

- 1:30PM *Estimating a transformation of the data in nonparametric regression.* Preliminary report.
(1125) **William J Hooper**, SUNY Binghamton (950-62-612)
- 1:45PM *A random effects model for multistate survival analysis with applications to bone marrow transplants.* Preliminary report.
(1126) **Mouchumi Bhattacharyya**, Brigham Young University (950-62-657)
- 2:00PM *The limiting power of the Durbin-Watson test.* Preliminary report.
(1127) ▶ **Jörg-Uwe Löbus*** and **Lutz Ritter**, University of Jena (950-62-669)
- 2:15PM *A Statistical Approach to the Segmentation and Volume Estimation of Ischemic Stroke Lesions in MR Images.* Preliminary report.
(1128) **Benjamin Stein***, **Joseph Horowitz** and **Donald Geman**, University of Massachusetts at Amherst (950-62-948)
- 2:30PM *Records in a Changing Population: An Elementary Approach.* Preliminary report.
(1129) ▶ **William C Calhoun**, Bloomsburg University (950-62-1087)

AMS Session on Mathematics Education and History

1:00 PM – 4:40 PM

- 1:00PM *The Texas/Moore Method and the NCTM Standards.*
(1130) ▶ **William Donnell*** and **D. R Traylor**, University of the Incarnate Word (950-97-84)
- 1:15PM *Transcendental Meditation: A Practical Method for Improving the Mathematical Achievement of Students.*
(1131) ▶ **Catherine A Gorini**, Maharishi University of Management (950-97-173)
- 1:30PM *Public Contests and Publications in an Algebra Enrichment Course for Teachers.* Preliminary report.
(1132) ▶ **Matthew J Haines**, New Jersey City University (950-01-848)
- 1:45PM *Historical and Classroom Snapshots: Adding Natural Color to the Black-and-White of Mathematical Representation.*
(1133) ▶ **Marshall Gordon**, The Park School (950-01-849)
- 2:00PM *Genesis of Universal Forms: The Four-Square Theorem and its Generalizations.*
(1134) ▶ **Mark B Beintema***, University of Wisconsin-Fox Valley, and **Azar N Khosravani**, University of Wisconsin-Oshkosh (950-01-1114)
- 2:15PM *Mystery surrounding the mathematical genius.* Preliminary report.
(1135) **Baikunth P. Ambasht***, Bokaro Steel City, India, **Jamuna P. Ambasht**, Benedict College, and **Sanjay Tiwari**, Gaya, India (950-00-625)
- 2:30PM *Teaching Geometry On-line.* Preliminary report.
(1136) ▶ **David A. Thomas**, Montana State University (950-98-24)
- 2:45PM *Extension of Mathematics Education Reform to the University Level.*
(1137) ▶ **D. R. Traylor***, University of the Incarnate Word, and **Ellen Szecsy**, Northeast ISD (950-98-80)
- 3:00PM *Cubic Equations Simply—Without Memorizing Long Formulas—Plus its Numerous Applications.*
(1138) ▶ **Robert Kreczner**, University of Wisconsin (950-98-192)
- 3:15PM *Teaching Liberal Arts Mathematics Courses with an Interdisciplinary Paper/Project Requirement.*
(1139) ▶ **Ann Robertson**, Connecticut College (950-98-991)
- 3:30PM *Awakening Students with Java and Number Theory.*
(1140) ▶ **John W Jones***, Arizona State University, and **Jeffrey J Holt**, University of Virginia (950-98-1093)

- 3:45PM *The ubiquitous geometric series.*
(1141) ▶ **Bella Wiener*** and **Joseph Wiener**, University of Texas-Pan American (950-98-1185)
- 4:00PM *The role of physical models in teaching hyperbolic geometry.*
(1142) ▶ **Daina Taimina***, University of Latvia, and **David W Henderson**, Cornell University (950-98-1228)
- 4:15PM *'SAAB' Congruence, the Steiner-Lehmus Theorem, and Generalization(?).* Preliminary report.
(1143) ▶ **David F Beran**, Univ of Wisconsin-Superior (950-51-323)
- 4:30PM *Inscribed Circles.*
(1144) **Saad M. Adnan**, Larkspur Middle School (950-51-1284)

AMS Session on Real Variables and Topological Groups

1:00 PM – 3:40 PM

- 1:00PM *Linear Operations on L^p -spaces.* Preliminary report.
(1145) **Nicolae Dinculeanu**, University of Florida (950-28-212)
- 1:15PM *Whitney covers and quasi-isometry of $L^s(\mu)$ -Averaging Domains.* Preliminary report.
(1146) **Shusen Ding**, U. of Seattle, and **Bing Liu***, College of St. Scholastica (950-28-719)
- 1:30PM *Fractal vector measures and Green's Theorem for curves.*
(1147) **Franklin Mendivil***, Georgia Tech, and **Ed Vrscay**, Applied Math, University of Waterloo (950-28-925)
- 1:45PM *On characterizations properties of an induced measure on an Wallman space.* Preliminary report.
(1148) **Carmen D. Vlad**, Pace University (950-28-1108)
- 2:00PM *General Weighted Opial Inequalities for Linear Differential Operators.*
(1149) **George A. Anastassiou***, University of Memphis, and **J. Pecaric**, University of Zagreb (950-26-25)
- 2:15PM *Extensions of Grüss' Inequality.*
(1150) **Arlington M. Fink**, Iowa State University (950-26-142)
- 2:30PM *Bounds on Output of a Linear Time Invariant System with Bandlimited Input.* Preliminary report.
(1151) **Nasser Dastrange**, Buena Vista University (950-26-184)
- 2:45PM *Automatic quasicontinuity.* Preliminary report.
(1152) **Andrzej A Szymanski**, Slippery Rock University (950-26-807)
- 3:00PM *Application of a Result of Davies and Petersen to Obtain some Discrete Inequalities.*
(1153) **Ram N Mohapatra*** and **Ratan Guha**, University of Central Florida (950-26-1028)
- 3:15PM *Sequential Definitions of Continuity.* Preliminary report.
(1154) ▶ **Jeff Connor***, Ohio University, and **Karl Grosse-Erdmann**, FernUniv. (950-40-801)
- 3:30PM *Theory of hypernumbers and Feynman integrals.* Preliminary report.
(1155) ▶ **Mark Burgin**, University of California at Los Angeles (950-28-47)

AMS Session on Associative Rings and Algebras

1:00 PM – 4:10 PM

- 1:00PM *A note on surjective inverse systems.*
(1156) **Radoslav M. Dimitric**, University of California, at Berkeley (950-16-217)
- 1:15PM *Polycyclic group rings whose principal ideals are projective.*
(1157) **Antonio F Behn**, University of Wisconsin-Madison (950-16-223)

- 1:30PM (1158) *Generalized Quivers and Representations of Rings with Local Units*. Preliminary report.
Jennifer A Firkins, University of Oregon (950-16-358)
- 1:45PM (1159) *Modules for the Generalized Terwilliger Algebra in the Diameter Two Case*. Preliminary report.
Eric S Egge, University of Wisconsin-Madison (950-16-672)
- 2:00PM (1160) *A direct sum of injective modules from a set of disjoint natural classes*.
Heakyung Lee, Winthrop University (950-16-905)
- ▶ 2:15PM (1161) *Rings That Contain a Finite Number of Zero Divisors*. Preliminary report.
Michael D Seyfried* and **Lenny K Jones**, Shippensburg University (950-16-943)
- 2:30PM (1162) *Representation theory of prime characteristic down-up algebras*.
Jeff Hildebrand, University of Wisconsin-Madison (950-16-959)
- 2:45PM (1163) *Isomorphic Fusion Algebras of Twisted Quantum Doubles*. Preliminary report.
Christopher D Goff, University of Arizona (950-16-984)
- 3:00PM (1164) *Prime Rings with Pivotal Monomial x^n* .
Philip S Blau*, Boston University, College of General Studies, **W. S Martindale, III**, University of Massachusetts, and **Gordon A Swain**, Ashland College (950-16-989)
- ▶ 3:15PM (1165) *Shpecht-Wever criteria for quantum Lie operations*. Preliminary report.
Vladislav Kirillovich Kharchenko, Universidad Nacional Autónoma de México, Campus Cuautitlán (950-16-1084)
- 3:30PM (1166) *Ring Extensions and the Preservation of Injective Envelopes*.
David W Dempsey*, University of Kentucky, and **Luis Oyonarte**, Universidad de Almería (950-16-1110)
- 3:45PM (1167) *AS-Regular Algebras of Dimension Four with One Point*. Preliminary report.
Christopher J Brazfield, Lebanon Valley College (950-16-1213)
- 4:00PM (1168) *Hermitian Forms*. Preliminary report.
Douglas William Larmour, Colorado College (950-16-1279)

MAA Session on Math and Math Sciences in 2010: What Should Graduates Know?, II

1:00 PM – 4:55 PM

- Organizers: **Herbert E. Kasube**, Bradley University
Harriet Pollatsek, Mount Holyoke College
- ▶ 1:00PM (1169) *A process for deciding what our graduates should know*. Preliminary report.
Paul Latiolais*, **Joyce O'Halloran** and **Marjorie Enneking**, Portland State University (950-L1-1274)
- 1:20PM (1170) *The role of geometry in the 21st century curriculum*.
Libby Krussel, The University of Montana - Missoula (950-L1-1095)
- ▶ 1:40PM (1171) *Knowledge and Reasoning - What Is the Relation?*
Gary W Krahn* and **Steven B Horton**, United States Military Academy (950-L1-1075)
- ▶ 2:00PM (1172) *Can We Teach What Employers Really Want?*
G. Daniel Callon, Franklin College (950-L1-915)
- ▶ 2:20PM (1173) *Some musings from a guy who finally got a real job after 31 years in college*.
Mark A Smith, Miami University (950-L1-817)
- 2:50PM Break.

- ▶ 3:00PM (1174) *A Model of an Effective Undergraduate Mathematics Program in the Year 2010*. Preliminary report.
Preston Dinkins, Southern University (950-L1-1289)
- ▶ 3:20PM (1175) *Connected Mathematics in 2010*. Preliminary report.
Matthew P Richey, St. Olaf College (950-L1-1266)
- 3:40PM (1176) *A Look Forward: Undergraduate Mathematics in 2010*. Preliminary report.
Kevin E Charlwood, Washburn University (950-L1-331)
- ▶ 4:00PM (1177) *A Profile of Mathematics in Michigan*.
Frances B Lichtman*, Alma College, **Mitzi Chaffer** and **Tom Miles**, Central Michigan University (950-L1-1002)
- 4:20PM (1178) *Recruiting Mathematics Majors from Remedial Courses?*
Janet P Ray, Seattle Central Community College (950-L1-1146)
- ▶ 4:40PM (1179) *A Preview of a Mathematician's Life - The Expectations, the Rewards, and the Challenges*.
Teresa D Edwards, Spelman College (950-L1-1271)

MAA Session on Research on the Use of Hand-Held Technology in Teaching Mathematics

1:00 PM – 4:15 PM

- Organizers: **Deborah A. Crocker**, Appalachian State University
Penelope Dunham, Muhlenberg College
- ▶ 1:00PM (1180) *A Large-scale Study Clarifying the Roles of the TI-92 and Instructional Format on Student Success in Calculus*. Preliminary report.
Brian A. Keller*, Iowa State University, **Chris A. Russell**, Marshalltown Community College, and **Heather A. Thompson**, Iowa State University (950-N1-348)
- ▶ 1:20PM (1181) *Integrating the TI-89 Handheld CAS into the United States Military Academy Curriculum*. Preliminary report.
Mary Ann Connors* and **Kathleen G. Snook**, United States Military Academy (950-N1-618)
- ▶ 1:40PM (1182) *Calculus Students Use of the Graphing Calculator*. Preliminary report.
Vincent E Dimiceli, Oral Roberts University (950-N1-942)
- ▶ 2:00PM (1183) *When Equalities Are Not Equal: Mathematical Precision in Teaching, Texts, and Technology*. Preliminary report.
Michael J Bosse** and **N. R Nandakumar**, Delaware State University (950-N1-681)
- 2:20PM (1184) *Laptops in the Classroom*.
James A Glackin* and **Joseph D Myers**, United States Military Academy (950-N1-415)
- 2:40PM (1185) *Preservice Middle School Mathematics Teacher's Visual Interpretation of Functions: The Effects of a Technology-based Capstone Mathematics Course*.
Brandy S Jumper*, **James A Epperson** and **Gary A Harris**, Texas Tech University (950-N1-587)
- ▶ 3:00PM (1186) *The Graphing Calculator: A Tale of Significant Growth and of Cognitive Overload*.
Mercedes A McGowen, William Rainey Harper College (950-N1-1253)
- ▶ 3:20PM (1187) *The handheld CAS in developmental algebra for college students*.
Laurie B Hopkins* and **Amelia S. Kinard**, Columbia College (950-N1-847)

3:40PM (1188) *The effect of using graphing calculators on students' understanding functions and attitudes towards mathematics & graphing calculators in Korean high school advanced algebra class.*
Oh-Nam Kwon* and **Minkyong Kim**, Ewha Womans University (950-N1-470)

▶ 4:00PM (1189) *Computer algebra systems in the secondary mathematics curriculum.* Preliminary report.
Todd Edwards, Ohio State University/Upper Arlington High School (950-N1-1257)

MAA Open Discussion

1:00 PM – 3:00 PM

College algebra reform.

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

MAA Panel Discussion

1:00 PM – 2:20 PM

If "less is more" in the K-12 curriculum, then which "less" do we choose?

Organizer: **Richard D. Anderson**, Louisiana State University

Panelists: **Andrew M. Gleason**, Harvard University

Hyman Bass, Columbia University

MAA Special Presentation

1:00 PM – 2:20 PM

School mathematics CDs from Singapore.

Organizer: **Richard A. Askey**, University of Wisconsin, Madison

AMS-MAA-NCTM Panel Discussion

1:00 PM – 2:20 PM

Shaping the principles and standards for school mathematics: The role of Association Review Groups from the mathematics community.

Organizer: **Joan Ferrini-Mundy**, Michigan State University

Panelists: **Mary M. Lindquist**, Columbus State University

W. Gary Martin, NCTM

Kenneth A. Ross, University of Oregon

John C. Polking, Rice University

ASL Invited Address

1:20 PM – 1:45 PM

(1190) *Four solutions in search of a problem.*

J. Karel Lambert, University of California, Irvine

ASL Invited Address

2:00 PM – 2:45 PM

(1191) *The logic of hyperimaginaries.*

Bradd Hart, McMaster University

AMS-MAA Special Session on in Memory of Gian-Carlo Rota, VI

2:00 PM – 4:20 PM

Organizers: **Richard P. Stanley**, MIT

Rodica Simion, The George Washington University

2:00PM (1192) *The Whitney Algebra of a Matroid.*

William R Schmitt*, University of Memphis, and **Henry H Crapo**, CAMS, Paris, France (950-05-1203)

2:30PM (1193) *Size Functions of Subgeometry-Closed Classes of Representable Combinatorial Geometries.*

Joseph E Bonin* and **Hongxun Qin**, The George Washington University (950-05-68)

3:00PM (1194) *Helly-type theorems for matroid flats.*

Daniel A Klain, Georgia Institute of Technology (950-05-434)

3:30PM (1195) *Geometric Identities in Linear Lattices.* Preliminary report.

Catherine H Yan, Texas A&M University (950-05-580)

4:00PM (1196) *The polymatroid critical problem.* Preliminary report.

Joseph P Kung, University of North Texas, Denton, TX 76203-1430 (950-05-152)

AMS Special Session on Analytic Aspects of Jordan Theory, II

2:00 PM – 4:50 PM

Organizers: **C. Martin Edwards**, Oxford University

Kevin McCrimmon, University of Virginia

Bernard Russo, University of California, Irvine

Gottfried Ruettiman, University of Bern

2:00PM (1197) *A new approach to representations of the Lorentz group on spinors.*

Yaakov Friedman, Jerusalem College of Technology, and **Bernard Russo***, University of California, Irvine (950-17-265)

3:00PM (1198) *JB*-triples with many dual ball extreme points.*

L. J. Bunce, University of Reading (950-46-590)

3:40PM (1199) *On the Zelmanovian classification of prime JB*-triples.*

Antonio Moreno Galindo* and **Angel Rodriguez Palacios**, Universidad de Granada (950-46-666)

4:20PM (1200) *Spectrum Preserving Maps on JB*-triples.* Preliminary report.

Matthew P Neal, University of California, Irvine (950-17-273)

AMS Special Session on Complex Hyperbolic Geometry and Conformal Geometry of the Heisenberg Group, III

2:00 PM – 3:50 PM

Organizers: **William M. Goldman**, University of Maryland

Hanna M. Sandler, American University

Richard Schwartz, University of Maryland

2:00PM (1201) *A Loop Structure on the Complex Hyperbolic Plane.*

Michael K Kinyon, Indiana University South Bend (950-20-51)

2:30PM (1202) *Complex hyperbolic surfaces with free fundamental groups.*

Nikolai Gusevskii, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil (950-53-729)

3:00PM (1203) *Rigidity and flexibility of triangle groups in complex hyperbolic geometry.*

Elisha Falbel, Universite Pierre et Marie Curie (950-22-256)

3:30PM *Moduli space for the modular group.*
(1204) **John R Parker**, University of Durham (950-22-253)

4:15PM *Students' Understanding of Linear Modeling in a College Mathematical Modeling Course.*
(1217) **Susie M Lanier**, Georgia Southern University (950-D1-367)

AWM Presentations by Recent Women Ph.D.s, II

2:00 PM – 3:50 PM

- 2:00PM *Construction of Orthonormal Wavelets in n Dimensions.*
(1205) **Jennifer Courter**, The Colorado College
- 2:30PM *Pattern Recognition in Gene Expression.*
(1206) **Laurie J. Heyer**, University of Southern California, Los Angeles
- 3:00PM *Uniqueness of Symmetric Vortex Solutions in the Ginzburg-Landau Model of Superconductivity.*
(1207) **Tiziana Giorgi**, Towson University
- 3:30PM *A categorical approach to the study of self-dual codes.*
(1208) **Judy L. Walker**, University of Nebraska, Lincoln

AMS Invited Address

2:15 PM – 3:05 PM

- (1209) *The Riemann-Hilbert Problem and integrable systems.* Preliminary report.
Alexander R. Its, Indiana University-Purdue University Indianapolis (950-34-06)

Association for Research on Undergraduate Mathematics Education Contributed Papers, II

2:30 PM – 4:30 PM

Organizers: **Julie Clark**, Emory and Henry College
M. Kathleen Heid, Pennsylvania State University
Rina Zazkis, Simon Fraser University

- ▶ 2:30PM *Proof Schemes of Above-Average Mathematics Students.* Preliminary report.
(1210) **Mary K Porter***, St. Mary's College, Notre Dame, IN, and **David L Housman**, Goshen College (950-D1-1003)
- ▶ 2:45PM *The NCTM Standards from an Axiological Perspective.* Preliminary report.
(1211) **Michael J Bosse'**, Delaware State University (950-D1-409)
- 3:00PM *A case study of a small group's dynamics during discussions and negotiations in an upper division discovery style spherical geometry class.* Preliminary report.
(1212) **Libby Krussel**, The University of Montana - Missoula, MT (950-D1-816)
- 3:15PM *Using portfolio in modern geometry classroom.* Preliminary report.
(1213) **Draga Vidakovic**, Georgia State University (950-D1-999)
- 3:30PM *A Study of Iconic Translation in Undergraduates' Interpretation of Graphs.*
(1214) **Nell K. Rayburn***, Austin Peay State University, **Margaret L. Morrow**, Plattsburgh SUNY, and **Rick Seaman**, University of Regina (950-D1-1051)
- 3:45PM *Theoretical Considerations On Incorporating Technology Into Multivariable Calculus.*
(1215) **Karen D King**, Michigan State University (950-D1-906)
- ▶ 4:00PM *A Study in Applying Covariational Reasoning While Modeling Dynamic Events.*
(1216) **Marilyn P. Carlson**, Arizona State University (950-D1-1017)

MAA Special Event

2:30 PM – 4:00 PM

Presentation for chairs of mathematics departments in comprehensive universities, four-year liberal arts, and two-year colleges.
Organizer: **Gerald L. Alexanderson**, Santa Clara University

MAA Panel Discussion

2:30 PM – 4:00 PM

Doctoral programs in mathematics education—Results from a national conference.
Presenters: **Robert Reys**, University of Missouri
James T. Fey, University of Maryland, College Park

MAA Panel Discussion

2:30 PM – 4:00 PM

Mathematics across the curriculum projects.
Organizer: **Frank Giordano**, COMAP, Inc.
Presenters: **Dorothy I. Wallace**, Dartmouth College
Dennis DeTurck, University of Pennsylvania
Mark H. Holmes, Rensselaer Polytechnic Institute
Alan C. Tucker, SUNY at Stony Brook
Steven R. Dunbar, University of Nebraska
Benny D. Evans, Oklahoma State University
Daniel P. Maki, Indiana University
Chris Arney, U.S. Military Academy
James H. Lightbourne, NSF
Elizabeth J. Teles, NSF
Lee Zia, NSF

ASL Invited Address

3:00 PM – 3:45 PM

- (1218) *L. E. J. Brouwer: How mathematics is rooted in life.*
Dirk van Dalen, Utrecht University

MAA Minicourse #6: Part B

3:15 PM – 5:15 PM

Teaching with web-based interactive modular materials.
Organizers: **David A. Smith**, Duke University
Lawrence C. Moore, Duke University

ASL Contributed Paper Session

4:10 PM – 6:00 PM

Bernard Russo
AMS Associate Secretary
Irvine, California

James J. Tattersall
MAA Associate Secretary
Providence, Rhode Island