
Program of the Sessions

San Francisco, California, May 3–4, 2003

Saturday, May 3

Meeting Registration

7:30 AM – 4:00 PM Main Lobby (3rd Floor), Thornton Hall

AMS Exhibit and Book Sale

7:30 AM – 4:00 PM Room 331, Thornton Hall

Special Session on Efficient Arrangements of Convex Bodies, I

8:00 AM – 10:40 AM Room 211, Thornton Hall

Organizers: **Dan P. Ismailescu**, Hofstra University
Włodzimierz Kuperberg, Auburn University

- 8:00AM (1) *The cardinality of a finite saturated packing of convex bodies in E^d .*
Valeriu Soltan, George Mason University (987-52-45)
- 8:30AM (2) *Lattice packings with a gap are not completely saturated.*
▶ **Greg Kuperberg**, UC-Davis, **Krystyna Kuperberg*** and **Włodzimierz Kuperberg**, Auburn University (987-52-86)
- 9:00AM (3) *On an area inequality related to Tarski's plank problem.*
Andras Bezdek, Auburn University, AL (987-52-159)
- 9:30AM (4) *Cyclic polytopes, hyperplanes and codes.*
T Bisztriczky*, U. of Calgary, **K. Boroczky, Jr.**, Renyi Institute, and **D S Gunderson**, U. of Manitoba (987-52-49)
- 10:00AM (5) *Isohedral multiple tilings of the sphere and isohedral polyhedra related to them.* Preliminary report.
▶ **Branko Grünbaum**, University of Washington, Seattle, WA 98195 (987-52-34)

Special Session on Numerical Methods, Calculations and Simulations in Knot Theory and Its Applications, I

8:00 AM – 10:50 AM

Room 327, Thornton Hall

Organizers: **Jorge Alberto Calvo**, North Dakota State University

Kenneth C. Millett, University of California Santa Barbara

Eric J. Rawdon, Duquesne University

- 8:00AM (6) *Numerical simulations of random knotting using the FVM method.*
▶ **Rob Scharein***, Centre for Experimental and Constructive Mathematics, and **Greg Buck**, St. Anselm College (987-55-193)
- 8:30AM (7) *Thermodynamics and Topology of Disordered Knots: Correlations in Trivial Lattice Knot Diagrams.*
▶ **Sergei Nechaev**, LPTMS (Orsay, France) (987-62-98)
- 9:00AM (8) *Scaling behavior of the average crossing number in equilateral random knots.* Preliminary report.
▶ **Akos Dobay**, University of Lausanne, **Yuanan Diao**, University of North Carolina at Charlotte, **Rob Kusner**, University of Massachusetts at Amherst, and **Andrzej Stasiak***, University of Lausanne (987-54-142)
- 9:30AM (9) *Scaling Behavior of Closed and Open Random Knots.*
▶ **Akos Dobay***, **Dubochet Jacques**, University of Lausanne, **Kenneth C. Millett**, University of California, Santa Barbara, **Pierre-Edouard Sottas**, Swiss Federal Institute of Technology, and **Andrzej Stasiak**, University of Lausanne (987-65-140)
- 10:00AM (10) *Topological entropic force associated with the topological swelling of random knots and links.*
Tetsuo Deguchi, Dept. of Physics, Ochanomizu University (987-82-105)
- 10:30AM (11) *An Exploration of the Local Structure of Knot Space.* Preliminary report.
▶ **Kenneth C. Millett**, University of California, Santa Barbara (987-57-201)

The time limit for each contributed paper in the sessions is ten minutes. 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 24, Issue 3 of *Abstracts of papers presented to the American Mathematical Society*, ordered according to the numbers in parentheses following the listings. The middle two digits, e.g., 897-20-1136, refer to the Mathematical Reviews subject classification assigned by the individual author. Groups of papers for each subject are listed chronologically in the *Abstracts*. The last one to four digits, e.g., 897-20-1136, refer to the receipt number of the abstract; abstracts are further sorted by the receipt number within each classification.

Special Session on PDEs and Applications in Geometry, I

8:00 AM – 10:40 AM Room 325, Thornton Hall

Organizer: **Qi S. Zhang**, University of California Riverside

- 8:00AM (12) *Existence and Nonexistence Results on Nonlinear Equations*. Preliminary report.
Mingxin Wang, Southeast University (987-35-204)
- 9:00AM (13) L^p_δ spaces, heat semigroups and applications to nonlinear parabolic and elliptic problems. Preliminary report.
Philippe P Souplet, Univ. de Picardie and Univ. de Versailles, France (987-35-179)
- 10:00AM (14) *The Convergent Rate for Solutions of Dirichlet Problems of Quasilinear Equations*.
Zhiren Jin* and **Kirk Lancaster**, Wichita State University (987-35-36)

Special Session on Commutative Algebra, I

8:00 AM – 10:50 AM Room 429, Thornton Hall

Organizers: **Raymond C. Heitmann**, University of Texas at Austin
Irena Swanson, New Mexico State University

- 8:00AM (15) *Annihilators of local cohomology in characteristic zero*. Preliminary report.
Paul C. Roberts, University of Utah (987-13-108)
- 8:30AM (16) *Characterization of Completions of Excellent Domains of Characteristic Zero*.
S. Loepf, Williams College (987-13-38)
- 9:00AM (17) *The plus closure of an ideal under degree three extensions*. Preliminary report.
Leslie Hayes, Saint Joseph's University (987-13-181)
- 9:30AM (18) *Associated primes of local cohomology modules and Frobenius powers of ideals*.
Anurag K Singh*, Georgia Institute of Technology, and **Irena Swanson**, New Mexico State University (987-13-111)
- 10:00AM (19) *An inequality involving colengths of tight closure of parameter ideals*.
Catalin Ciuperca*, University of California, Riverside, and **Florian Enescu**, University of Utah (987-13-131)
- 10:30AM (20) *Splitting in module-finite extension rings and the vanishing conjecture for maps of Tor*.
Nandini Ranganathan, Reed College (987-13-202)

Special Session on Gromov-Witten Theory of Spin Curves and Orbifolds, I

8:00 AM – 10:40 AM Room 335, Thornton Hall

Organizers: **Tyler Jarvis**, Brigham Young University
Takashi Kimura, Boston University
Arkady Vaintrob, University of Oregon

- 8:00AM (21) *Gerbe and twisted orbifold quantum cohomology*. Preliminary report.
Yongbin Ruan, Wisconsin/HKUST (987-53-104)
- 9:00AM (22) *Inertia Orbifolds, Configuration Spaces and the Ghost Loop Space*.
Ernesto Lupercio*, University of Wisconsin, and **Bernardo Uribe**, Max Planck Institute (987-55-171)
- 9:30AM (23) *Gerbes over orbifolds and their TQFTs*.
Bernardo Uribe, Max Planck Institut fuer Mathematik (987-55-61)

- 10:00AM (24) *From moduli space of curves to Gromov-Witten invariants*.
Xiaobo Liu, University of Notre Dame (987-53-78)

Special Session on Q-Series and Partitions, I

8:30 AM – 10:40 AM Room 210, Thornton Hall

Organizer: **Neville Robbins**, San Francisco State University

- 8:30AM (25) *Divisibility properties of p -regular partition functions*. Preliminary report.
David K Penniston, Furman University (987-11-152)
- 9:00AM (26) *Gordon's Theorem For Overpartitions*.
Jeremy Lovejoy, CNRS, Universite Bordeaux I, and University of Wisconsin (987-11-85)
- 9:30AM (27) *Arithmetic properties of the partition function*.
Matthew G. Boylan, University of Illinois at Urbana-Champaign (987-11-82)
- 10:00AM (28) *Congruence properties of the partition function $p(n)$* .
Ken Ono*, University of Wisconsin, and **Jan Bruinier**, University of Cologne (987-11-52)

Special Session on Combinatorial Commutative Algebra and Algebraic Geometry, I

8:30 AM – 10:50 AM Room 432, Thornton Hall

Organizers: **Serkan Hosten**, San Francisco State University
Ezra Miller, Mathematical Sciences Research Institute

- 8:30AM (29) *Ideals with a power equal to a power of the maximal ideal*. Preliminary report.
David Eisenbud*, MSRI / UC Berkeley, **Craig Huneke**, U of Kansas, and **Bernd Ulrich**, Purdue U (987-13-77)
- 9:00AM (30) *Minimal Primes of Adjacent Minor Ideals*. Preliminary report.
Serkan Hosten, San Francisco State University, and **Seth Sullivant***, University of California, Berkeley (987-05-135)
- 9:30AM (31) *Complexity in Commutative Algebra*. Preliminary report.
Amelia Taylor*, Rutgers University, **Dave Bayer**, Barnard College, and **Volmer Vasconcelos**, Rutgers University (987-13-143)
- 10:00AM (32) *Beyond Tutte-Grothendieck: A new recursion for matroids and shifted complexes*. Preliminary report.
Art Duval, University of Texas at El Paso (987-05-125)
- 10:30AM (33) *Lexicographic Shifting*. Preliminary report.
Rekha R Thomas*, **E Babson** and **I Novik**, University of Washington (987-13-147)

Special Session on Beyond Classical Boundaries of Computability, I

8:30 AM – 10:50 AM Room 329, Thornton Hall

Organizers: **Mark Burgin**, University of California Los Angeles
Peter Wegner, Brown University

- 8:30AM (34) *Supertask computation with infinite time Turing machines*.
Joel David Hamkins, Georgia State University (987-03-09)

Program of the Sessions – San Francisco, CA, Saturday, May 3 (cont'd.)

- 9:00AM *Computation in Pitowsky and Malament-Hogarth Spacetimes.*
▶ (35) **Oron Shagrir**, The Hebrew University of Jerusalem (987-68-20)
- 9:30AM *Quantum Mechanical Principles and Computation.*
▶ (36) Preliminary report.
Tien D Kieu, Swinburne University of Technology (987-81-10)
- 10:00AM *Hypercomputation by Definition.* Preliminary report.
▶ (37) **Benjamin Wells**, University of San Francisco (987-03-14)
- 10:30AM *Determinacy, Arithmetical quasi-inductive definitions, and Infinite Time Turing Machine Computations.*
(38) **Philip David Welch**, University of Bristol (987-03-141)

Special Session on The History of Nineteenth and Twentieth Century Mathematics, I

9:00 AM – 10:50 AM Room 425, Thornton Hall

Organizers: **Shawnee McMurrin**, California State University, San Bernardino
James A. Tattersall, Providence College

- 9:00AM *The evolutionary origins of mathematical ability.*
▶ (39) Preliminary report.
Keith J Devlin, Stanford University (987-01-186)
- 9:30AM *Ruth Moufang and the foundations of geometry.*
▶ (40) **John Colin Stillwell**, University of San Francisco (987-01-28)
- 10:00AM *The Angle of Parallelism in the Development of Linear Elasticity.*
▶ (41) **John Sarli**, CSU San Bernardino (987-51-35)
- 10:30AM *The Erdos-Szekeres Theorem.*
(42) **Ronald Graham**, UCSD (987-05-59)

Special Session on Topological Quantum Computation, I

9:00 AM – 10:45 AM Room 428, Thornton Hall

Organizers: **Alexei Kitaev**, California Institute of Technology
Samuel J. Lomonaco, University of Maryland, Baltimore County

- 8:00AM *A report on topological quantum computation.*
(43) Preliminary report.
Fernando J. O. Souza, University of Iowa (987-81-194)
- 9:00AM *Nonabelian phases in electronic and bosonic Hubbard models.* Preliminary report.
▶ (44) **Michael Freedman**, Microsoft Research (987-81-203)
- 10:00AM *A subexponential time algorithm for the dihedral hidden subgroup problem.*
(45) **Greg Kuperberg**, UC Davis (987-68-130)

Special Session on Qualitative Properties and Applications of Functional Equations, I

9:00 AM – 10:50 AM Room 326, Thornton Hall

Organizer: **Theodore A. Burton**, Southern Illinois University at Carbondale

- 9:00AM *Multiple Solutions for Impulsive Functional Differential Equations.*
(46) **Mouffak Benchohra**, Université de Sidi Bel Abbes, **Johnny Henderson***, Baylor University, **Sotiris K. Ntouyas**, University of Ioannina, and **A. Ouahabi**, Université de Sidi Bel Abbes (987-34-17)
- 9:30AM *Massera's Theorem for Almost Periodic Solutions and Almost Automorphic Solutions of Functional Differential Equations.*
(47) **Satoru Murakami**, Department of Applied Mathematics/ Okayama University of Science (987-34-53)
- 10:00AM *Instability for Dynamical Systems with Applications to Functional Differential Equations and Difference Equations.* Preliminary report.
▶ (48) **John R. Haddock**, University of Memphis (987-34-124)
- 10:30AM *Periodic Solutions of Evolution Equations.*
▶ (49) **James H Liu**, James Madison University (987-34-22)

Special Session on Geometry and Arithmetic over Finite Fields, I

9:30 AM – 10:50 AM Room 409, Thornton Hall

Organizers: **Bjorn Poonen**, University of California Berkeley
Joe P. Buhler, Reed College

- 9:30AM *On Effective Hilbert Irreducibility Theorems.*
(50) **Shuhong Gao**, Clemson University (987-11-67)
- 10:30AM *Counting symmetric, diagonalizable matrices of small size over finite fields.*
▶ (51) **Christopher L Phan*** and **Harvey J Schmidt**, Lewis & Clark College (987-15-21)

AMS Special Presentation: Part I

9:30 AM – 10:50 AM Room 434, Thornton Hall

TA development using case studies: A workshop for faculty.

Organizer: **Diane Herrmann**, University of Chicago

Invited Address

11:00 AM – 11:50 AM Room 201, Science Building

- (52) *Higher spin curves and Gromov-Witten theory.*
Arkady Vaintrob, University of Oregon (987-14-170)

Invited Address

2:00 PM – 2:50 PM Room 201, Science Building

- (53) *Topological quantum computation and quantum media.*
Alexei Kitaev, Caltech (987-81-177)

Special Session on The History of Nineteenth and Twentieth Century Mathematics, II

3:00 PM – 4:20 PM Room 425, Thornton Hall

Organizers: **Shawnee McMurrin**, California State University, San Bernardino
James A. Tattersall, Providence College

- 3:00PM *Riemann's Explicit Formula.*
▶ (54) **Jeffrey Stopple**, UC Santa Barbara (987-11-42)

- 3:30PM *Moments of the Riemann zeta function: from Ingham, Hardy and Littlewood to today.* Preliminary report.
(55) **Jennifer E Beineke**, Western New England College (987-01-146)
- 4:00PM *Mathematical Questions and Their Solutions from The Educational Times.* Preliminary report.
▶ (56) **James J Tattersall***, Providence College, and **Shawnee L McMurran**, California State University San Bernardino (987-01-65)

Special Session on Q-Series and Partitions, II

3:00 PM – 5:20 PM Room 210, Thornton Hall

- Organizer: **Neville Robbins**, San Francisco State University
- 3:00PM *A new formula for 9 squares.* Preliminary report.
(57) **Stephen C Milne**, The Ohio State University (987-11-96)
- 3:30PM *Gollnitz-Gordon partitions with weights and parity conditions.* Preliminary report.
(58) **Krishnaswami Alladi*** and **Alexander Berkovich**, University of Florida (987-11-56)
- 4:00PM *Statistics on Schröder paths and Symmetric Functions.*
(59) **E. S. Egge**, Gettysburg College, **J. Haglund***, University of Pennsylvania, **K. Killpatrick**, Pepperdine University, and **D. Kremer**, Gettysburg College (987-05-74)
- 4:30PM *Identities for the total number of parts in all partitions of an integer.* Preliminary report.
▶ (60) **Neville Robbins***, San Francisco State University, and **Arnold Knopfmacher**, University of the Witwatersrand (987-11-50)
- 5:00PM *A classical treatment of the divisibility properties of $p(n)$.* Preliminary report.
(61) **Dennis A Eichhorn**, University of Arizona (987-11-136)

Special Session on Combinatorial Commutative Algebra and Algebraic Geometry, II

3:00 PM – 5:50 PM Room 432, Thornton Hall

- Organizers: **Serkan Hosten**, San Francisco State University
Ezra Miller, Mathematical Sciences Research Institute
- 3:00PM *Smooth toric varieties and quadratic embeddings.* Preliminary report.
(62) **Joseph Gubeladze***, San Francisco State University and Georgian Academy of Sciences, and **Serkan Hosten**, San Francisco State University (987-13-117)
- 3:30PM *Delta Normal Configurations.*
(63) **Edwin Michael O'Shea**, University of Washington (987-13-195)
- 4:00PM *Combinatorial Structure of Injective Resolutions over Semigroup Rings.*
(64) **David F Helm**, UC Berkeley (987-13-165)
- 4:30PM *Multiplier ideals on toric varieties.*
(65) **Howard M Thompson**, University of Michigan (987-14-81)
- 5:00PM *The K-theory of the flag variety and the Fomin-Kirillov quadratic algebra.* Preliminary report.
(66) **Cristian P. Lenart**, State University of New York at Albany (987-05-172)
- 5:30PM *On a Pieri-Chevalley type formula for $K(G/B)$.*
(67) **Peter Littelmann**, Wuppertal/MSRI (987-14-184)

Special Session on Topological Quantum Computation, II

3:00 PM – 5:45 PM Room 428, Thornton Hall

- Organizers: **Alexei Kitaev**, California Institute of Technology
Samuel J. Lomonaco, University of Maryland, Baltimore County
- 3:00PM *Quantum Entanglement and Topological Entanglement.* Preliminary report.
▶ (68) **Louis H Kauffman***, University of Illinois at Chicago, and **Samuel J. Lomonaco**, University of Maryland Baltimore County (987-81-174)
- 4:00PM *Quantum computations using anyons from finite groups.*
(69) **Carlos Mochon**, Caltech (987-68-109)
- 5:00PM *Quantum Invariants of 3-Manifolds and Quantum Computation.*
(70) **Sergey Bravyi*** and **Alexei Kitaev**, Institute for Quantum Information, Caltech (987-00-167)

Special Session on Beyond Classical Boundaries of Computability, II

3:00 PM – 6:00 PM Room 329, Thornton Hall

- Organizers: **Mark Burgin**, University of California Los Angeles
Peter Wegner, Brown University
- 3:00PM *Turing's Life and Ideas.* Preliminary report.
▶ (71) **Peter Wegner**, Brown University (987-68-11)
- 3:30PM *SuperTuring Models of Computation.* Preliminary report.
▶ (72) **Dina Goldin**, University of Connecticut (987-68-12)
- 4:00PM *Natural Computation and Non-Turing Models of Computation.*
▶ (73) **Bruce J. MacLennan**, Department of Computer Science, The University of Tennessee, Knoxville (987-68-18)
- 4:30PM *New Kind of Computer Science.* Preliminary report.
▶ (74) **Eugene Eberbach**, University of Massachusetts (987-68-13)
- 5:00PM *Continuous-space model of computation.*
▶ (75) **Damien Woods***, **Thomas J Naughton** and **J Paul Gibson**, National University of Ireland, Maynooth (987-68-30)
- 5:30PM Round Table

Special Session on Qualitative Properties and Applications of Functional Equations, II

3:00 PM – 5:50 PM Room 326, Thornton Hall

- Organizer: **Theodore A. Burton**, Southern Illinois University at Carbondale
- 3:00PM *Second Order Functional Equations of Neutral Type.*
(76) **Constantin C. Corduneanu**, University of Texas, Arlington (987-34-145)
- 3:30PM *Existence results for second order functional differential equations with causal operators.*
(77) **Mehran Mahdavi**, Bowie State University (987-34-116)
- 4:00PM *Generalized Quasilinearization Method Versus Newton's Method.*
(78) **Aghalaya S Vatsala**, University of Louisiana at Lafayette (987-34-69)

- 4:30PM *Recent Results Related to Blow-up and Quenching Problems.* (79)
C M Kirk, California Polytechnic State University; San Luis Obispo, CA (987-45-134)
- 5:00PM *Inequalities and Stability of Solutions of a Linear Scalar Functional Differential Equation.* Preliminary report. (80)
Tingxiu Wang, Oakton Community College (987-34-64)
- 5:30PM *Integrodifferential Equations and Equations of Viscoelasticity.* (81)
Min He, Kent State University Trumbull Campus (987-35-102)

Special Session on Geometry and Arithmetic over Finite Fields, II

3:00 PM – 5:40 PM Room 409, Thornton Hall

Organizers: **Bjorn Poonen**, University of California Berkeley
Joe P. Buhler, Reed College

- 3:00PM *Tate duality and the discrete logarithm problem.* (82)
Ming-Deh Huang, University of Southern California (987-11-72)
- 4:00PM *On some subgroups of the multiplicative group of finite rings.* (83)
J Felipe Voloch, University of Texas at Austin (987-11-27)
- 5:00PM *Sharper ABC-based bounds for congruent polynomials.* (84)
Daniel J. Bernstein, University of Illinois at Chicago (987-12-33)

Special Session on Efficient Arrangements of Convex Bodies, II

3:00 PM – 5:40 PM Room 211, Thornton Hall

Organizers: **Dan P. Ismailescu**, Hofstra University
Włodzimierz Kuperberg, Auburn University

- 3:00PM *The symmetry of densest packings.* (85)
Charles Radin, University of Texas at Austin (987-52-39)
- 4:00PM *Regular Production Systems and Aperiodicity in the Hyperbolic Plane.* (86)
Chaim Goodman-Strauss, Univ Arkansas (987-52-40)
- 4:30PM *Infinite packings of hyperbolic space through ergodic theory.* (87)
Lewis P Bowen, University of California, Davis (987-52-73)
- 5:00PM *On the Kneser-Poulsen Conjecture in Euclidean and spherical spaces.* (88)
Robert Connelly*, Cornell University, and **Károly Bezdek**, Eötvös University (987-52-114)

Special Session on Numerical Methods, Calculations and Simulations in Knot Theory and Its Applications, II

3:00 PM – 5:50 PM Room 327, Thornton Hall

Organizers: **Jorge Alberto Calvo**, North Dakota State University
Kenneth C. Millett, University of California Santa Barbara
Eric J. Rawdon, Duquesne University

- 3:00PM *Some conjectures on the enumeration of alternating links and tangles.* (89)
Paul G Zinn-Justin, LPTMS, Universite Paris-sud (987-05-70)
- 3:30PM *The Y-energy of knots.* Preliminary report. (90)
Jun O'Hara, Tokyo Metropolitan University (987-53-178)
- 4:00PM *Quadriseccants of 3-superbridge knots.* Preliminary report. (91)
Gyo Taek Jin* and **Miyoung Lee**, Korea Advanced Institute of Science and Technology (987-57-175)
- 4:30PM *Ordered groups, topology and computation.* Preliminary report. (92)
Dale Rolfsen, University of British Columbia (987-06-75)
- 5:00PM *Meridians of Hyperbolic Knots.* Preliminary report. (93)
Colin C Adams, Williams College (987-57-138)
- 5:30PM *Flat Knotted Bands.* Preliminary report. (94)
Louis H. Kauffman, University of Illinois at Chicago (987-57-79)

Special Session on PDEs and Applications in Geometry, II

3:00 PM – 5:40 PM Room 325, Thornton Hall

Organizer: **Qi S. Zhang**, University of California Riverside

- 3:00PM *Three dimensional geometry and the Einstein constraint equations.* (95)
Richard M Schoen, Stanford University (987-53-144)
- 4:00PM *Certain collapsing sequences of solutions to Ricci flow.* (96)
Bennett Chow*, **David Glickenstein**, UCSD, and **Peng Lu**, University of Oregon (987-53-155)
- 5:00PM *Sub-Riemannian calculus on hypersurfaces in Carnot groups and geometric estimates of Ahlfors type.* (97)
Nicola Garofalo, Purdue University (987-35-196)

Special Session on Commutative Algebra, II

3:00 PM – 5:50 PM Room 429, Thornton Hall

Organizers: **Raymond C. Heitmann**, University of Texas at Austin
Irena Swanson, New Mexico State University

- 3:00PM *Multiplicities of graded sequences of ideals.* (98)
Mircea I Mustata, Clay Mathematics Institute (987-13-92)
- 3:30PM *Effective Uniform Artin Rees Theorems.* (99)
L Ein, UIC, **R. Lazarsfeld**, **K E Smith***, U Michigan, Ann Arbor, and **D Varolin**, U Illinois, Urbana (987-14-90)
- 4:00PM *Multiplicity of the special fiber of blowups.* Preliminary report. (100)
Claudia Polini, University of Notre Dame (987-13-153)
- 4:30PM *On a Certain Variety of Determinantal-Like Ideals.* (101)
Jennifer C. McLoud-Mann, University of Texas at Tyler (987-13-115)
- 5:00PM *Evolutions and monomial ideals.* (102)
Reinhold Huebl, Universitaet Regensburg (987-13-55)

5:30PM *Weak Subintegral Closure of Ideals: Local Characterization and Connections with Reductions.* Preliminary report.
Marie A Vitulli*, University of Oregon, and **Terence Gaffney**, Northeastern University (987-13-187)

Special Session on Gromov-Witten Theory of Spin Curves and Orbifolds, II

3:00 PM – 5:50 PM Room 335, Thornton Hall

Organizers: **Tyler Jarvis**, Brigham Young University
Takashi Kimura, Boston University
Arkady Vaintrob, University of Oregon

- 3:00PM *Orbifold Gromov-Witten theory.* Preliminary report. (104) **Tom Graber**, UC Berkeley (987-14-163)
- 4:00PM *The stringy Chow rings of M_2 and \overline{M}_2 .* Preliminary report. (105) **Dan Abramovich***, Boston University / Brown University, and **James Spencer**, Boston University (987-14-151)
- 4:30PM *The Global Mackay-Ruan Correspondence via Motivic Integration.* (106) **Mainak Poddar**, Michigan State University (987-14-189)
- 5:00PM *New cohomological field theories arising from quasi-homogeneous polynomials.* Preliminary report. (107) **Huijun Fan**, Max-Planck Institut fuer Math., **Tyler J Jarvis***, Brigham Young University, and **Yong-Bin Ruan**, Hong Kong University of Science and Technology (987-14-160)
- 5:30PM *Pointed admissible G-covers, equivariant topological field theories and analogies with the moduli space of higher spin curves.* (108) **Takashi Kimura**, Institute for Advanced Study (987-14-192)

AMS Special Presentation: Part I

3:00 PM – 4:30 PM Room 434, Thornton Hall

TA development using case studies: A workshop for faculty.
 Organizer: **Diane Herrmann**, University of Chicago

Session for Contributed Papers

3:15 PM – 5:55 PM Room 106, Business Building

- 3:15PM *Multiplication of Hypernumbers and Extrafunctions.* Preliminary report. (109) **Mark Burgin**, UCLA (987-46-46)
- 3:30PM *Autonomous DNA Computing model for logical and arithmetic operations.* (110) **Ponnammal Natarajan***, Rajalakshmi Engineering College, Chennai(India), and **Anbarasu Sivalingam**, Anna University, Chennai (India) (987-68-123)
- 3:45PM *Maximizing Confidence That a Vector Valued Diffusion Process Will Hit a Target.* (111) **Rod A Freed**, California State University (987-60-137)
- 4:00PM *A Stochastic Forecast Model with the Sum-of-Digit Moving Averages.* Preliminary report. (112) **Guangwei Fan**, Maryville University (987-60-23)
- 4:15PM *Krull dimension of skew-polynomial rings.* Preliminary report. (113) **Vijay Kumar Bhat, Dr.**, Banasthali VidyapithRajasthan-304022.India. (987-13-95)

- 4:30PM *Exceptional surgery and boundary slopes.* Preliminary report. (114) **Masaharu Ishikawa**, Tokyo Metropolitan University, **Thomas W Mattman***, Cal. State Univ., Chico, and **Koya Shimokawa**, Saitama University (987-57-91)
- 4:45PM *Intrinsically Linked Graphs and Kuratowski Minors.* Preliminary report. (115) **Thomas R Fleming**, UC San Diego (987-57-89)
- 5:00PM *Some applications of the Frobenius-Perron theorem to dynamical systems in geometry.* (116) **Jiu Ding**, University of Southern Mississippi (987-15-97)
- 5:15PM *Best Possible Hadamard Inequalities for Midpoint estimates.* Preliminary report. (117) **A. M. Fink***, Iowa state University, and **Zsolt Pales**, University of Debrecen (987-26-24)
- 5:30PM *Generalized Shifts On Cartesian Products Of Sequence Spaces Ip.* Preliminary report. (118) **Sundaresan Kondagunta**, Cleveland State University (987-46-119)
- 5:45PM *A Note on Semi-developable spaces and Generalizations of Quasi-developable Spaces.* Preliminary report. (119) **Gangadharayya R. Hiremath**, UNCP (987-54-19)

Sunday, May 4

Meeting Registration

8:00 AM – NOON Main Lobby (3rd Floor), Thornton Hall

Special Session on Beyond Classical Boundaries of Computability, III

8:00 AM – 10:50 AM Room 329, Thornton Hall

Organizers: **Mark Burgin**, University of California Los Angeles
Peter Wegner, Brown University

- 8:00AM *On the complexity of real recursive functions.* (120) **Manuel Lameiras Campagnolo**, Lisbon University of Technology (987-68-08)
- 8:30AM *Descriptive complexity in classes of inductive Turing machines.* (121) **Mark Burgin**, UCLA (987-68-06)
- 9:00AM *If Intelligence is Uncomputable, Then...* (122) **Peter Kugel**, Boston College (987-68-16)
- 9:30AM *Learning in the limit and experience of generations.* Preliminary report. (123) **Mark Burgin*** and **Allen Klinger**, UCLA (987-68-31)
- 10:00AM *A formal model of fuzzy computations (preliminary report).* Preliminary report. (124) **Jiri Wiedermann**, Institute of Computer Science, Academy of Sciences of the Czech Republic, Prague (987-68-48)
- 10:30AM *On Asymptotic Decidability of Some Problems Related to Artificial Intelligence.* (125) **Marek A Suchenek**, California State University Dominguez Hills (987-03-100)

Special Session on Qualitative Properties and Applications of Functional Equations, III

8:00 AM – 10:50 AM Room 326, Thornton Hall

Organizer: **Theodore A. Burton**, Southern Illinois University at Carbondale

- 8:00AM *Fixed Points and Controllability in Delay Systems.*
(126) Preliminary report.
Bo Zhang, Fayetteville State University (987-34-99)
- 8:30AM *Asymptotic behavior of solutions of functional differential equations by Schauder's theorem.*
(127) **Theodore A. Burton**, Northwest Research Institute, and **Tetsuo Furumochi***, Shimane University (987-34-71)
- 9:00AM *Bifurcation of almost periodic solutions in difference equations.*
(128) **Yoshihiro Hamaya**, Department of Information Science Okayama University of Science (987-39-43)
- 10:30AM *Stability Properties of Nonlinear Volterra Integrodifferential Equations.* Preliminary report.
(129) **M N Islam**, University of Dayton (987-45-57)

Special Session on Efficient Arrangements of Convex Bodies, III

8:00 AM – 10:50 AM Room 211, Thornton Hall

Organizers: **Dan P. Ismailescu**, Hofstra University
Wlodzimierz Kuperberg, Auburn University

- 8:00AM *The Kneser-Poulsen conjecture for bounded hyperbolic convex polyhedra.* Preliminary report.
(130) **Karoly Bezdek**, Cornell University, Dept. of Math., Ithaca NY (987-52-112)
- 8:30AM *The bottleneck conjecture.*
(131) **Greg Kuperberg**, UC Davis (987-52-129)
- 9:30AM *A Polytopal Generalization of Sperner's coloring Lemma.*
▶ (132) **Jesus A De Loera***, Univ. of California, Davis, **Elisha Peterson**, Univ. of Maryland, and **Francis E. Su**, Harvey Mudd College (987-52-37)
- 10:00AM *Upper bounds for generalized touching numbers of convex bodies.* Preliminary report.
▶ (133) **Istvan Talata**, Eotvos University, Budapest (987-52-158)
- 10:30AM *Sphere Packing in Hyperbolic Space.* Preliminary report.
(134) **Henry Cohn***, Microsoft Research, **Thomas Hales**, University of Pittsburgh, **Jacob Lurie**, MIT, and **Peter Sarnak**, Princeton (987-52-161)

Special Session on Numerical Methods, Calculations and Simulations in Knot Theory and Its Applications, III

8:00 AM – 10:50 AM Room 327, Thornton Hall

Organizers: **Jorge Alberto Calvo**, North Dakota State University
Kenneth C. Millett, University of California Santa Barbara
Eric J. Rawdon, Duquesne University

- 8:00AM *On the ropelength of infinite families of knots.*
▶ (135) Preliminary report.
Claus Ernst*, Western Kentucky University, and **Yuanan Diao**, UNCC (987-57-150)
- 8:30AM *The effects of a topological constraint and excluded volume on the gyration radius of a ring polymer.*
(136) **Miyuki K Shimamura**, Tokyo, Japan (987-65-133)
- 9:00AM *Topological States of Circular DNA Obtained in Site-Specific Recombination.* Preliminary report.
▶ (137) **Alexander V Vologodskii**, New York University (987-92-139)
- 9:30AM *Sedimentation dynamics of rigid, knotted filaments.*
▶ (138) Preliminary report.
Oscar Gonzalez, University of Texas (987-76-190)

- 10:00AM *Numerical simulation of gel electrophoresis of DNA knots.* Preliminary report.
▶ (139) **Giovanni Dietler***, **Paolo De Los Rios**, **Cedric Weber** and **Marc Fleurant**, University of Lausanne (987-82-148)
- 10:30AM *8-bar Tangling Blues.*
(140) **G R Buck**, St. Anselm College (987-82-199)

Special Session on PDEs and Applications in Geometry, III

8:00 AM – 10:40 AM Room 325, Thornton Hall

Organizer: **Qi S. Zhang**, University of California Riverside

- 8:00AM *On conformally compact Einstein 4-manifolds.*
(141) Preliminary report.
Alice Chang, Princeton University, **Jie Qing***, University of California, Santa Cruz, and **Paul Yang**, Princeton University (987-53-169)
- 9:00AM *The Origins of Fractality in Nature and the Singularities of Solutions to PDEs: The Model of the Koch Snowflake Drum.*
▶ (142) **Michel L. Lapidus**, University of California, Riverside (987-35-54)
- 10:00AM *The wave maps equation.*
(143) **Daniel Tataru**, UC Berkeley (987-35-164)

Special Session on Commutative Algebra, III

8:00 AM – 10:50 AM Room 429, Thornton Hall

Organizers: **Raymond C. Heitmann**, University of Texas at Austin
Irena Swanson, New Mexico State University

- 8:00AM *Local rings of bounded Cohen-Macaulay type.*
(144) **Graham J Leuschke**, University of Kansas and MSRI, and **Roger Wiegand***, University of Nebraska and MSRI (987-13-94)
- 8:30AM *Vanishing of Ext and Tor over Cohen-Macaulay local rings.*
(145) **Craig Huneke**, University of Kansas, **Liana M Sega***, Mathematical Sciences Research Institute, and **Adela N Vraciu**, University of Kansas (987-13-118)
- 9:00AM *On a conjecture of Auslander and Reiten.*
(146) Preliminary report.
Craig Huneke, University of Kansas, and **Graham J. Leuschke***, University of Kansas / MSRI (987-13-166)
- 9:30AM *The degree of the Hilbert polynomial of certain Ext modules and its leading coefficient.* Preliminary report.
(147) **Emanoil Theodorescu**, University of Missouri, Columbia (987-13-188)
- 10:00AM *Realizing cohomology over complete intersections.*
(148) **L L Avramov**, University of Nebraska-Lincoln/MSRI, and **D A Jorgensen***, University of Texas at Arlington/MSRI (987-13-168)
- 10:30AM *Asymptotic invariants of homomorphisms with applications to the Frobenius endomorphism.*
(149) **Luchezar L Avramov**, University of Nebraska, **Srikanth Iyengar**, University of Missouri, and **Claudia Miller***, Syracuse University (987-13-191)

Special Session on Gromov-Witten Theory of Spin Curves and Orbifolds, III

- 8:00 AM – 10:50 AM **Room 335, Thornton Hall**
 Organizers: **Tyler Jarvis**, Brigham Young University
Takashi Kimura, Boston University
Arkady Vaintrob, University of Oregon
- 8:00AM *nKdV hierarchies and A_{n-1} -singularities.*
 (150) **Alexander B Givental**, UC Berkeley (987-14-103)
- 9:00AM *Semisimple Frobenius manifolds and higher spin curves.* Preliminary report.
 (151) **Y.-P. Lee**, Univ. of Utah / Princeton U. (987-14-149)
- 10:00AM *Some remarks on Witten's top Chern class.*
 (152) Preliminary report.
Alexander Polishchuk, Boston University (987-14-113)
- 10:30AM *Witten's top Chern class in K-theory.*
 (153) **Alessandro Chiodo**, Cambridge University, UK (987-14-127)

AMS Exhibit and Book Sale

8:00 AM – NOON **Room 331, Thornton Hall**

Special Session on Combinatorial Commutative Algebra and Algebraic Geometry, III

- 8:30 AM – 10:50 AM **Room 432, Thornton Hall**
 Organizers: **Serkan Hosten**, San Francisco State University
Ezra Miller, Mathematical Sciences Research Institute
- 8:30AM *Total positivity and canonical basis in cluster algebras of types $A_1^{(1)}$ and $A_2^{(2)}$.* Preliminary report.
 ▶ (154) **Paul Sherman** and **Andrei Zelevinsky***, Northeastern University (987-13-84)
- 9:00AM *The most singular Schubert variety?* Preliminary report.
 (155) **Alexander Woo**, UC-Berkeley (987-14-200)
- 9:30AM *Castelnuovo-Mumford regularity and line configurations in the projective plane.*
 (156) **Hal Schenck**, Texas A&M University (987-14-180)
- 10:00AM *Resolutions and Multigraded Regularity.* Preliminary report.
 (157) **Gregory G Smith***, Barnard College, and **Diane Maclagan**, Stanford University (987-13-121)
- 10:30AM *Stanley Filtrations and Regularity.*
 (158) **Diane Maclagan***, Stanford University, and **Gregory G Smith**, Barnard College (987-13-120)

Special Session on Q-Series and Partitions, III

- 9:00 AM – 10:40 AM **Room 210, Thornton Hall**
 Organizer: **Neville Robbins**, San Francisco State University
- 9:00AM *A reciprocity theorem for certain q-series found in Ramanujan's lost notebook.*
 (159) **Bruce C. Berndt**, **Song Heng Chan**, **Boon Pin Yeap** and **Ae Ja Yee***, University of Illinois (987-05-128)
- 9:30AM *On the parity of partition functions.*
 (160) **Bruce C. Berndt***, **Ae Ja Yee** and **Alexandru Zaharescu**, University of Illinois at Urbana-Champaign (987-11-41)
- 10:00AM *On a Partition Problem of Richard Stanley.*
 ▶ (161) **George E. Andrews**, The Pennsylvania State University (987-11-83)

Special Session on Geometry and Arithmetic over Finite Fields, III

- 9:00 AM – 10:40 AM **Room 409, Thornton Hall**
 Organizers: **Bjorn Poonen**, University of California Berkeley
Joe P. Buhler, Reed College
- 9:00AM *Prime values of polynomials.* Preliminary report.
 ▶ (162) **B. Conrad**, Univ. of Michigan, **K. Conrad***, UC San Diego, and **R. Gross**, Boston College (987-11-26)
- 10:00AM *Unramified covers of affine spaces.*
 (163) **Kiran S. Kedlaya**, University of California, Berkeley (987-14-29)

Invited Address

- 11:00 AM – 11:50 AM **Room 201, Science Building**
 (164) *The Direct Summand Conjecture in dimension three.*
Raymond C Heitmann, University of Texas at Austin (987-13-66)

Invited Address

- 2:00 PM – 2:50 PM **Room 201, Science Building**
 (165) *A problem in symmetric functions arising from phase determination in crystallography.*
Joe P Buhler, Reed College (987-12-198)

Special Session on Beyond Classical Boundaries of Computability, IV

- 3:00 PM – 6:00 PM **Room 329, Thornton Hall**
 Organizers: **Mark Burgin**, University of California Los Angeles
Peter Wegner, Brown University
- 3:00PM *A Logical Approach to the Philosophy of Hypercomputation.*
 (166) **Selmer C Bringsjord**, Rensselaer Polytechnic Institute (RPI) (987-03-15)
- 3:30PM *Turing's Thesis, Hume's Problem, and Ockham's Razor: Uncertainty, Simplicity, and Efficiency in Empirical and Formal Reasoning.*
 ▶ (167) **Kevin T. Kelly**, Carnegie Mellon University (987-03-25)
- 4:00PM *The Concept of Computability.*
 (168) **Carol E. Cleland**, Philosophy Department, University of Colorado (987-03-47)
- 4:30PM *Hypercomputation in the Real World.*
 (169) **B. Jack Copeland**, University of Canterbury, New Zealand (987-03-126)
- 5:00PM *Attempts to Compute the Uncomputable.*
 ▶ (170) **Martin D Davis**, UC Berkeley (987-03-93)
- 5:30PM Round Table

Special Session on Qualitative Properties and Applications of Functional Equations, IV

- 3:00 PM – 4:20 PM **Room 326, Thornton Hall**
 Organizer: **Theodore A. Burton**, Southern Illinois University at Carbondale
- 3:00PM *Extinction, Persistence, and Permanence in a Lotka-Volterra Model.* Preliminary report.
 (171) **Shair Ahmad**, University of Texas at San Antonio (987-34-68)

- 3:30PM *Parametric resonance in a predator-prey model.*
(172) Preliminary report.
Alfonso C Casal, Universidad Politecnica de Madrid, and **Alfredo S Somolinos***, Mercy College, Dobbs Ferry, NY. (987-34-63)
- 4:00PM *Fixed Points, Stability, and Three Averages.*
(173) **Theodore A Burton**, Southern Illinois University (987-34-51)

Special Session on Geometry and Arithmetic over Finite Fields, IV

3:00 PM – 4:40 PM Room 409, Thornton Hall

Organizers: **Bjorn Poonen**, University of California Berkeley
Joe P. Buhler, Reed College

- 3:00PM *A heuristic explanation of the distribution of Frobenius eigenvalues for principally-polarized abelian varieties.* Preliminary report.
(174) **Everett W Howe**, Center for Communications Research, La Jolla (987-11-58)
- 4:00PM *L functions of exponential sums over affinoids.*
(175) **Hui June Zhu**, McMaster University (987-14-60)
- 5:00PM *The Zeta function of Algebraic r-cycles: Conjectures and Results.*
(176) **C. Douglas Haessig**, UC Irvine (987-11-101)

Special Session on Efficient Arrangements of Convex Bodies, IV

3:00 PM – 4:50 PM Room 211, Thornton Hall

Organizers: **Dan P. Ismailescu**, Hofstra University
Wlodzimierz Kuperberg, Auburn University

- 3:00PM *Large transversals to families of unit disks.*
▶ (177) **T Bisztriczky**, University of Calgary, Canada, **F Fodor***, University of Szeged, Hungary, and **D Oliveros-Braniff**, University of Calgary, Canada (987-52-62)
- 3:30PM *Hyperbolic Regular Polygons with Notched Edges – A Classification of Tilers.* Preliminary report.
▶ (178) **Casey Mann**, University of Texas at Tyler (987-52-76)
- 4:00PM *On the Number of Cylinders Touching a Ball.*
▶ (179) Preliminary report.
Dan P Ismailescu, Hofstra University (987-52-173)
- 4:30PM *Covering a Strip by Unit Circles.* Preliminary report.
▶ (180) **Gábor Fejes Tóth**, Alfréd Rényi Mathematical Institute (987-52-157)

Special Session on Numerical Methods, Calculations and Simulations in Knot Theory and Its Applications, IV

3:00 PM – 6:10 PM Room 327, Thornton Hall

Organizers: **Jorge Alberto Calvo**, North Dakota State University
Kenneth C. Millett, University of California Santa Barbara
Eric J. Rawdon, Duquesne University

- 3:00PM *Densely packed knots.*
(181) **Rhonald Lua**, University of Minnesota, **Alexander Borovinskiy**, UCSF, and **Alexander Grosberg***, University of Minnesota (987-60-162)

- 3:30PM *Computation of ideal shapes using a discretization by Biarcs.*
(182) **Jana Smutny**, Swiss Federal Institute of Technology (987-65-80)
- 4:00PM *Tightening knots with Ridgerunner.* Preliminary report.
▶ (183) **Jason H Cantarella***, University of Georgia, **Eric Rawdon** and **Michael Piatek**, Duquesne University (987-53-87)
- 4:30PM *Simulations of Tight Links.* Preliminary report.
▶ (184) **John M Sullivan**, Univ. of Illinois, Urbana (987-51-32)
- 5:00PM *Power law for the ideal prime knots.*
(185) **Piotr Pieranski***, **Sylwester Przybyl** and **Justyna Marchwiak**, Poznan University of Technology, Poznan, Poland (987-54-154)
- 5:30PM *The Effect of Flexibility on Minimum Ropelength Conformations.* Preliminary report.
(186) **Gregory Buck**, Saint Anselm College, **Michael Piatek** and **Eric Rawdon***, Duquesne University (987-57-185)

Special Session on PDEs and Applications in Geometry, IV

3:00 PM – 5:40 PM Room 325, Thornton Hall

Organizer: **Qi S. Zhang**, University of California Riverside

- 3:00PM *Asymptotic behavior to Dissipative Quasi-Geostrophic flows.*
(187) **Maria E Schonbek***, University of California Santa Cruz, and **Tomas P Schonbek**, Florida Atlantic University (987-35-88)
- 4:00PM *On smoothly bounded domains covering compact quotients.* Preliminary report.
(188) **Bun Wong***, UC Riverside, and **W-S Cheung**, The Univeristy of Hong Kong (987-32-197)
- 5:00PM *Control in the presence of a black box.*
(189) **Maciej Zworski**, UC Berkeley (987-35-156)

Special Session on Gromov-Witten Theory of Spin Curves and Orbifolds, IV

3:00 PM – 4:20 PM Room 335, Thornton Hall

Organizers: **Tyler Jarvis**, Brigham Young University
Takashi Kimura, Boston University
Arkady Vaintrob, University of Oregon

- 3:00PM *A homotopy-theoretical Heisenberg group.*
(190) **Jack Morava**, Johns Hopkins University (987-55-183)
- 3:30PM *On Gromov-Witten theory for global quotients.*
(191) **Ralph M Kaufmann**, Oklahoma State University and Max-Planck-Institute for Mathematics (987-14-176)
- 4:00PM *A Generalization of Spin Orbifold Quantum Cohomology Arising From Quasi-Homogeneous Polynomials.* Preliminary report.
(192) **Huijun Fan***, MPI in Leipzig, Germany, **Tyler Jarvis**, Brigham Young university, and **Yongbin Ruan**, Wisconsin univ.& Hongkong Univ. Sci.& Tech. (987-53-122)

Michel L. Lapidus
Associate Secretary
Riverside, California