

# Program of the Sessions

Boston, Massachusetts, January 4-7, 2012

## Monday, January 2

### *AMS Short Course on Computing with Elliptic Curves Using Sage, Part I*

- 8:00 AM - 5:00 PM**      **Back Bay Ballroom B, 2nd Floor, Sheraton**
- Organizer: **William Stein**, University of Washington
- 8:00AM Registration, Back Bay Ballroom D, Sheraton.
- 9:00AM *Introduction to Python and Sage.*  
(1) **Kiran Kedlaya**, University of California San Diego
- 10:30AM Break.
- 11:00AM Question and Answer Session: How do I do XXX in Sage?
- 2:00PM *Computing with elliptic curves over finite fields using Sage.*  
(2) **Ken Ribet**, University of California, Berkeley
- 3:30PM Break.
- 4:00PM Problem Session: Try to solve a problem yourself using Sage.

### *AMS Short Course on Random Fields and Random Geometry, Part I*

- 8:00 AM - 5:00 PM**      **Back Bay Ballroom A, 2nd Floor, Sheraton**
- Organizers: **Robert Adler**, Technion - Israel Institute of Technology  
**Jonathan Taylor**, Stanford University
- 8:00AM Registration, Back Bay Ballroom D, Sheraton.
- 9:00AM *Gaussian fields and Kac-Rice formulae.*  
(3) **Robert Adler**, Technion
- 10:15AM Break.
- 10:45AM *The Gaussian kinematic formula.*  
(4) **Jonathan Taylor**, Stanford University
- 2:00PM *Gaussian models in fMRI image analysis.*  
(5) **Jonathan Taylor**, Stanford University
- 3:15PM Break.
- 3:45PM Tutorial session.

### *MAA Short Course on Discrete and Computational Geometry, Part I*

- 8:00 AM - 5:00 PM**      **Back Bay Ballroom C, 2nd Floor, Sheraton**
- Organizers: **Satyan L. Devadoss**, Williams College  
**Joseph O'Rourke**, Smith College

**The time limit** for each AMS contributed paper in the sessions is ten minutes. The time limit for each MAA Invited Paper or contributed paper varies. In the AMS 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 33, Issue 1 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 in receipt order in the *Abstracts*. The last one to four digits, e.g., 897-20-1136, refer to the receipt number of the abstract. MAA abstracts are listed toward the back of the issue sorted by session name, and by receipt order within the session name.



## Program of the Sessions – Boston, MA, Monday, January 2 (cont'd.)

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- 8:00AM Registration, Back Bay Ballroom D, Sheraton.
- 9:00AM *Polygons: Building blocks of discrete and computational geometry.* (6)  
**Satyan Devadoss\***, Williams College, and **Joseph O'Rourke\***, Smith College
- 10:15AM Break.
- 10:45AM *Triangulations: Flip graphs and Delaunay triangulations.* (7)  
**Satyan Devadoss**, Williams College
- 2:00PM *Convex hulls: Computing in 2D and 3D.* (8)  
**Joseph O'Rourke**, Smith College
- 2:15PM Break.
- 3:45PM *Voronoi diagrams: Geometry, duality, and hulls revisited.* (9)  
**Joseph O'Rourke**, Smith College

### ***AMS Short Course on Computing with Elliptic Curves Using Sage, Part II***

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- 9:00 AM – 5:00 PM **Back Bay Ballroom B, 2nd Floor, Sheraton**
- Organizer: **William Stein**, University of Washington
- 9:00AM *Computing with elliptic curves over the rational numbers using Sage.* (10)  
**Jared Weinstein**, Boston University
- 10:30AM Break.
- 11:00AM *Computing with the Birch and Swinnerton-Dyer conjecture using Sage.* (11)  
**William Stein**, University of Washington
- 2:00PM *Computing with elliptic surfaces.* (12)  
**Noam Elkies**, Harvard University
- 3:30PM Break.
- 4:00PM Question and Answer Session: How do I do XXX in Sage?

## Tuesday, January 3

### ***AMS Department Chairs Workshop***

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- 8:00 AM – 6:30 PM **Commonwealth, 3rd Floor, Sheraton**
- Presenters: **Timothy Hodges**, University of Cincinnati  
**John Meakin**, University of Nebraska-Lincoln  
**Helen Roberts**, Montclair State University  
**Alex Smith**, University of Wisconsin-Eau Claire

### ***MAA Ancillary Workshop on Statistics: Identifying and Addressing Difficult Concepts for Students in the Introductory Statistics Course***

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- 8:30 AM – 4:30 PM **Gardner, 3rd Floor, Sheraton**
- Presenter: **Marjorie Bond**, Monmouth University

### ***MAA Ancillary Workshop on Statistics: Facilitating Student Projects in Elementary Statistics***

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- 8:30 AM – 4:30 PM **Berkeley, 3rd Floor, Sheraton**
- Presenters: **Brad Bailey**, North Georgia College & State University  
**Sherry L. Hix**, North Georgia College & State University  
**Dianna Spence**, North Georgia College & State University

### ***AMS Short Course on Random Fields and Random Geometry, Part II***

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- 9:00 AM – 5:00 PM **Back Bay Ballroom A, 2nd Floor, Sheraton**
- Organizers: **Robert Adler**, Technion - Israel Institute of Technology  
**Jonathan Taylor**, Stanford University
- 9:00AM *Random fields in Physics.* (13)  
**Mark Dennis**, University of Bristol
- 10:15AM Break.
- 10:45AM *Random matrices and Gaussian analytic functions.* (14)  
**Balint Virag**, University of Toronto
- 2:00PM *Random metrics.* (15)  
**Dmitry Jakobson**, McGill University
- 3:15PM Break.
- 3:45PM Discussion groups.

### ***MAA Short Course on Discrete and Computational Geometry, Part II***

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- 9:00 AM – 5:00 PM **Back Bay Ballroom C, 2nd Floor, Sheraton**
- Organizers: **Satyan L. Devadoss**, Williams College  
**Joseph O'Rourke**, Smith College
- 9:00AM *Polyhedra from Euler to Gauss to Cauchy, I: Rigidity.* (16)  
**Satyan Devadoss**, Williams College
- 10:15AM Break.
- 10:45AM *Polyhedra from Euler to Gauss to Cauchy, II: Unfolding.* (17)  
**Joseph O'Rourke**, Smith College
- 2:00PM *Configuration spaces: Locked polygonal chains and particle collisions.* (18)  
**Satyan Devadoss**, Williams College
- 2:15PM Break.

*Boston, MA, Wednesday, January 4 – Program of the Sessions*

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3:45PM *Pedagogy and research.*  
(19) **Satyan Devadoss\***, Williams College, and  
**Joseph O'Rourke\***, Smith College

**MAA Ancillary Workshop on Statistics:  
Teaching Modeling-Based Calculus**

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9:00 AM – 4:30 PM Hampton, 3rd Floor, Sheraton

Presenters: **Daniel Kaplan**, Macalester College  
**Daniel Flath**, Macalester College  
**Randall Pruim**, Calvin College  
**Eric Marland**, Appalachian University

**WebWork Consulting Training Session**

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9:00 AM – 5:00 PM Simmons, 3rd Floor, Marriott

Organizer: **Michael Gage**, University of Rochester

**MAA Board of Governors**

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9:00 AM – 5:00 PM Salon E, 4th Floor, Marriott

**AMS Council**

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1:30 PM – 10:00 PM Salon F, 4th Floor, Marriott

**Joint Meetings Registration**

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3:00 PM – 8:00 PM 2nd Floor Corridor,  
opposite Hall C, Hynes

*New registrations will be accepted until 7:00 p.m. Those who registered in advance may pick up materials until 8:00 p.m.*

## Wednesday, January 4

**Joint Meetings Registration**

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7:30 AM – 6:00 PM 2nd Floor Corridor,  
opposite Hall C, Hynes

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

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8:00 AM – 10:50 AM Back Bay Ballroom  
A, 2nd Floor, Sheraton

Organizers: **Sloan Despeaux**, Western Carolina University  
**Craig Fraser**, University of Toronto  
**Deborah Kent**, Hillsdale College

8:00AM *Mathematical Schemes in Babylonian Astral Medicine.*  
► (20) **John Steele**, Brown University (1077-01-455)

8:30AM *Proportion Theory in Medieval Astronomical Works.*  
► (21) **Henry T. Zepeda**, Dept. of the History of Science, University of Oklahoma (1077-01-2662)

9:00AM *On Finding Times of True Syzygy in the Fifteenth Century: Melchion de Friquento's Eclipse Tables of 1437.* Preliminary report.  
► (22) **Richard L. Kremer**, Dartmouth College (1077-01-556)

9:30AM *The Evolution of Geometry in ancient China, from the newly discovered Shu and Suan shu shu bamboo texts to the Nine Chapters.* Preliminary report.  
► (23) **Joseph W. Dauben**, Herbert H. Lehman College, The City University of New York (1077-01-501)

10:00AM *Who reads mathematics? A case study from Mesopotamia.*  
► (24) **Duncan J. Melville**, St. Lawrence University (1077-01-1669)

10:30AM *Euclid's Elements in Spanish, during the XVII century.* Preliminary report.  
► (25) **Alejandro R. Garciadiego**, Universidad Nacional Autonoma de Mexico (1077-01-82)

**AMS-ASL Special Session on the Life and Legacy of Alan Turing, I**

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8:00 AM – 10:40 AM Room 207, Hynes

Organizers: **Damir Dzhafarov**, University of Chicago and University of Notre Dame  
**Jeff Hirst**, Appalachian State University  
**Carl Mummert**, Marshall University

8:00AM *Algorithmic Randomness and Pathological Computable Measures.* Preliminary report.  
(26) **Christopher P Porter**, University of Notre Dame (1077-03-2392)

8:30AM *Computing the strength of some combinatorial theorems.* Preliminary report.  
(27) **Stephen Flood**, University of Notre Dame (1077-03-1998)

9:00AM *Low<sub>n</sub> Boolean Subalgebras.* Preliminary report.  
(28) **Rebecca M. Steiner**, Graduate Center, City University of New York (1077-03-476)

9:30AM *Vegetative Turing Pattern Formation: A Historical Perspective.*  
► (29) **Bonni J Kealy\*** and **David J Wollkind**, Washington State University (1077-92-84)

Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)

10:00AM Answering Descartes: Beyond Turing.  
▶ (30) **Stuart A Kauffman**, University of Vermont (1077-68-384)

**AMS Special Session on Advances in Coding Theory, I**

8:00 AM – 10:50 AM **Dartmouth, 3rd Floor, Marriott**

Organizers: **Sarah Spence Adams**, Olin College of Engineering  
**Gretchen L. Matthews**, Clemson University  
**Judy L. Walker**, University of Nebraska-Lincoln

- 8:00AM *Symmetric Group Testing.*  
(31) **Amin Emad\***, **Jun Shen** and **Olgica Milenkovic**, University of Illinois at Urbana-Champaign (1077-94-1403)
- 8:30AM *On Sums of Locally Testable Affine Invariant Properties.*  
(32) **Eli Ben-Sasson**, Technion, Haifa, Israel, **Elena Grigorescu\***, Georgia Institute of Technology, **Ghid Maatouk**, EPFL, Lausanne, Switzerland, **Amir Shpilka**, Technion, Haifa, Israel, and **Madhu Sudan**, Microsoft Research New England, Cambridge, MA (1077-68-1230)
- 9:00AM *Flexible coding schemes with applications to emerging memory technologies.*  
(33) **Lara Dolecek**, EE Department, UCLA (1077-94-1779)
- 9:30AM *High-rate Codes with Sublinear-time Decoding.*  
(34) **Swastik Kopparty**, Rutgers, **Shubhangi Saraf**, Institute for Advanced Study, and **Sergey Yekhanin\***, Microsoft Research (1077-68-1057)
- 10:00AM *Codes from separable linearized polynomials and associated Riemann-Roch spaces.*  
(35) **Justin D. Peachey**, Clemson University (1077-14-1896)
- 10:30AM *Asymmetric Quantum Codes from Two-Point Divisors on Algebraic Curves.*  
(36) Preliminary report.  
**Martianus Frederic Ezerman**, Laboratoire d'Information Quantique, Université Libre de Bruxelles, and **Radoslav M Kirov\***, San Francisco, CA (1077-94-1810)

**AMS Special Session on Arithmetic Geometry, I**

8:00 AM – 10:50 AM **Room 204, Hynes**

Organizers: **Bo-Hae Im**, Chung-Ang University, South Korea  
**Jennifer Johnson-Leung**, University of Idaho  
**Jennifer Paulhus**, Grinnell College

- 8:00AM *Infinite rank of elliptic curves over the maximal abelian extension of  $Q$ .*  
(37) **Bo-Hae Im\***, Chung-Ang University, Seoul, Korea, and **Michael Larsen**, Indiana University (1077-11-1759)
- 8:30AM *Arithmetic Progressions in the  $x$ -coordinates on Mordell Curves.*  
▶ (38) **Alejandra Alvarado\*** and **Edray Herbert Goins**, Purdue University (1077-11-1757)
- 9:00AM *Rational linear spaces on hypersurfaces over quasi-algebraically closed fields.*  
▶ (39) **Todd Cochrane**, **Craig V. Spencer**, Kansas State University, and **Hee-Sung Yang\***, Dartmouth College (1077-11-376)
- 9:30AM *Mordell-Weil groups via Artin-Schreier extensions.*  
(40) **Rachel Pries\***, Colorado State University, and **Douglas Ulmer**, Georgia Institute for Technology (1077-11-1829)
- 10:00AM *A variety with many points over a finite field.*  
(41) **Jared S Weinstein**, Boston University (1077-11-1854)
- 10:30AM *De Rham cohomology of Artin-Schreier curves in characteristic two.*  
(42) **Arsen Elkin\***, University of Warwick, and **Rachel Pries**, Colorado State University (1077-14-435)

**AMS Special Session on Classical Fourier Analysis and Partial Differential Equations, I**

8:00 AM – 10:50 AM **Room 104, Hynes**

Organizers: **William O. Bray**, University of Maine  
**Mark A. Pinsky**, Northwestern University

- 8:00AM *The  $L^p$ -Operator Norm of a Perturbation of the Martingale Transform.*  
(43) **Nicholas Boros**, Michigan State University (1077-42-1083)
- 8:30AM *Variation and oscillation inequalities for convolution products.*  
(44) **Anna Savvopoulou\***, Indiana University South Bend, and **Karin Reinhold**, University at Albany (1077-28-79)
- 9:00AM *An  $L^2$  metric limit theorem for Wiener measure on manifolds with non-positive sectional curvature.*  
(45) **Thomas Albert Laetsch**, UC San Diego (1077-60-2511)
- 9:30AM *Decay of spherical means of Fourier transforms and distance sets of measures.*  
(46) **Bassam H. Shayya**, American University of Beirut (1077-42-115)
- 10:00AM *Funk, Cosine, and Sine Transforms on Stiefel and Grassmann Manifolds. The Fourier Transform Approach.*  
(47) **Boris Rubin**, Louisiana State University (1077-42-726)

10:30AM *Intrinsic square function and almost-orthogonality on homogeneous spaces.*  
(48)  
**Caroline Sweezy**, New Mexico State University, and **James Michael Wilson\***, University of Vermont (1077-42-399)

9:00AM *Periods of rational maps modulo primes.*  
(57)  
**Benjamin Hutz\***, CUNY Graduate Center, **Robert L Benedetto**, Amherst College, **Dragos Ghioca**, University of British Columbia, **Par Kurlberg**, KTH, **Thomas Scanlon**, Univer of California Berkeley, and **Thomas J Tucker**, University of Rochester (1077-11-1703)

***AMS Special Session on Difference Equations and Applications, I***

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8:00 AM – 10:50 AM **Wellesley, 3rd Floor, Marriott**

Organizer: **Michael Radin**, Rochester Institute of Technology

8:00AM *Open Problems and Conjectures in Difference Equations.* Preliminary report.  
▶ (49) **Gerasimos E. Ladas**, University of Rhode Island (1077-39-490)

8:30AM *Further Consequences of the m-M Theorem.* Preliminary report.  
▶ (50) **Gabriel Lugo\*** and **Frank Palladino**, University of Rhode Island (1077-39-1642)

9:00AM *General Allee effect and semistability in planar difference equations.*  
▶ (51) **Saber N Elaydi\***, Trinity University, and **George Livadiotis**, Southwest Research Institute (1077-39-1259)

9:30AM *Convergence of periodically forced rank-type equations.*  
(52) **Tyrus Berry\*** and **Tim Sauer**, George Mason University (1077-39-669)

10:00AM *On Periodic Trichotomies.*  
(53) **Frank J. Palladino**, University of Rhode Island (1077-39-470)

10:30AM *On Rational Difference Equations with Nonnegative Periodic Coefficients.* Preliminary report.  
▶ (54) **Yevgeniy Kostrov**, Xavier University, and **Zachary Kudlak\***, Mount Saint Mary College (1077-39-1260)

***AMS Special Session on Dynamical Systems in Algebraic and Arithmetic Geometry, I***

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8:00 AM – 10:50 AM **Room 200, Hynes**

Organizers: **Patrick Ingram**, University of Waterloo, Canada  
**Michelle Manes**, University of Hawaii, Honolulu  
**Clayton Petsche**, Hunter College (CUNY)

8:00AM *Fixed-point-free elements of iterated monodromy groups.* Preliminary report.  
(55) **Rafe Jones**, College of the Holy Cross (1077-37-2716)

8:30AM *On the prime divisors in zero orbits of families of commuting polynomials.* Preliminary report.  
(56) **Jason Bell** and **Kevin Doerkson\***, Simon Fraser University (1077-11-2109)

9:30AM *A dynamical system for elliptic divisibility sequences.*  
(58) **Joseph H. Silverman**, Brown University, and **Katherine E. Stange\***, Stanford University (1077-11-1267)

10:00AM *Projective varieties covered by trivial families.*  
(59) **Anupam Bhatnagar**, New York University (1077-14-2726)

10:30AM *Algebra, Geometry, and Dynamics of Pseudo-Real Maps.* Preliminary report.  
(60) **Joseph H. Silverman\***, Brown University, and **Michael Zieve**, University of Michigan (1077-37-172)

***AMS Special Session on Generalized Cohomology Theories in Engineering Practice, I***

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8:00 AM – 10:40 AM **Provincetown, 4th Floor, Marriott**

Organizer: **P. Robert Kotiuga**, Boston University

8:00AM *Cohomology in electromagnetic modelling.* Preliminary report.  
▶ (61) **Pawel Dlotko\***, Institute of Computer Science, Jagiellonian University in Krakow, and **Ruben Specogna**, Unit of Electrical Engineering, Department DIEGM, University of Udine (1077-55-2353)

8:30AM *Cohomology Ring: Algorithmic approach.*  
(62) **Tomasz Kaczynski\***, Université de Sherbrooke, and **Marian Mrozek**, Jagiellonian University Krakow (1077-55-1404)

9:00AM *Hodge Theory and the Netflix Problem.*  
(63) **Lek-Heng Lim**, University of Chicago (1077-91-2946)

10:00AM *Cohomology reveals when helicity is a diffeomorphism invariant.*  
(64) **Jason Cantarella**, University of Georgia, and **Jason Parsley\***, Wake Forest University (1077-53-2888)

***AMS Special Session on Groups, Algorithms, Complexity, and Theory of Security, I***

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8:00 AM – 10:50 AM **Room 101, Hynes**

Organizers: **Maggie Habeeb**, City University of New York  
**Delaram Kahrobaei**, City University of New York

**Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)**

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8:00AM *Automorphisms and isomorphism of finite  $p$ -groups.* Preliminary report.  
(65) **James B Wilson**, Colorado State University (1077-20-919)

8:30AM *Polynomial-time isomorphism test for groups with abelian Sylow towers.* Preliminary report.  
(66) **László Babai**, the University of Chicago, and **Youming Qiao\***, Institute for Theoretical Computer Science, Tsinghua University (1077-68-1157)

9:00AM *On restricting free factors in relatively free groups.*  
(67) **Lucas Sabalka\*** and **Dmytro Savchuk**, Binghamton University (1077-20-1122)

9:30AM *Algorithms in GAP for permutability and Sylow permutability in finite groups.* Preliminary report.  
(68) **Adolfo Ballester-Bolinches**, Universitat de València, and **Ramon Esteban-Romero\***, Universitat Politècnica de València (1077-20-1079)

10:00AM *Statistics about curves on surfaces.*  
▶ (69) **Moira Chas\***, Stony Brook University, **Steven Lalley**, University of Chicago, **Keren Li** and **Bangrui Chen**, Stony Brook University (1077-57-357)

10:30AM *Infinite primitive permutation groups whose set of subdegrees has a finite upper bound.*  
(70) **Simon M. Smith**, Syracuse University (1077-20-716)

**AMS Special Session on Hyperbolicity in Manifolds and Groups, I**

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8:00 AM – 10:50 AM **Berkeley, 3rd Floor, Marriott**

Organizers: **David Futer**, Temple University  
**Genevieve Walsh**, Tufts University

8:00AM *Exponential decay in the mapping class group.*  
(71) **Joseph Maher**, College of Staten Island, CUNY (1077-57-311)

8:30AM *On genericity of pseudo-Anosovs in the Torelli group.*  
(72) **Justin Malestein\***, Temple University, and **Juan Souto**, University of British Columbia (1077-51-1212)

9:00AM *Mapping class groups and covers of surfaces.*  
(73) **Thomas Koberda**, Harvard University (1077-20-1323)

9:30AM *Triangulations of hyperbolic 3-manifolds admitting strict angle structures.*  
(74) **Craig D. Hodgson**, **J. Hyam Rubinstein** and **Henry Segerman\***, University of Melbourne (1077-57-588)

10:00AM *Handlebody filling and the Heegaard tree.* Preliminary report.  
(75) **Jesse Johnson**, Oklahoma State University (1077-57-571)

10:30AM *Rank and genus of 3-manifolds.*  
(76) **Tao Li**, Boston College (1077-57-589)

**AMS Special Session on Local Field Properties, Microstructure, and Multiscale Modeling of Heterogeneous Media, I**

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8:00 AM – 10:50 AM **Suffolk, 3rd Floor, Marriott**

Organizers: **Silvia Jiménez**, Worcester Polytechnic Institute  
**Bogdan Vernescu**, Worcester Polytechnic Institute

8:00AM *Multiscale Modeling and Simulation of Fluid Flows in Deformable Porous Media.*  
(77) **Yuliya Gorb**, University of Houston (1077-35-1840)

8:30AM *Multiscale methods for high-contrast problems using local spectral basis functions.*  
▶ (78) **Juan Galvis\***, IAMCS/ISC Texas A&M University, and **Efendiev**, Texas A&M University (1077-65-2268)

9:00AM *A Numerical Boundary Eigenvalue Problem For Elastic Cracks in Free and Half Space.*  
(79) **Darko Volkov**, WPI (1077-45-1023)

9:30AM *Stochastic homogenization for permeable membranes.*  
(80) **Florian Maris**, Worcester Polytechnic Institute (1077-49-2552)

10:00AM *Acoustic Propagation in a Random Saturated Medium: The Biphasic Case.*  
(81) **Robert P. Gilbert\***, Univ. of Delaware, **Alexander Panchenko**, Washington State University, and **Ana Vasilic**, United Arab Emirates University (1077-35-579)

10:30AM *Random fluctuations of solutions to partial differential equations.*  
(82) **Guillaume Bal**, Columbia University (1077-35-534)

**AMS Special Session on Mathematics in Industry, I**

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8:00 AM – 10:50 AM **Room 109, Hynes**

Organizers: **Kirk E. Jordan**, IBM T. J. Watson Research  
**Donald Schwendeman**, Rensselaer Polytechnic Institute  
**Burt S. Tilley**, Worcester Polytechnic Institute  
**Suzanne L. Weekes**, Worcester Polytechnic Institute

8:00AM *The Importance of the Math Formulation for Modeling and Simulation of Industrial Strength Problems on Peta and Exascale Systems.*  
▶ (83) **Kirk E Jordan**, IBM Research (1077-65-1153)

*Boston, MA, Wednesday, January 4 – Program of the Sessions*

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- 8:30AM *Constructions and Existence Results for Complementary Code Sets*. Preliminary report. ▶ (84)  
**Gregory E Coxson**, Technology Service Corporation, Washington Office (1077-94-1183)
- 9:00AM *Designing Scalable Algorithms for Complex Networks*. (85)  
**Tuhin Sahai**, United Technologies Research Center (1077-37-1005)
- 9:30AM *Real World Tracking*. (86)  
**Rebecca D. Wasyk**, Metron, Inc (1077-00-843)
- 10:00AM *Drying of spreading droplets of colloidal suspensions*. (87)  
**Kara L Maki\***, Rochester Institute of Technology, and **Satish Kumar**, University of Minnesota (1077-76-546)
- 10:30AM *Some Applied Math Problems of Interest at Schlumberger*. ▶ (88)  
**Lalitha Venkataramanan**, Schlumberger (1077-00-524)

**AMS Special Session on Mathematics in Natural Resource Modeling, I**

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8:00 AM – 10:50 AM Simmons, 3rd Floor, Marriott

- Organizer: **Catherine Roberts**, College of the Holy Cross
- 8:00AM *Non-Spatial and Spatial Models in Bioeconomics*. (89)  
**Jon M. Conrad\***, Cornell University, and **Martin D. Smith**, Duke University (1077-49-319)
- 9:00AM *Modeling the Economics of Water: Progress and Challenges*. ▶ (90)  
**James F. Booker\***, Economics Department and Environmental Studies Department, Siena College, **Richard E. Howitt**, Department of Agricultural and Resource Economics, University of California, Davis, **Ari M. Michelsen**, Department of Agricultural Economics, Texas AgriLife Research and Extension Center, and **Robert A. Young**, Department of Agricultural and Resource Economics, Colorado State University (1077-91-2238)
- 9:30AM *Accounting for Habitat Damage Increases the Economic Optimality of Marine Reserves*. Preliminary report. ▶ (91)  
**Holly V. Moeller\***, Department of Biology, Stanford University, and **Michael G. Neubert**, Department of Biology, Woods Hole Oceanographic Institution (1077-92-2201)
- 10:00AM *Features of biologically realistic fishery models frequently used in fish stock assessment*. ▶ (92)  
**Terrance J. Quinn II**, Juneau Center, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks (1077-92-2194)

- 10:30AM *Species Diversity, Fishing Induced Change In Carrying Capacity And Sustainable Fisheries Management*. ▶ (93)  
**Worku T. Bitew\*** and **Wisdom Akpalu**, Farmingdale State College (1077-92-1320)

**AMS Special Session on Set-Valued Optimization and Variational Problems, I**

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8:00 AM – 10:50 AM Fairfield, 3rd Floor, Marriott

- Organizers: **Andreas H. Hamel**, Yeshiva University  
**Akhtar A. Khan**, Rochester Institute of Technology  
**Miguel Sama**, E.T.S.I. Industriales
- 8:00AM *Global Metric Regularity*. (94)  
**A. L. Dontchev**, *Mathematical Reviews* (1077-49-1302)
- 8:30AM *A new derivative concept for set-valued functions*. (95)  
**Andreas H. Hamel**, Yeshiva University New York (1077-49-1878)
- 9:00AM *The Smallest Intersecting Ball Problem and the Smallest Enclosing Ball Problem: Theoretical Analysis*. (96)  
**Mau Nam Nguyen\*** and **Cristina Villalobos**, University of Texas-Pan American (1077-90-1715)
- 9:30AM *Coderivative Analysis of Quasi-Variational Inequalities in Asplund Spaces*. (97)  
**Nhi Nguyen\***, Carleton University, and **Boris Mordukhovich**, Wayne State University (1077-49-2776)
- 10:00AM *KKT conditions for a nonconvex vector optimization problem*. (98)  
**Miguel Sama\***, **Bienvenido Jimenez** and **Vicente Novo**, Universidad Nacional de Educación a Distancia (UNED) (1077-90-1507)
- 10:30AM *Some remarks on stochastic variational inequalities with applications to equilibrium problems*. (99)  
**Baasansuren Jadamba\***, **Akhtar A. Khan**, Rochester Institute of Technology, and **Fabio Raciti**, University of Catania, Italy (1077-49-2168)

**AMS Special Session on Several Complex Variables and Multivariable Operator Theory, I**

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8:00 AM – 10:50 AM Room 108, Hynes

- Organizers: **Ronald Douglas**, Texas A&M University  
**John McCarthy**, Washington University
- 8:00AM *Regularity of Weighted Bergman Projections*. ▶ (100)  
**Yunus E Zeytuncu**, Texas A&M University (1077-32-656)

**Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)**

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8:30AM  $H^1$  and dyadic  $H^1$  in multiparameter settings. (101)

**Sergei Treil**, Brown University (1077-42-2052)

9:00AM Compactness of Hankel operators on convex domains. Preliminary report. (102)

**Zeljko Cuckovic\*** and **Sonmez Sahutoglu**, University of Toledo, Ohio (1077-47-467)

9:30AM The spectrum and essential spectrum of Toeplitz operators. (103)

**Carl Sundberg**, University of Tennessee, and **Dechao Zheng\***, Vanderbilt University (1077-47-642)

10:00AM Fundamental Agler Decompositions. (104)

**Kelly Bickel**, Washington University in St. Louis (1077-46-677)

10:30AM Carleson Measures for Besov-Sobolev Spaces and Non-Homogeneous Harmonic Analysis. (105)

**Brett D. Wick**, Georgia Institute of Technology (1077-32-798)

**Thomas W. Tucker**, Colgate University

8:00AM Applications of Discrete Morse Theory to Certain Complexes of Bounded Degree Graphs. Preliminary report. (111)

**Luke P. Diaz**, New Mexico State University (1077-55-1143)

8:30AM Topological Symmetry Groups of Complete Graphs. (112)

**Erica Flapan**, Pomona College, **Blake Mellor\***, Loyola Marymount University, and **Ramin Naimi**, Occidental College (1077-57-93)

9:00AM Rotation systems for 2-complexes in orientable 3-manifolds. Preliminary report. (113)

**Thomas Tucker\***, Colgate University, **Ergun Akleman**, **Jianer Chen**, Texas A&M University, and **Jonathan Gross**, Columbia University (1077-05-1062)

9:30AM Chmutov's generalized duality and the gem representation of embedded graphs. Preliminary report. (114)

**Mark Ellingham**, Vanderbilt University (1077-05-1582)

10:00AM A recent progress in map enumeration. (115)

**Roman Nedela**, Matej Bel University, Banska Bystrica, Slovak rep. (1077-05-848)

10:30AM Abelian coverings of the platonic maps. Preliminary report. (116)

**Gareth A. Jones**, University of Southampton (1077-20-685)

**AMS Special Session on Stochastic Analysis (in honor of Hui-Hsiung Kuo), I**

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8:00 AM – 10:50 AM Room 107, Hynes

Organizers: **Julius Esunge**, University of Mary Washington

**Aurel Stan**, Ohio State University

8:00AM Yang-Mills heat equation with  $H_{1/2}$  initial data in three dimensions. Preliminary report. (106)

**Leonard Gross**, Cornell University (1077-35-2216)

9:00AM Some aspects of modelling dependence in copula based Markov Chains. (107)

**Martial Longla\*** and **Magda Peligrad**, University of Cincinnati (1077-60-443)

9:30AM New Itô formula with application to linear SDEs with anticipating initial conditions. (108)

**Hui-Hsiung Kuo**, Louisiana State University, **Anuwat Sae-Tang**, King Mongkut's University of Technology Thonburi, and **Benedykt Szozda\***, Louisiana State University, Baton Rouge (1077-60-1336)

10:00AM The Gambler's Ruin Problem for a Class of Non-stationary Markov Chains. (109)

**Mark Burgin**, UCLA, **Alan Krinik\*** and **David Luu**, California State Polytechnic University, Pomona (1077-60-1307)

10:30AM Modeling Healthcare Data Using Markov Decision Process. Preliminary report. (110)

**Kumer Pial Das**, Lamar University (1077-60-1561)

**AMS Special Session on Topological Graph Theory: Structure and Symmetry, I**

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8:00 AM – 10:50 AM Room 102, Hynes

Organizers: **Jonathan L. Gross**, Columbia University

**AMS Special Session on Trends in Representation Theory, I**

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8:00 AM – 10:50 AM Room 103, Hynes

Organizers: **Donald King**, Northeastern University

**Alfred Noel**, University of Massachusetts, Boston

8:00AM Kazhdan-Lusztig polynomials for disconnected groups. Preliminary report. (117)

**David A. Vogan**, MIT (1077-22-87)

8:30AM Generalized Harish-Chandra Modules for Mixed Subgroups. (118)

**Annegret Paul**, Western Michigan University, **Siddhartha Sahi**, Rutgers University, and **Wai Ling Yee\***, University of Windsor (1077-22-1916)

9:00AM Unipotent representations for  $Sp(p,q)$  and  $O^*(n)$ . Preliminary report. (119)

**Dan M Barbasch\***, Cornell University, and **Peter A Trapa**, University of Utah (1077-22-1044)

9:30AM Unitary Representations of Double Covers of Linear Groups. Preliminary report. (120)

**Annegret Paul**, Western Michigan University (1077-22-1572)



*Boston, MA, Wednesday, January 4 – Program of the Sessions*

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- 10:00AM (121) *On the classification of some unitary representations.*  
**S. A. Salamanca-riba\***, New Mexico State University, **A. Pantano**, University of California, Irvine, and **A. Paul**, Western Michigan University (1077-22-2107)
- 10:30AM (122) *Lefschetz Functors for the Metaplectic Group.*  
**Benjamin Trahan**, University of Utah (1077-22-1415)

- 8:30AM (130) *Hypothesis testing on tensors.* Preliminary report.  
**Dustin Cartwright**, Yale University (1077-AA-2393)
- 9:00AM (131) *Graphical models and monoidal categories.* Preliminary report.  
**Jason Morton**, Penn State (1077-AA-2366)
- 9:30AM (132) *Binary Cumulant Varieties.*  
**Bernd Sturmfels\***, UC Berkeley, and **Poitr Zwiernik**, IPAM UCLA (1077-AA-34)
- 10:00AM (133) *Betti numbers of ideals from graphs.*  
**Alexander Engström**, Aalto University (1077-AA-2461)
- 10:30AM (134) *Species trees from gene trees.*  
**Elizabeth S. Allman\***, University of Alaska Fairbanks, **James H. Degnan**, University of Canterbury, New Zealand, and **John A. Rhodes**, University of Alaska Fairbanks (1077-AA-291)

**AMS Special Session on the Mathematics of Decisions, Elections, and Games, I**

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8:00 AM – 10:50 AM Exeter, 3rd Floor, Marriott

Organizers: **Karl-Dieter Crisman**, Gordon College  
**Michael Jones**, *Mathematical Reviews*  
**Michael Orrison**, Harvey Mudd College

- 8:00AM (123) *The Separability Problem in Referendum Elections: Some Recent Developments.*  
**Jonathan K. Hodge**, Grand Valley State University (1077-91-651)
- 8:30AM (124) *A Failure of Representative Democracy.*  
**Katherine A Baldiga**, Harvard University (1077-91-75)
- 9:00AM (125) *Variable-population voting rules.*  
**Marcus J. Pivato**, Trent University (1077-91-133)
- 9:30AM (126) *Coalitions and Cliques in the School Choice Problem.*  
**Sinan Aksoy**, University of Chicago, **Adam Azzam**, University of Nebraska Lincoln, **Chaya Coppersmith**, Bryn Mawr College, **Julie Glass**, California State University East Bay, **Gizem Karaali\***, Pomona College, **Xueying Zhao** and **Xinjing Zhu**, Mount Holyoke College (1077-91-126)
- 10:00AM (127) *Symmetry in Voting Theory: The Borda-Kemeny Spectrum and Beyond.* Preliminary report.  
**Karl-Dieter Crisman**, Gordon College (1077-91-1410)
- 10:30AM (128) *The geometry of influence: weighted voting and hyper-ellipsoids.*  
**Nicolas Houy**, Ecole Polytechnique, France, and **William S. Zwicker\***, Union College (1077-91-580)

**MAA Invited Paper Session on Algebraic Statistics**

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8:00 AM – 10:50 AM Room 302, Hynes

Organizer: **Seth Sullivant**, North Carolina State University

- 8:00AM (129) *What is an algebraic statistical model?*  
**Luis David Garcia-Puente**, Sam Houston State University (1077-AA-1821)

**AMS Session on Combinatorics and Graph Theory, I**

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8:00 AM – 10:10 AM Room 111, Hynes

- 8:00AM (135) *On Steinhilber Set of Four Points in  $\mathbb{R}^2$ .* Preliminary report.  
**Mingzhi Xuan**, University of North Texas (1077-05-790)
- 8:15AM (136) *An alternate proof that any graph that is  $mn$ -colorable is decomposable into two graphs that are  $m$ -colorable and  $n$ -colorable, respectively.* Preliminary report.  
**Liam Rafferty**, University of Montana (1077-05-2903)
- 8:30AM (137) *Jack Symmetric Functions and the Non-Orientability of Rooted Maps.*  
**Michael Andrew La Croix**, Boston, MA (1077-05-2890)
- 8:45AM (138) *New Cameron-Liebler line classes relating to point sets of type  $(m, n)$  in odd order affine planes.* Preliminary report.  
**Morgan J Rodgers**, University of Colorado Denver (1077-05-2862)
- 9:00AM (139) *Using Ehrhart theory for solving combinatorial problems.* Preliminary report.  
**Felix Breuer**, San Francisco State University (1077-05-2874)
- 9:15AM (140) *A new clustering algorithm.*  
**Yezhou Wu\*** and **Cun-Qun Zhang**, West Virginia University (1077-05-2784)
- 9:30AM (141) *Quasi-residual and quasi-derived Hadamard designs.* Preliminary report.  
**Tariq A Alraqad\***, Northern State University, and **Mohan Shrikhande**, Central Michigan University (1077-05-1235)
- 9:45AM (142) *Packing trees into complete bipartite graphs.*  
**Susan L Hollingsworth**, Edgewood College (1077-05-2842)

Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)

- 10:00AM *An additive version of Ramsey's theorem.*  
▶ (143) **Andy Parrish**, University of California, San Diego (1077-05-2802)

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

8:00 AM – 9:55 AM Room 208, Hynes

- 8:00AM *Picard group of dual operator algebras.*  
(144) Preliminary report.  
**Upasana Kashyap**, The Citadel (1077-46-1917)
- 8:15AM *Shrinking and Boundedly complete frames for Banach spaces.*  
(145) **Kevin Beanland**, Virginia Commonwealth University, **Daniel Freeman\***, University of Texas, Austin, and **Rui Liu**, Nankai University (1077-46-2645)
- 8:30AM *Boundaries for operator systems.*  
(146) **Craig Kleski**, University of Virginia (1077-46-2539)
- 8:45AM *On locally JB\*-algebras.*  
(147) **Alexander A. Katz**, St. John's University, NY, USA (1077-46-2212)
- 9:00AM *Research Experiences in Quantum Information Systems.* Preliminary report.  
▶ (148) **Manmohan Kaur**, Benedictine University (1077-97-2251)
- 9:15AM *Prime  $E_0$ -semigroups.*  
(149) **Christopher Jankowski\***, University of Pennsylvania, **Daniel Markiewicz**, Ben-Gurion University of the Negev, and **Robert Powers**, University of Pennsylvania (1077-46-2193)
- 9:30AM *A Browder topological degree theory for multi-valued pseudomonotone perturbation of maximal monotone operators.* Preliminary report.  
(150) **Teffer M. Asfaw\*** and **Athanassios G. Kartsatos**, University of South Florida (1077-46-494)
- 9:45AM *On a version of dual space characterization of real Locally  $C^*$ -algebras.*  
(151) **Alexander A. Katz**, St. John's University, NY, and **Oleg Friedman\***, Touro College/Lander College for Men, NY & UNISA, Pretoria, RSA (1077-46-1717)

**AMS Session on History and Philosophy of Mathematics**

8:00 AM – 9:25 AM Room 308, Hynes

- 8:00AM *Translating the Elements into Sanskrit: Jagannātha's Rekhaganita.*  
(152) **Clemency Montelle**, University of Canterbury (1077-01-2865)
- 8:15AM *Cryptanalysis vs Calvary.* Preliminary report.  
▶ (153) **Maryam Vulis**, Norwalk Community College, Fordham University (1077-01-2474)

- 8:30AM *Khodjandi: A Tenth-Century Persian Mathematician.*  
▶ (154) **Mohammad Moazzam**, Salisbury University (1077-01-1938)

- 8:45AM *Contributions of Rudjer Bosovich to civil engineering and architecture.* Preliminary report.  
▶ (155) **Radoslav Dimitric**, CUNY (1077-01-90)

- 9:00AM *To Be Woman or Not To Be: The Struggles of Women Mathematicians and How They Have Impacted Mathematics.* Preliminary report.  
▶ (156) **Rebecca Miller**, University of Central Oklahoma (1077-01-1390)

- 9:15AM *Mathematics at the Science Museum, London, England.* Preliminary report.  
▶ (157) **Agnes M. Kalemari**s, Farmingdale State College (1077-01-2253)

**AMS Session on Mathematical Biology and Related Fields, I**

8:00 AM – 10:10 AM Room 105, Hynes

- 8:00AM *On non-exponential models of prebiological evolution.*  
(158) **Georgiy P Karev**, National Center for Biotechnological Information, NIH (1077-92-2494)
- 8:15AM *A Data-Driven Approach to Modeling the Effect of Disease on the Immune System.* Preliminary report.  
(159) **Anne Elizabeth Yust\***, Birmingham-Southern College, and **Shlomo Ta'asan**, Carnegie Mellon University (1077-92-268)
- 8:30AM *Health safety nets can break cycles of poverty and disease: a stochastic ecological model.*  
▶ (160) **Calistus Ngeh Ngonghala**, National Institute for Mathematical and Biological Synthesis (NIMBioS) (1077-92-2714)
- 8:45AM *Measuring Information Storage and Transfer in Swarms.*  
(161) **X Rosalind Wang**, CSIRO Information and Communications Technology Centre, **Jennifer M Miller\***, University of Delaware, **Joseph T Lizier**, Max Planck Institute for Mathematics in the Sciences, **Mikhail Prokopenko**, CSIRO Information and Communications Technology Centre, and **Louis F Rossi**, University of Delaware (1077-92-2588)
- 9:00AM *Discrete and Continuous Approaches to Modeling of Cell Movement in the Presence of a Foreign Stimulus.*  
(162) **Alicia Prieto-Langarica\***, **Hristo Kojouharov** and **Benito Chen-Charpentier**, University of Texas at Arlington (1077-92-2522)

*Boston, MA, Wednesday, January 4 – Program of the Sessions*

- 9:15AM (163) *A numerical approximation and parameter estimation for modeling bee pollination: an application of the Shigesada-Kawasaki-Teramoto model.* Preliminary report.  
**Kamuela E Yong\***, The University of Iowa, **Yi Li**, Wright State University, and **Stephen D Hendrix**, The University of Iowa (1077-92-2521)
- 9:30AM (164) *Invariant Based Quartet Puzzling for Phylogentic Reconstructon.* Preliminary report.  
**Joseph Rusinko**, Winthrop University (1077-92-1009)
- 9:45AM (165) *A continuum model for the simultaneous growth and deformation of biofilms.*  
**Jared A. Hicks\*** and **David L. Chopp**, Northwestern University (1077-92-2794)
- 10:00AM (166) *MicroRNA Target Modeling via Clustering of mRNA Microarray Data.* Preliminary report.  
**Frederick A Adkins**, Indiana University of Pennsylvania (1077-92-2778)

**AMS Session on Mechanics and Mathematical Physics, I**

8:00 AM – 10:10 AM **Room 303, Hynes**

- 8:00AM (167) *Continuum equations from a model of step-flow.*  
**Nicholas O. Kirby**, University of Kentucky (1077-74-2807)
- 8:15AM (168) *The effect of a surface tension on the stress field near a curvilinear crack.*  
**Anna Zemlyanova**, Texas A&M University (1077-74-516)
- 8:30AM (169) *Exact Results for Effective Tensors of Fiber-Reinforced Elastic Composites.*  
**Meredith Hegg**, Temple University (1077-74-250)
- 8:45AM (170) *Identifying jet noise source based on high-fidelity numerical simulations of round and chevron jet flows.*  
**Hyunsun Lee\***, **Ali Uzun** and **M. Yousuff Hussaini**, Florida State University (1077-76-2481)
- 9:00AM (171) *Characteristics of Non-symmetric Edge Flames in Narrow Channels.*  
**Joanna A Bieri**, University of Redlands (1077-76-2164)
- 9:15AM (172) *Hydrodynamic effects of spines: A different spin.*  
**Hoa V Nguyen**, Center for Computational Science, Tulane University (1077-76-1470)
- 9:30AM (173) *Singularities in the complex plane for deep water waves.*  
**Gregory R Baker\***, The Ohio State University, and **Chao Xie**, Austin, Texas (1077-76-1898)

- 9:45AM (174) *Analytic solution of the effect of slip condition on magnetohydrodynamic Stokes flow due to an oscillating wall.*  
**Sherif M Azeez**, **Dawn A Lott\*** and **Pablo Suarez**, Delaware State University (1077-76-1370)
- 10:00AM (175) *Mixed convection in viscoelastic flow due to a stretching sheet.* Preliminary report.  
**Antonio Mastroberardino**, Penn State Erie, The Behrend College (1077-76-2077)

**AMS Session on Ordinary Differential Equations and Special Functions**

8:00 AM – 10:10 AM **Arlington, 3rd Floor, Marriott**

- 8:00AM (176) *Bifurcation of Solutions to a Second Order Nonlinear Singular Differential Equation from Boundary Layer Theory.*  
**Chunqing Lu**, Southern Illinois University Edwardsville (1077-34-783)
- 8:15AM (177) *Competition between two phytoplankton species under predation and allelopathic effects.*  
**Jean-Jacques Kengwoung-Keumo**, New Mexico State University, Las Cruces (1077-34-2754)
- 8:30AM (178) *On the Solvability of Nonlinear Sturm-Liouville Problems.*  
**Zachary J. Abernathy\***, Winthrop University, and **Jesus Rodriguez**, North Carolina State University (1077-34-1940)
- 8:45AM (179) *Existence of Positive Solutions of a Second Order Right Focal Boundary Value Problem.*  
**Douglas R. Anderson**, Concordia College, **Richard I. Avery**, Dakota State University, **Johnny Henderson** and **Xueyan Liu\***, Baylor University (1077-34-1857)
- 9:00AM (180) *Stability of solutions for fractional differential equations.*  
**Namjip Koo\*** and **Sung Kyu Choi**, Chungnam National University, Daejeon, South Korea (1077-34-1794)
- 9:15AM (181) *Role of CD4<sup>+</sup> T-cell proliferation in HIV infection under antiretroviral therapy.* Preliminary report.  
**Hongying Shu\*** and **Lin Wang**, University of New Brunswick (1077-34-1278)
- 9:30AM (182) *Topological Aspects of Stability of Trajectories.* Preliminary report.  
**Zhivko S. Athanassov**, Bulgarian Academy of Sciences (1077-34-160)
- 9:45AM (183) *On the Approximation of the Lower Generalized Incomplete Gamma Function, Arising in Heat Conduction Problems.*  
**Mohamed T Boudjelkha**, Rensselaer Polytechnic Institute (1077-33-81)
- 10:00AM (184) *On the asymptotic behavior of the solutions to the replicator equation.*  
**Faina Berezovskaya**, Howard University (1077-34-2231)

Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)

**AMS Session on Probability Theory, Stochastic Processes, and Statistics, I**

8:00 AM – 10:25 AM Room 209, Hynes

- 8:00AM (185) *Probability measures on the space of persistence diagrams.*  
**Yuriy Mileyko\***, Sayan Mukherjee and **John Harer**, Duke University (1077-60-2532)
- 8:15AM (186) *Numerical methods for stochastic differential equations.*  
**Robert D Wooster**, West Point (1077-60-2480)
- ▶ 8:30AM (187) *On the Volatility of Binomial Option Pricing Model.* Preliminary report.  
**Constantine Georgakis**, DePaul University (1077-60-2327)
- 8:45AM (188) *How fed policy makes financial markets chaotic or not.*  
**James M. Haley**, Point Park University (1077-60-2953)
- 9:00AM (189) *The rate of decay of the Wiener sausage in a local Dirichlet space.* Preliminary report.  
**Lee R Gibson**, Indiana University - Southeast, and **Melanie A Pivarski\***, Roosevelt University (1077-60-2751)
- ▶ 9:15AM (190) *Encoding and Counting Strings.*  
**Jennifer D Herdan\*** and **Melinda Lanius**, East Tennessee State University (1077-60-2749)
- 9:30AM (191) *Bistable systems with Stochastic Noise: Virtues and Limits of effective Langevin equations for the Thermohaline Circulation strength.*  
**Valerio Lucarini**, Klimcampus, University of Hamburg (1077-60-2523)
- 9:45AM (192) *Numerical solutions of quantile hedging for guaranteed minimum death benefits under a regime-switching jump-diffusion formulation.*  
**Yumin Wang\***, University of Missouri, St Louis, **Zuo Jin** and **George Yin**, Wayne State University (1077-60-2533)
- 10:00AM (193) *On the directions for which directional critical exponents are equal in inhomogeneous percolation models.* Preliminary report.  
**Matthew R. A. Sedlock\*** and **John C Wierman**, Johns Hopkins University (1077-60-2613)
- 10:15AM (194) *Random Additive Bases and Mixed Sidon Sets.*  
**Vince Lyzinski\***, Johns Hopkins University, **Anant Godbole**, East Tennessee State University, **Chang Mou Lim**, University of Chicago, and **Nicholas George Triantafillou**, University of Michigan-Ann Arbor (1077-60-2208)

**AMS Session on Undergraduate Research, I**

8:00 AM – 10:10 AM Room 110, Hynes

- 8:00AM (195) *Algebraic Tchoukaillon Representations.* Preliminary report.  
**Fanya Wyrick-Flax\***, Bard College, and **Benjamin Warren**, Ramapo College of New Jersey (1077-00-1424)
- ▶ 8:15AM (196) *Adinkra Phase Graphs.*  
**Jasper O Weinrich-Burd**, Bard College (1077-00-2221)
- 8:30AM (197) *Mathematics of Sowing Games.* Preliminary report.  
**Spencer O Sims\***, Oakwood University, **Amanda Fernandez**, **Qian Zhang**, **Tyesha Hall** and **Mikias Kidane**, James Madison University (1077-00-2282)
- ▶ 8:45AM (198) *Periodicity and asymptotics of Tchoukaillon sequences.*  
**David Creech\***, Central Michigan University, and **Jeff Anway**, Longwood University (1077-00-2894)
- 9:00AM (199) *The Magic Behind Franklin Magic Circles.*  
▶ (199) **Maximino Aviles Montes\***, **Katie Watkins** and **Tatiana Kovyreshina**, Sam Houston State University (1077-01-2224)
- 9:15AM (200) *AN EPQ Model for Deterioration Items and Exponential Demand Rate Taking into Account the Time Value of Money.* Preliminary report.  
**Vikram Jeet Singh**, Dehradun (1077-03-2928)
- 9:30AM (201) *Families of Half-Transitive Graphs.*  
▶ (201) **Nate R Harman**, University of Massachusetts Amherst (1077-05-1966)
- 9:45AM (202) *Lower bounds on cliques of  $(2, m)$ -agreeable graphs.* Preliminary report.  
**Benjamin J. Maguire\*** and **Thierry Zell**, Lenoir-Rhyne University (1077-05-855)
- 10:00AM (203) *A Turán-type Problem for Circular Arc Graphs.*  
▶ (203) **Rosalie J. Carlson\***, Harvey Mudd College, **Stephen Flood**, University of Notre Dame, **Kevin W. O'Neill** and **Francis Edward Su**, Harvey Mudd College (1077-05-136)

**MAA Session on Arts and Mathematics, Together Again, I**

8:00 AM – 10:55 AM Room 311, Hynes

- Organizer: **Douglas E. Norton**, Villanova University
- 8:00AM (204) *Limits of Picture Sequences.*  
▶ (204) **Craig M. Johnson**, Marywood University (1077-B1-1047)
- 8:20AM (205) *Using Escher's Work to Demonstrate Symmetries of the Plane.*  
▶ (205) **Jeffrey W Clark**, Elon University (1077-B1-92)

*Boston, MA, Wednesday, January 4 – Program of the Sessions*

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- 8:40AM ▶ (206) *A family of butterfly patterns.*  
Preliminary report.  
**Douglas Dunham**, University of Minnesota Duluth (1077-B1-2738)
- 9:00AM ▶ (207) *Art First: How Artists Discovered the Projective Plane Before Mathematicians Knew It Was There.* Preliminary report.  
**Meg Dillon**, Southern Polytechnic State University (1077-B1-1238)
- 9:20AM ▶ (208) *Polyhedral Modularity in a Special Class of Decagram Based Interlocking Star Polygons.* Preliminary report.  
**Reza Sarhangi**, Towson University, Maryland (1077-B1-451)
- 9:40AM ▶ (209) *Recreating a 14th Century 14-Pointed Star Polygon Design Found on the Mimbar of the Mausoleum of Barquq in Egypt.*  
**B Lynn Bodner**, Monmouth University (1077-B1-430)
- 10:00AM ▶ (210) *Stigmmetry Prints.* Preliminary report.  
**Gary R Greenfield**, University of Richmond (1077-B1-868)
- 10:20AM (211) *Between pattern and chance.*  
**Andrzej K Brodzik**, The MITRE Corporation (1077-B1-290)
- 10:40AM ▶ (212) *Variation of Parameters.* Preliminary report.  
**Anne M. Burns**, Long Island University, C.W. Post Campus (1077-B1-355)

**MAA Session on Effective Use of Dynamic Mathematical Software in the Classroom, I**

**8:00 AM – 10:55 AM**                      **Back Bay Ballroom C, 2nd Floor, Sheraton**

Organizers: **M. E. Waggoner**, Simpson College  
**Therese Shelton**, Southwestern University

- 8:00AM ▶ (213) *Exploring regressions through Geometer's Sketchpad and Microsoft Excel.* Preliminary report.  
**Brandon Milonovich**, Syracuse University (1077-D5-1201)
- 8:20AM ▶ (214) *Using Geometer's Sketch Pad to examine whether the SSA condition in Euclidean geometry is always ambiguous.*  
**Jennifer Bergner**, Salisbury University (1077-D5-1700)
- 8:40AM ▶ (215) *From Dilation to Similarity - an Exploration Using Geometer's Sketchpad.*  
**Margaret L. Morrow**, SUNY Plattsburgh (1077-D5-2828)
- 9:00AM ▶ (216) *Epsilons and Deltas with GeoGebra.*  
**Jason McCullough**, University of California, Riverside (1077-D5-1499)
- 9:20AM ▶ (217) *The Euler Line in GeoGebra.*  
**Philip P. Mummert**, Taylor University (1077-D5-1769)

- 9:40AM (218) *An iPad-based activity for learning to sketch the graph of the derivative of a given graph.*  
**Hillary Einziger**, Pennsylvania State University (1077-D5-700)
- 10:00AM ▶ (219) *Rolling Wheels: Explore Curve Sketching via GeoGebra and Mathematica.*  
**David A. Brown**, Ithaca College (1077-D5-468)
- 10:20AM ▶ (220) *Motions and Rates: Using GeoGebra to Analyze Video Recordings.*  
**Tibor Marcinek**, Central Michigan University (1077-D5-2854)
- 10:40AM ▶ (221) *WeBWorK labs? A case study in differential equations.* Preliminary report.  
**Dan Gries**, Hopkins School,  
**Barbara Margolius** and **Felipe Martins\***, Cleveland State University (1077-D5-2542)

**MAA Session on Mathematics and Sports, I**

**8:00 AM – 10:55 AM**                      **Room 203, Hynes**

Organizer: **R. Drew Pasteur**, College of Wooster

- 8:00AM ▶ (222) *Streaking: Finding the probability for various batting streaks.*  
**Stanley Rothman**, Quinnipiac University Hamden Connecticut (1077-G1-60)
- 8:20AM ▶ (223) *What is the True Probability of Getting a Hit?*  
**Jeffrey W. Heath\*** and **Ian M. Powell**, Centre College (1077-G1-1114)
- 8:40AM ▶ (224) *The Baseball Simulator: Accurately Simulating Major League Baseball Games with a Minimum Number of Statistics.* Preliminary report.  
**Robert Franzosa**, University of Maine (1077-G1-618)
- 9:00AM ▶ (225) *Individual player productivity in baseball and basketball can be measured in a Mathematically coherent fashion using play-by-play data.* Preliminary report.  
**Charles T Zahn**, San Diego, California (1077-G1-1197)
- 9:20AM ▶ (226) *Beyond Regression: Using Learning Machines to Predict NBA Performance.*  
**Andrew Larsen\*** and **Kali Wickens**, Westminster College, Salt Lake City, UT (1077-G1-1417)
- 9:40AM ▶ (227) *Pursuing an optimal statistically-based model for NFL prediction.*  
**Andrew D. Blaikie\***, **Gabriel J. Abud**, College of Wooster, **John A. David**, Virginia Military Institute, and **R. Drew Pasteur**, College of Wooster (1077-G1-1467)
- 10:00AM ▶ (228) *Boxing in Basketball: A Round-By-Round Analysis of the College Game.*  
**Paul P. Britton\*** and **Carl R. Yerger**, Davidson College (1077-G1-738)

**Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)**

10:20AM *Seed Distributions for the NCAA Mens Basketball Tournament: Why it May Not Matter Who Plays Whom.*  
 (229) **Sheldon H. Jacobson\***, University of Illinois at Urbana-Champaign, **Alexander G. Nikolaev**, University of Buffalo, **Douglas M. King**, University of Illinois at Urbana-Champaign, and **Adrian J. Lee**, CITERI (1077-G1-607)

10:40AM *Using sports to inspire and teach math to the non-major.*  
 ▶ (230) **Chris M. Jones**, Saint Mary's College of California (1077-G1-1194)

**MAA Session on the Capstone Course: Innovations and Implementations, I**

8:00 AM – 10:55 AM Room 310, Hynes

Organizers: **Kathryn Weld**, Manhattan College  
**Agnes Rash**, St. Joseph's College

8:00AM *Capstone Course: Why it didn't work for us.*  
 ▶ (231) **Sandra Fillebrown**, Saint Joseph's University (1077-C1-437)

8:20AM *Problem Seminar: A Capstone Course.*  
 ▶ (232) Preliminary report.  
**Kathryn Weld**, Manhattan College (1077-C1-1764)

8:40AM *The Right Model Makes All The Difference!* Preliminary report.  
 ▶ (233) **Rachel Esselstein**, California State University, Monterey Bay (1077-C1-668)

9:00AM *A Course in Experimental Mathematics.*  
 ▶ (234) **Marc Chamberland**, Grinnell College (1077-C1-2531)

9:20AM *Assessing Mathematics and Mathematics-Secondary Education Majors through a Senior Seminar Capstone Experience.* Preliminary report.  
 ▶ (235) **Marcella Louise Wallowicz CSFN**, Holy Family University (1077-C1-1383)

9:40AM *Our capstone course - principles and tasks.* Preliminary report.  
 ▶ (236) **Greisy Winicki Landman**, Cal Poly Pomona (1077-C1-213)

10:00AM *A Capstone Course for Secondary Education Students.*  
 (237) **Rosemary C Farley**, Manhattan College (1077-C1-1673)

10:20AM *Showcasing students' mathematical understanding through portfolios: A capstone course for mathematics majors on a secondary teaching track.*  
 ▶ (238) **Pete Johnson\*** and **Hari P. Koirala**, Eastern Connecticut State University (1077-C1-181)

10:40AM *Using Error-Eliciting Problems via a Classroom Voting System in a Capstone Course to Foster Conceptual Understanding and Mathematical Habits of Mind.*  
 ▶ (239) **Kien H Lim**, University of Texas at El Paso (1077-C1-27)

**MAA Session on the Scholarship of Teaching and Learning in Collegiate Mathematics, I**

8:00 AM – 10:55 AM Room 202, Hynes

Organizers: **Jacqueline Dewar**, Loyola Marymount University  
**Thomas Banchoff**, Brown University  
**Pam Crawford**, Jacksonville University  
**Edwin Herman**, University of Wisconsin-Stevens Point  
**Nathan Wodarz**, University of Wisconsin-Stevens Point

8:00AM *From Fred Flintstone to Ferraris, Driving Mathematical Content through Questioning.*  
 ▶ (240) **Debbie Gochenaur**, Shippensburg University (1077-N1-2866)

8:20AM *They Can Do It: Applications of a Hybrid Classroom Model in a Traditional Classroom.*  
 (241) **Lee Evans\***, **Heather Jackson**, **Christopher Weld** and **Gerald Kobylski**, United States Military Academy (USMA) (1077-N1-2490)

8:40AM *Smartpen Technology as an Instructional Medium.* Preliminary report.  
 ▶ (242) **Jennifer A Czochoer\*** and **Jenna Tague**, The Ohio State University (1077-N1-1899)

9:00AM *Using and Analyzing Student Confidence in Classroom Voting.* Preliminary report.  
 (243) **Ann C. Stewart**, Hood College (1077-N1-2058)

9:20AM *Helping Algebra Students Succeed at Word Problems.* Preliminary report.  
 ▶ (244) **Ibrahim A. Saleh\*** and **Andrew G. Bennett**, Kansas State University (1077-N1-2040)

9:40AM *Outside of Class Learning: Perspectives on Mathematics Tutoring Programs at a Community College.* Preliminary report.  
 ▶ (245) **C. Adam Feldhaus\*** and **David L. Reedy**, Columbus State Community College (1077-N1-1364)

10:00AM *Role of Prerequisite Knowledge in Student Learning in Lower Level Mathematics Courses.*  
 ▶ (246) **Anne Albert**, The University of Findlay (1077-N1-2660)

10:20AM *Assessing and Improving Quantitative Reasoning Skills with CLA Performance Tasks.* Preliminary report.  
 ▶ (247) **Gerald W. Kruse\*** and **David Drews**, Juniata College (1077-N1-1020)

*Boston, MA, Wednesday, January 4 – Program of the Sessions*

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- 10:40AM *Using Data to Develop an Adaptive Syllabus for PreCalculus Course at the College of Staten Island, City University of New York.*  
 ▶ (248) **Jane P Coffee\***, College of Staten Island, City University of New York, and **Jesenko Vukadinovic**, College of Staten Island (1077-N1-612)

**MAA General Contributed Paper Session:  
 Interdisciplinary Topics in Mathematics**

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8:00 AM – 10:40 AM Room 312, Hynes

Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University

- 8:00AM *On the intersection spectrum conjecture.*  
 (249) **C. A. Marx**, University of California, Irvine (UCI) (1077-VH-1396)
- 8:15AM *A Study of Hudson Food Web and its Competition Graph.* Preliminary report.  
 ▶ (250) **Urmi Ghosh-Dastidar\***, NYCCT, CUNY, **Margaret Cozzens**, DIMACS, Rutgers University, **Steven Lora** and **Alma Cabral-Reynoso**, NYCCT, CUNY (1077-VH-2851)
- 8:30AM *Asymptotically normal distribution of some tree families relevant for phylogenetics.*  
 (251) **Eva Czabarka**, University of South Carolina, Columbia, **Peter Erdos**, Alfred Renyi Institute of Mathematics, Hungary, **Virginia Johnson\***, University of South Carolina, Columbia, **Anne Kupczok**, Center for Integrative Bioinformatics, Vienna, and **Laszlo Szekely**, University of South Carolina, Columbia (1077-VH-1962)
- 8:45AM *The mechanisms behind the evolution of cooperation.*  
 ▶ (252) **Candace Ohm**, Florida State University (1077-VH-1711)
- 9:00AM *Mathematics in Computed Tomography.*  
 ▶ (253) Preliminary report. **Mohamed Allali**, Chapman University (1077-VH-2024)
- 9:15AM *Model for self-polarization and motility of keratocyte fragments.*  
 (254) **Falko Ziebert**, Physikalisches Institut, **Sumanth Swaminathan\***, Northwestern University, and **Igor Aronson**, Argonne National Laboratory (1077-VH-2882)
- 9:30AM *Computing Stable Models of Logic Programs Using Metropolis Type Algorithms.*  
 ▶ (255) **Jeffrey Remmel** and **Alex Brik\***, UC San Diego (1077-VH-1789)
- 9:45AM *A course on pre-Hispanic Latin American mathematical ideas.* Preliminary report.  
 ▶ (256) **Colleen Duffy**, University of Wisconsin - Eau Claire (1077-VH-657)

- 10:00AM *A course in spherical geometry and its applications for math majors.*  
 ▶ (257) Preliminary report. **Marshall A Whittlesey**, California State University San Marcos (1077-VH-1708)
- 10:15AM *Creating an Institutional Interdisciplinary Culture with Mathematicians at the Lead.*  
 (258) **Gerald Kobylski\*** and **Hilary DeRemigio Fletcher**, United States Military Academy (1077-VH-2319)
- 10:30AM *Boston University Students' Interdisciplinary Activities.*  
 ▶ (259) **Emma Previato**, Boston University (1077-VH-2415)

**SIAM Minisymposium on Probabilistic Combinatorics**

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8:00 AM – 10:55 AM Room 206, Hynes

Organizers: **Jacob Fox**, Massachusetts Institute of Technology  
**Po-Shen Loh**, Carnegie Mellon University

- 8:00AM *From random graphs to graph limits and graphlets.* Preliminary report.  
 ▶ (260) **Fan Chung**, University of California, San Diego (1077-05-2756)
- 8:30AM *A natural barrier for random greedy hypergraph matching.*  
 (261) **Patrick Bennett** and **Tom Bohman\***, Carnegie Mellon University (1077-05-2399)
- 9:00AM *Approximating Minimum Linear Ordering Problems.* Preliminary report.  
 ▶ (262) **Prasad Tetali**, Georgia Institute of Technology (1077-68-2203)
- 9:30AM *Chromatic number, clique subdivisions, and the conjectures of Hajós and Erdős-Fajtlowicz.*  
 (263) **Jacob Fox**, Massachusetts Institute of Technology (1077-05-2881)
- 10:00AM *Bisections of graphs.*  
 ▶ (264) **Choongbum Lee**, UCLA, **Po-Shen Loh\***, Carnegie Mellon University, and **Benjamin Sudakov**, UCLA (1077-05-2334)
- 10:30AM *Analysis of a simple 2-matching algorithm on a random graph.*  
 (265) Preliminary report. **Alan Frieze**, Carnegie Mellon University (1077-05-1318)

**Employment Center**

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8:00 AM – 6:00 PM Exhibit Hall C, Hynes

**MAA General Contributed Paper Session:  
 Mathematics and Technology, I**

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8:15 AM – 10:55 AM Back Bay Ballroom D, 2nd Floor, Sheraton

Organizers: **Jennifer Beineke**, Western New England College

Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)

Lynette Boos, Providence College

Aliza Steurer, Dominican University

- 8:15AM ▶ (266) *An assessment of the use of an Interactive Electronic Text on student engagement and learning in Pre-Calculus and Calculus at Medgar Evers College, CUNY.* Preliminary report.  
**Terrence R Blackman**, Medgar Evers College, CUNY (1077-VI-2779)
- 8:30AM (267) *An Innovative Approach to Derivative Instruction Using Technology to Explore Local Straightness.*  
**Jason Samuels**, City University of New York-BMCC (1077-VI-2406)
- 8:45AM ▶ (268) *Using Dynamic Sketches to Help Calculus Students Develop and Integrate Coherent Mental Models of the Formal Definition of the Limit of a Sequence.*  
**Beth Cory\*** and **Ken W. Smith**, Sam Houston State University (1077-VI-2847)
- 9:00AM ▶ (269) *Clickers in the Calculus II Classroom.* Preliminary report.  
**Ellen M Ziliak**, Benedictine University (1077-VI-199)
- 9:15AM ▶ (270) *Building Intuition and Computational Skills with Maplets for Calculus.*  
**Philip B. Yasskin\***, Texas A&M University, and **Douglas B. Meade**, University of South Carolina (1077-VI-1127)
- 9:30AM (271) *Calculus Video Clips.*  
**Shay Fuchs**, University of Toronto Mississauga (1077-VI-1337)
- 9:45AM ▶ (272) *Motion Sensor Activities for Middle School Algebra.*  
**Kimberly Arp\*** and **Ellen Panofsky**, Cabrini College (1077-VI-2932)
- 10:00AM ▶ (273) *Making proofs click: Classroom response systems in transition-to-proof courses.*  
**Robert Talbert**, Grand Valley State University (1077-VI-2059)
- 10:15AM ▶ (274) *Exploratory Activities for College Geometry.* Preliminary report.  
**Barbara E. Reynolds**, Cardinal Stritch University, and **William E. Fenton\***, Bellarmine University (1077-VI-1043)
- 10:30AM ▶ (275) *Exploring Graph Theory Utilizing The OEIS, Wolfram Alpha, and Mathworld.* Preliminary report.  
**Jay Lawrence Schiffman**, Rowan University (1077-VI-43)
- 10:45AM ▶ (276) *Using Octave (a freeware version of Matlab) to generate close calls for Fermat's last theorem.* Preliminary report.  
**Arthur J. Rosenthal**, Salem State University (1077-VI-2817)

**MAA General Contributed Paper Session:  
Research in Geometry and Linear Algebra**

8:15 AM – 10:55 AM

Back Bay Ballroom B, 2nd Floor, Sheraton

Organizers: **Jennifer Beineke**, Western New England College

**Lynette Boos**, Providence College

**Aliza Steurer**, Dominican University

- 8:15AM (277) *New Results in Calibrated Geometry.*  
**Yongsheng Zhang**, Stony Brook Univ. (1077-VJ-2632)
- 8:30AM ▶ (278) *Geometry of cubics.* Preliminary report.  
**Sam Northshield**, SUNY-Plattsburgh (1077-VJ-2717)
- 8:45AM (279) *Minimum-size convex decompositions in  $d$  dimensions.*  
**Carlos M. Nicolas**, UNC-Greensboro (1077-VJ-1737)
- 9:00AM ▶ (280) *A Characterization of Homeomorphisms on Cantor Sets by Orbit Structures.*  
**Casey L Sherman**, Baylor University (1077-VJ-2191)
- 9:15AM (281) *The Log-Convex Density Conjecture and vertical surface area in warped products.*  
**Sean P Howe**, Leiden University (1077-VJ-992)
- 9:30AM Break.
- 9:45AM (282) *Unitary Similarity To a Complex Symmetric Matrix And Its Extension to Orthogonal Symmetric Lie Algebra.*  
**Brice Merlin Nguelifack\***, **Huhua Liu** and **Tin-Yau Tam**, Auburn University (1077-VJ-739)
- 10:00AM ▶ (283) *Moment Formulas for Ensembles of Classical Compact Groups.*  
**Steven J. Miller\***, Williams College, and **Geoffrey S Iyer**, University of Michigan (1077-VJ-1903)
- 10:15AM ▶ (284) *Distribution of Eigenvalues of Weighted, Structured Matrix Ensembles.*  
**Karen Shen\***, Stanford University, **Olivia Beckwith**, Harvey Mudd College, and **Steven J Miller**, Williams College (1077-VJ-601)
- 10:30AM (285) *A functional equation for a prehomogeneous vector space and unitary representations of  $GL(2n, R)$ .*  
**Juhyung Lee**, Oklahoma State University (1077-VJ-2856)
- 10:45AM (286) *An inverse approach to the Littlewood-Richardson Rule for the  $K$ -theoretic coproducts.*  
**Huilan Li\*** and **Jennifer Morse**, Drexel University (1077-VJ-1961)



**MAA Session on Touch It, Feel It, Learn It: Tactile learning Activities in the Undergraduate Mathematics Classroom, I**

8:20 AM – 10:15 AM Room 313, Hynes

Organizers: **Jessica Mikhaylov**, U.S. Military Academy  
**Julie Barnes**, Western Carolina University

- 8:20AM *Partition Numbers and Fractals: Insights Using Bulgarian Solitaire.*  
 ▶ (287) **Richard D Summers**, Reinhardt University (1077-01-565)
- 8:40AM *A Photographic Assignment for Abstract Algebra.*  
 ▶ (288) **Gregory S. Warrington**, University of Vermont (1077-01-1543)
- 9:00AM *The Parity Theorem Shuffle.*  
 (289) **Michael D Smith**, Lycoming College (1077-01-366)
- 9:20AM *Active Learning in Discrete Mathematics.*  
 ▶ (290) **Ann N Trenk**, Wellesley College (1077-01-1479)
- 9:40AM *Loaded Dredels.* Preliminary report.  
 ▶ (291) **Allan Struthers**, Michigan Technological University (1077-01-1518)
- 10:00AM *Rolling the Dice in Statistics.*  
 ▶ (292) **Heidi N Hulsizer**, Hampden-Sydney College (1077-01-1702)

**AMS Special Session on Stability Analysis for Infinite Dimensional Hamiltonian Systems, I**

8:30 AM – 10:20 AM Room 300, Hynes

Organizers: **Wilhelm Schlag**, University of Chicago  
**Gene Wayne**, Boston University

- 8:30AM *Estimates and wellposedness for magnetic Schrödinger equations and related systems.* Preliminary report.  
 (293) **Magdalena Czubak**, Binghamton University (SUNY) (1077-35-2478)
- 9:00AM *On Schrödinger maps from  $T^1$  to  $S^2$ .*  
 ▶ (294) **R. L. Jerrard\***, University of Toronto, and **D. Smets**, Université Pierre et Marie Curie (1077-35-2332)
- 9:30AM *Asymptotic stability of solitary waves in a water wave model with indefinite variational structure.* Preliminary report.  
 (295) **Robert L. Pego\***, Carnegie Mellon University, **Tetsu Mizumachi**, Kyushu University, and **José Raúl Quintero**, Universidad del Valle (1077-35-1991)
- 10:00AM *Birkhoff normal forms and scattering for the NLS on  $R^d$ .* Preliminary report.  
 (296) **Walter Craig**, McMaster University (1077-35-1223)

**MAA General Contributed Paper Session: Teaching Introductory Mathematics**

8:30 AM – 10:55 AM Room 201, Hynes

Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University

- 8:30AM *Money, That's What I Want!* Preliminary report.  
 ▶ (297) **Peter T. Olszewski**, Penn State Erie, The Behrend College (1077-VB-1381)
- 8:45AM *Pass with CARE (Clicking Algebra-Related Education).* Preliminary report.  
 ▶ (298) **Jerry J. Chen\*** and **Myung-Chul Kim**, Suffolk County Community College (1077-VB-1495)
- 9:00AM *Teaching using the iPad and Air Sketch.*  
 (299) **Jason A Price**, Nichols College (1077-VB-976)
- 9:15AM *Minimum Academic Preparation and Performance in First Year Mathematics Courses.* Preliminary report.  
 (300) **Carrie Muir**, University of Colorado, Boulder (1077-VB-1681)
- 9:30AM *The origin of error: A study of the reasons behind common mistakes in introductory Mathematics.* Preliminary report.  
 ▶ (301) **Stefanos Orfanos**, KFUPM (1077-VB-1541)
- 9:45AM *Why Should Any Students Take Developmental Math?*  
 ▶ (302) **Sheldon P Gordon**, Farmingdale State College (1077-VB-1910)
- 10:00AM *Improving Student Success in Developmental Algebra and Its Impact on Subsequent Mathematics Courses.*  
 (303) **William O Bond\*** and **John C Mayer**, University of Alabama at Birmingham (1077-VB-2025)
- 10:15AM *Refocusing Intermediate Algebra.*  
 (304) **Don Small**, U.S. Military Academy (1077-VB-1391)
- 10:30AM *Daily Quizzing as a Means of Motivating Review and Preview.*  
 ▶ (305) **Joshua Ducey**, James Madison University (1077-VB-2876)
- 10:45AM *Growing a Learning Center: From a small, underfunded closet to a popular learning space.*  
 ▶ (306) **Jim Sobota\***, **Karoline Auby** and **Maighread McHugh**, University of Wisconsin - La Crosse (1077-VB-2048)

Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)

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**MAA Minicourse #6: Part A**

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9:00 AM – 11:00 AM Salon CD, 4th Floor, Marriott

*Getting students involved in undergraduate research.*

Presenters: **Aparna Higgins**, University of Dayton  
**Joseph A. Gallian**, University of Minnesota-Duluth

**MAA Minicourse #8: Part A**

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9:00 AM – 11:00 AM Salon AB, 4th Floor, Marriott

*Preparing to serve as an outside consultant in the mathematical sciences.*

Presenters: **Kyle Riley**, South Dakota School of Mines and Technology  
**Nancy Baxter Hastings**, Dickinson College

**MAA Minicourse #14: Part A**

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9:00 AM – 11:00 AM Salon HI, 4th Floor, Marriott

*Teaching introductory statistics.*

Presenters: **Michael Posner**, Villanova University  
**Carolyn Cuff**, Westminster College

**MAA Panel Discussion**

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9:00 AM – 10:20 AM Room 304, Hynes

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

Organizers: **Richard Alo**, National Science Foundation  
**Ron Buckmire**, National Science Foundation  
**Dean Evasius**, National Science Foundation  
**Lee Zia**, National Science Foundation

**MAA Panel Discussion**

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9:00 AM – 10:20 AM Room 306, Hynes

*Quantitative support center: Common themes.*

Organizer: **Michael E. Schuckers**, St. Lawrence University  
Panelists: **Grace Coulombe**, Bates College  
**Cat McCune**, Smith College  
**Tom Roby**, University of Connecticut  
**Michael E. Schuckers**

**MAA/NCTM Mutual Concerns Committee Panel Discussion**

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9:00 AM – 10:20 AM Room 309, Hynes

*Why is transition from high school to college important? Issues and next steps.*

Organizer: **Gail Burrill**, Michigan State University  
Panelists: **Arthur Benjamin**, Harvey Mudd College  
**David Bressoud**, Macalester College  
**William McCallum**, University of Arizona  
**Daniel Teague**, North Carolina School for Science and Mathematics  
**Paul Zorn**, St. Olaf College  
**Gail Burrill**

**Student Hospitality/Information Center**

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9:00 AM – 5:00 PM 2nd Floor Corridor by Veterans Auditorium, Hynes

**MAA Department Liaisons Meeting**

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9:30 AM – 11:00 AM Salon E, 4th Floor, Marriott

**AMS Invited Address**

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10:05 AM – 10:55 AM Ballrooms A/B, 3rd floor, Hynes

(307) *The polynomial method in combinatorial geometry.*  
**Larry Guth**, University of Toronto (1077-05-8)

**AMS-MAA Invited Address**

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11:10 AM – NOON Ballrooms A/B, 3rd floor, Hynes

(308) *A stratification of the space of all  $k$ -planes in  $\mathbb{C}^n$ .*  
**Allen Knutson**, Cornell University (1077-14-28)

**Exhibits and Book Sales**

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12:15 PM – 5:30 PM Exhibit Hall D, Hynes

**AMS Colloquium Lectures: Lecture I**

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1:00 PM – 1:50 PM Ballrooms A/B, 3rd floor, Hynes

(309) *Langlands program, trace formulas, and their geometrization, I.*  
**Edward Frenkel**, University of California Berkeley (1077-14-10)

**MAA Invited Address**

2:15 PM – 3:05 PM Ballrooms A/B, 3rd floor, Hynes

- (310) *Mathematics to DIE for: The battle between counting and matching.*  
**Jennifer Quinn**, University of Washington, Tacoma (1077-A0-4)

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

2:15 PM – 6:05 PM Back Bay Ballroom A, 2nd Floor, Sheraton

Organizers: **Sloan Despeaux**, Western Carolina University  
**Craig Fraser**, University of Toronto  
**Deborah Kent**, Hillsdale College

- 2:15PM  
 ▶ (311) *Toward Algebra as a General Problem-Solving Technique: Rafael Bombelli to Francois Viète.*  
**Karen V. H. Parshall**, University of Virginia (1077-01-1593)
- 2:45PM  
 (312) *Newton and the Neo-Pythagorean Tradition.*  
**Niccolo' Guicciardini**, University of Bergamo, Italy (1077-01-422)
- 3:15PM  
 ▶ (313) *Evolutes in the works of Huygens and Johann(I) Bernoulli.*  
**Robert E Bradley**, Adelphi University (1077-01-1416)
- 3:45PM  
 ▶ (314) *We The Jury: The Mathematics of Group Decisions From Condorcet to Cournot.*  
**Jeff A Suzuki**, Brooklyn College (1077-01-73)
- 4:15PM  
 ▶ (315) *Boscovich and the Line of Best Fit.*  
 Preliminary report.  
**Lawrence A. D'Antonio**, Ramapo College of New Jersey (1077-01-743)
- 4:45PM  
 ▶ (316) *C.H. Kummell and the Method of Least Squares.*  
**J. J. Tattersall\*** and **Asta Shomberg**, Providence College (1077-01-425)
- 5:15PM  
 ▶ (317) *Toward a history of the square-peg problem.* Preliminary report.  
**John McCleary**, Vassar College (1077-51-2102)
- 5:45PM  
 (318) *Human collectives in mathematical practices: the example of the writing of a theorem, the kernel theorem of Laurent Schwartz (1915-2002).*  
**Anne-Sandrine Paumier**, Institut de Mathématiques de Jussieu, Paris (1077-01-1510)

**AMS-SIAM Special Session on the Mathematics of Computation: Differential Equations, Linear Algebra, and Applications, I**

2:15 PM – 6:05 PM Room 109, Hynes

Organizers: **Susanne C. Brenner**, Louisiana State University  
**Chi-Wang Shu**, Brown University

- 2:15PM  
 (319) *Anderson Acceleration for Fixed-Point Iterations.*  
**Homer F. Walker**, Worcester Polytechnic Institute (1077-65-1285)
- 2:45PM  
 (320) *A simple WENO limiter for Runge-Kutta Discontinuous Galerkin method.*  
**Xinghui Zhong\*** and **Chi-Wang Shu**, Brown University (1077-65-460)
- 3:15PM  
 (321) *WENO Scheme with Subcell Resolution for Computing Nonconservative Euler Equations.*  
**Tao Xiong\***, University of Science and Technology of China, **Chi-Wang Shu**, Brown University, and **Mengping Zhang**, University of Science and Technology of China (1077-65-1218)
- 3:45PM  
 (322) *Block Krylov Subspace Recycling: Theory and Application in a Newton Iteration.*  
**Michael Parks**, Sandia National Laboratories, and **Kirk M. Soodhalter\***, Temple University (1077-65-1358)
- 4:15PM  
 (323) *Local convergence analysis of several inexact Newton-type algorithms for general nonlinear eigenvalue problems.* Preliminary report.  
**Daniel B. Szyld** and **Fei Xue\***, Temple University (1077-65-1347)
- 4:45PM  
 (324) *The Reliability of Error Estimates for Multivariate Numerical Integration.*  
**Fred J. Hickernell**, Illinois Institute of Technology (1077-65-21)
- 5:15PM  
 (325) *Inverse Lax-Wendroff procedure for numerical boundary conditions of hyperbolic equations.*  
**Sirui Tan\*** and **Chi-Wang Shu**, Brown University (1077-65-1344)
- 5:45PM  
 (326) *Approximation of Stochastic Partial Differential Equations by a Kernel-based Collocation Method.*  
**Qi Ye\***, **Gregory Fasshauer** and **Igor Cialenco**, Illinois Institute of Technology (1077-35-327)

**AMS-ASL Special Session on the Life and Legacy of Alan Turing, II**

2:15 PM – 5:55 PM Room 207, Hynes

Organizers: **Damir Dzhafarov**, University of Chicago and University of Notre Dame  
**Jeff Hirst**, Appalachian State University

**Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)**

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**Carl Mummert**, Marshall University

- 2:15PM *A Survey of Alan Turing's Contributions to Logic, to the Invention of General Purpose Computers, and to Theoretical Computer Science.*  
▶ (327) **Martin D. Davis**, NYU/Courant and UC Berkeley (1077-01-389)
- 3:15PM *Alan Turing: The creative power of mathematics.* Preliminary report.  
▶ (328) **Andrew P Hodges**, University of Oxford, UK (1077-01-423)
- 4:15PM *The influence of Alan Turing.*  
▶ (329) **Marvin Minsky**, MIT (1077-01-2934)
- 5:15PM *Alan Turing's Philosophy of Mind.*  
▶ (330) Preliminary report.  
**James H. Moor**, Dartmouth College (1077-01-1987)

**AMS-AAAS Special Session on Science for Policy and Policy for Science: Career Opportunities at the Intersection of Science and Policy**

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2:15 PM – 4:35 PM **Arlington, 3rd Floor, Marriott**

Organizers: **Cynthia Robinson**, AAAS Science & Technology Fellowships  
**Shar Steed**, AAAS Science & Technology Fellowships

- 2:15PM *Opportunities at the intersection of science and policy.*  
▶ (331) **Cynthia Robinson**, American Association for the Advancement of Science (1077-00-1074)
- 2:45PM *Applying mathematical tools in public policy.*  
▶ (332) **Sonja Sandberg**, Framingham State University (1077-00-1614)
- 3:15PM *Is there mathematical work to be done on Capitol Hill?*  
▶ (333) **Daniel H Ullman**, George Washington University (1077-00-1844)
- 3:45PM *Careers in Math Policy.*  
▶ (334) **Katherine Socha**, Math for America (1077-00-1617)
- 4:15PM *Radical Mathematicians: A (mostly) non-partisan call to arms.*  
▶ (335) **David Weinreich**, Washington, DC (1077-00-1883)

**AMS Special Session on Advances in Coding Theory, II**

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2:15 PM – 6:05 PM **Dartmouth, 3rd Floor, Marriott**

Organizers: **Gretchen L. Matthews**, Clemson University  
**Sarah Spence Adams**, Olin College of Engineering  
**Judy L. Walker**, University of Nebraska-Lincoln

- 2:15PM *A Family of Codes with Two Homogeneous Weights.*  
(336) **Eimear Byrne**, University College Dublin, **Michael Kiermaier**, University of Bayreuth, and **Alison Sneyd\***, University College Dublin (1077-05-2412)
- 2:45PM *Optimum Distance Profiles and Optimal Subcodes of Binary Self-Dual Type II Codes.*  
(337) **Finley Freibert\*** and **Jon-Lark Kim**, University of Louisville (1077-94-1621)
- 3:15PM *A coding theory perspective on combinatorial neural codes.*  
(338) **Carina Curto**, **Vladimir Itskov**, **Katherine Morrison\***, **Zach Roth** and **Judy Walker**, University of Nebraska (1077-94-1546)
- 3:45PM *Pseudocodewords and pseudoweights.*  
(339) **Nigel Boston**, University of Wisconsin - Madison (1077-94-1270)
- 4:45PM *Using Pseudocodewords to Convey Information.* Preliminary report.  
(340) **Nathan Axvig**, Virginia Military Institute (1077-94-1763)
- 5:15PM *Trellis Behavior Under Dualization.*  
(341) Preliminary report.  
**Elizabeth Weaver\*** and **Heide Gluesing-Luerssen**, University of Kentucky (1077-93-1129)
- 5:45PM *Hybrid Noncoherent Network Coding.*  
(342) **Vitaly Skachek\***, **Olgica Milenkovic** and **Angelia Nedic**, University of Illinois at Urbana-Champaign (1077-94-1628)

**AMS Special Session on Classical Fourier Analysis and Partial Differential Equations, II**

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2:15 PM – 5:35 PM **Room 104, Hynes**

Organizers: **William O. Bray**, University of Maine  
**Mark A. Pinsky**, Northwestern University

- 2:15PM *Global harmonic analysis of eigenfunctions in the real and complex domain.* Preliminary report.  
(343) **Steve Zelditch**, Northwestern University (1077-35-710)
- 3:15PM *Gibbs phenomena and Pinsky phenomena for solutions to nonlinear Schrodinger equations.*  
(344) **Michael E. Taylor**, University of North Carolina (1077-35-489)
- 4:15PM *On the Pinsky phenomenon and the Kahane theorem for nonspherical partial Fourier integrals.*  
▶ (345) **Ravshan R Ashurov\*** and **Almaz A Butaev**, University Putra Malaysia (1077-42-333)
- 4:45PM *A relation between multiple Fourier series and lattice point problems.*  
(346) **Shigehiko Kuratsubo**, Mathematical Society of Japan, Hirosaki University (1077-42-477)

5:15PM *Estimates of Fourier Transforms.*  
 (347) Preliminary report.  
**William O. Bray**, University of Maine  
 (1077-42-1239)

**AMS Special Session on Difference Equations and Applications, II**

2:15 PM – 6:05 PM Wellesley, 3rd Floor, Marriott

Organizer: **Michael Radin**, Rochester Institute of Technology

2:15PM *On the Nature of Solutions of the*  
 (348) *Difference Equation  $x_{n+1} = x_n x_{n-3} - 1$ .*  
**Candace M. Kent\***, Virginia Commonwealth University, and **Witold Kosmala**, Appalachian State University (1077-39-1500)

2:45PM *Periodicity In General Delay Nonlinear*  
 (349) *Difference Equations Using Fixed Point Theory.*  
**Youssef N. Raffoul**, University of Dayton (1077-39-1340)

3:15PM *Global Asymptotic Behavior of Some*  
 (350) *Periodically Forced Discrete Nonlinear Population Models.* Preliminary report.  
**Vlajko L. Kocic**, Xavier University of Louisiana (1077-39-475)

3:45PM *Global Dynamics of Certain Competitive*  
 (351) *System in the Plane.*  
**Mustafa R. S. Kulenovic\***, **Orlando Merino**, The University of Rhode Island, and **Mehmed Nurkanovic**, University of Tuzla (1077-39-301)

4:15PM *Patterns of Boundedness of Rational*  
 (352) *Systems in the Plane.* Preliminary report.  
**Emmanouil Drymonis**, University of Rhode Island (1077-39-1041)

4:45PM *The Global Character of Solutions of*  
 (353) *Rational Systems in the Plane.*  
**Chris D Lynd**, The University of Rhode Island (1077-39-750)

5:15PM *The Global Characteristics of a Family of*  
 (354) *Systems of Piecewise Linear Difference Equations.*  
**E Grove**, **G Ladas**, University of Rhode Island, **E Lapierre\***, Johnson & Wales University, and **W Tikjha**, Mahidol University (1077-39-794)

5:45PM *Positive solutions for a system of second*  
 (355) *order multipoint discrete boundary value problems.*  
**Johnny Henderson\***, Baylor University, and **Rodica Luca**, Gh. Asachi Technical University (1077-39-30)

**AMS Special Session on Dynamical Systems in Algebraic and Arithmetic Geometry, II**

2:15 PM – 6:05 PM Room 200, Hynes

Organizers: **Patrick Ingram**, University of Waterloo, Canada  
**Michelle Manes**, University of Hawaii, Honolulu

**Clayton Petsche**, Hunter College (CUNY)

2:15PM *Where geodesics go to die.*  
 (356) **James M Henle\***, Smith College, and **Frederick V Henle**, athenahealth, Inc. (1077-53-61)

2:45PM *Towards a Dynamical Analogue of*  
 (357) *Szpiro's Conjecture.*  
**Phillip O Williams**, The Kings College (1077-37-1474)

3:15PM *Ritt's Theorem and refinements.*  
 (358) **Alice Medvedev\*** and **Thomas W Scanlon**, UC Berkeley (1077-12-2891)

3:45PM *Multiplier Spectra and the Moduli Space*  
 (359) *of Degree 3 Morphisms on  $\mathbb{P}^1$ .*  
**Benjamin Hutz**, Graduate Center of CUNY, and **Michael Tepper\***, Division of Science and Engineering, Penn State Abington (1077-11-1228)

4:15PM *Twisted matings of polynomials.*  
 (360) Preliminary report.  
**Xavier Buff**, Université Paul Sabatier, **Adam Epstein**, University of Warwick, and **Sarah Koch\***, Harvard University (1077-37-1199)

4:45PM *Extending the Polya-Carlson Theorem:*  
 (361) *When Uniform Limits of Rational Functions are Rational.*  
**Nathan L Walters**, University of Georgia (1077-11-2165)

5:15PM *Towards a dynamical relative*  
 (362) *Manin-Mumford conjecture.*  
**Dragos Ghioca**, University of British Columbia, **Liang-Chung Hsia**, National Taiwan Normal University, and **Thomas J Tucker\***, University of Rochester (1077-11-1289)

5:45PM *On a uniform bound for the number of*  
 (363) *exceptional linear subvarieties in the dynamical Mordell-Lang conjecture.*  
**Joseph H Silverman** and **Bianca Viray\***, Brown University (1077-37-717)

**AMS Special Session on Fractal Geometry in Pure and Applied Mathematics (in memory of Benoit Mandelbrot), I**

2:15 PM – 5:05 PM Room 204, Hynes

Organizers: **Michael L. Lapidus**, University of California, Riverside  
**Erin Pearse**, University of Oklahoma  
**Machiel van Frankenhuijsen**, Utah Valley University

2:15PM *Fractal structures in functions related to*  
 (364) *number theory.*  
**Jeffrey C. Lagarias**, University of Michigan (1077-11-1469)

2:45PM *Complex Dimensions of Cantor Strings*  
 (365) *and the Riemann Zeros.*  
**Machiel van Frankenhuijsen**, Utah Valley University (1077-11-2341)

**Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)**

- 3:15PM *Explicit tube formulas for  $p$ -adic fractal strings.*  
(366)  
**Hung Lu\***, Hawaii Pacific University,  
**Michel L. Lapidus**, University of California, Riverside, and **Machiel van Frankenhuijsen**, Utah Valley University (1077-51-1503)
- 3:45PM *Multifractal spectra of certain self-similar measures as abscissa of convergence functions.*  
(367)  
**Kate E. Ellis**, California State University, Stanislaus, **Michel L. Lapidus**, University of California, Riverside, **Michael C. Mackenzie**, University of Connecticut, and **John A. Rock\***, California State Polytechnic University, Pomona (1077-28-1181)
- 4:15PM *Fractal Strings and the Invertibility of the Spectral Operator.*  
(368)  
**Hafedh Herichi\*** and **Michel L. Lapidus**, University of California, Riverside (1077-46-1805)
- 4:45PM *Fractal Strings, the Riemann Hypothesis, Universality and Phase Transitions.*  
(369)  
**Hafedh Herichi** and **Michel L. Lapidus\***, University of California, Riverside (1077-11-1609)

- 2:15PM *Polynomial-time Theory of Matrix Groups.*  
(374)  
**László Babai\***, University of Chicago, **Robert Beals**, Renaissance Technologies, and **Ákos Seress**, Ohio State University (1077-20-1481)
- 2:45PM *Stackable groups.* Preliminary report.  
(375)  
**Mark Brittenham** and **Susan Hermiller\***, University of Nebraska (1077-20-834)
- 3:15PM *Security assumptions in non-commutative cryptography.*  
▶ (376)  
Preliminary report.  
**Vladimir Shpilrain**, The City College of New York (1077-94-1322)
- 3:45PM *Subgroups of semigroups freely generated by idempotent matrices.*  
(377)  
Preliminary report.  
**John C. Meakin**, University of Nebraska-Lincoln (1077-20-856)
- 4:15PM *The submonoid membership problem for groups.*  
(378)  
**Markus Lohrey**, Institut für Informatik, Universität Leipzig, and **Benjamin Steinberg\***, City College of New York (1077-20-1462)
- 4:45PM *Generic properties of finitely presented groups.* Preliminary report.  
(379)  
**Robert H Gilman**, Stevens Institute of Technology, Hoboken, NJ (1077-20-1395)
- 5:15PM *Extreme compression and efficient computation, with application to the word problem.* Preliminary report.  
(380)  
**Will Dison**, Bank of England, and **Tim Riley\***, Cornell (1077-20-1682)
- 5:45PM *On the Dimension of Matrix Representations of Nilpotent Groups.*  
(381)  
**Maggie Habeeb\*** and **Delaram Kahrobaei**, CUNY Graduate Center (1077-68-1207)

**AMS Special Session on Generalized Cohomology Theories in Engineering Practice, II**

2:15 PM – 5:55 PM **Provincetown, 4th Floor, Marriott**

Organizer: **P. Robert Kotiuga**, Boston University

- ▶ 2:15PM *Computing integrals using equivariant cohomology.*  
(370)  
**Loring W. Tu**, Tufts University (1077-55-2256)
- 3:15PM *Expanders and K-Theory for Discrete Groups.*  
(371)  
**Paul Frank Baum**, Penn State University (1077-19-400)
- 4:15PM *Fractional topological states in electronic flattened bands with non-zero Chern number.*  
(372)  
**Claudio Chamon**, Boston University (1077-82-2306)
- 5:15PM *Generalized Cohomology Theories in Engineering Practice.* Preliminary report.  
(373)  
**P. Robert Kotiuga**, Boston University (1077-18-2400)

**AMS Special Session on Groups, Algorithms, Complexity, and Theory of Security, II**

2:15 PM – 6:05 PM **Room 101, Hynes**

Organizers: **Maggie Habeeb**, City University of New York  
**Delaram Kahrobaei**, City University of New York

**AMS Special Session on Hyperbolicity in Manifolds and Groups, II**

2:15 PM – 6:05 PM **Berkeley, 3rd Floor, Marriott**

Organizers: **David Futer**, Temple University  
**Genevieve Walsh**, Tufts University

- 2:15PM *Short geodesics in moduli space.*  
(382)  
**Christopher J. Leininger\***, University of Illinois at Urbana-Champaign, and **Dan Margalit**, Georgia Tech (1077-57-1798)
- 2:45PM *Recurrence and unique ergodicity for Weil-Petersson geodesics and their ending laminations.*  
(383)  
**Jeffrey F. Brock**, Brown University (1077-37-2833)
- 3:15PM *Recognizing 3-manifold groups.*  
(384)  
**Daniel Groves**, University of Illinois at Chicago, **Jason Fox Manning\***, University at Buffalo, and **Henry Wilton**, University College London (1077-20-934)
- 3:45PM *L-spaces vs. left-orderability.*  
(385)  
**Liam Watson**, UCLA (1077-57-591)

*Boston, MA, Wednesday, January 4 – Program of the Sessions*

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- 4:15PM (386) *Small knot complements, cyclic commensurability and hidden symmetries.*  
**Neil R Hoffman**, Boston College (1077-57-1555)
- 4:45PM (387) *Divergence, thick groups, and morse geodesics.*  
**Jason Behrstock\***, CUNY Lehman, and **Cornelia Drutu**, Exeter College, Oxford (1077-20-1272)
- 5:15PM (388) *Essential tori and Dehn twists in Outer space.* Preliminary report.  
**Kasra Rafi\***, University of Oklahoma, and **Matt Clay**, Allegheny College (1077-51-1346)
- 5:45PM (389) *Groups acting on CAT(0) spaces and their Boundaries.* Preliminary report.  
**Kim Ruane**, Tufts Univeristy (1077-20-2320)

**AMS Special Session on Local Field Properties, Microstructure, and Multiscale Modeling of Heterogeneous Media, II**

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2:15 PM – 6:05 PM      **Suffolk, 3rd Floor, Marriott**

Organizers: **Silvia Jiménez**, Worcester Polytechnic Institute  
**Bogdan Vernescu**, Worcester Polytechnic Institute

- 2:15PM (390) *G-convergence approach to homogenization of nonlinear difference operators.*  
**Alexander Pankov**, Morgan State University (1077-35-1203)
- 2:45PM (391) *Homogenization in periodically perforated domains.*  
**Rachad Zaki**, Khalifa University of Science, Technology and Research, Abu Dhabi, UAE (1077-35-1498)
- 3:15PM (392) *On a novel idea for the local characterization for solutions of multiscale elliptic problems.*  
**Daniel T. Onofrei\***, **Giles Auchmuty** and **Yuliya Gorb**, University of Houston (1077-35-1990)
- 3:45PM (393) *Bounds and optimal structures of three-material composites: Beyond the translation bound.* Preliminary report.  
**Andrej Cherkaev**, University of Utah (1077-35-2135)
- 4:15PM (394) *Flux norm approach to finite-dimensional homogenization approximation with non-separated scales and high contrast.*  
**Leonid Berlyand\***, Penn State University, and **Houman Owhadi**, Caltech (1077-35-1547)
- 4:45PM (395) *Mesososcopic continuum mechanics of particle systems.* Preliminary report.  
**Alexander Panchenko\***, Washington State University, and **Lyudmyla Barannyk**, University of Idaho (1077-70-2090)

- 5:15PM (396) *On the Characterization of the Effective Yield Set in Polycrystal Plasticity.*  
**Marian Bocea**, Loyola University Chicago (1077-49-1868)
- 5:45PM (397) *Multiscale analysis of the peridynamic equation of motion.*  
**Bacim Alali**, University of Utah, **Robert Lipton**, Louisiana State University, and **Tadele Mengesha\***, Penn State University (1077-46-2071)

**AMS Special Session on Mathematics in Natural Resource Modeling, II**

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2:15 PM – 6:05 PM      **Simmons, 3rd Floor, Marriott**

Organizer: **Catherine Roberts**, College of the Holy Cross

- 2:15PM (398) *A Biomass Flow Approach to Population Models and Food Webs.*  
**Wayne M. Getz**, Berkeley, California (1077-92-2945)
- 3:15PM (399) *Mathematical Modeling of Viral Zoonoses in Wildlife.*  
**L. J. S. Allen\***, Texas Tech University, **V. L. Brown**, University of Michigan, **C. B. Jonsson**, University of Louisville, **S. L. Klein**, John Hopkins Bloomberg School of Public Health, **S. M. Lavery**, University of Utah, **K. Magwedere**, Directorate of Veterinary Services, **J. C. Owen**, Michigan State University, and **P. van den Driessche**, University of Victoria (1077-92-402)
- 3:45PM (400) *Models for the Spatial Management of Transboundary and Straddling Stocks and their Bioeconomic Implications for Marine Protected Areas.* Preliminary report.  
**Michael G. Neubert\***, Woods Hole Oceanographic Institution, **Holly V. Moeller**, Stanford University, and **Guillermo E. Herrera**, Bowdoin College (1077-91-459)
- 4:15PM (401) *The influence of high trophic-level predators, data scarcity, parameter confounding, and model mis-specification on a multispecies age-structured assessment model for the Gulf of Alaska.*  
**Kray Van Kirk\***, **Terrance J. Quinn II**, Juneau Center, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks, and **Jeremy S. Collie**, Graduate School of Oceanography, University of Rhode Island (1077-92-1699)
- 4:45PM (402) *A Discrete-Time Age-Structured Model Of Exploited Fishery Systems.*  
**Nianpeng Li** and **Abdul-Aziz Yakubu\***, Howard University (1077-92-1451)
- 5:15PM (403) *Selecting Sites for a Fully Connected Reserve Network.*  
**Nahid Jafari\*** and **John Hearne**, RMIT University, Melbourne, Victoria, Australia. (1077-90-735)

Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)

- 5:45PM Dysfunction by Design: Consequences of  
 ▶ (404) Limitations on Transferability of Catch Shares in the Alaska Pollock Fishery.  
**Keith R Criddle\*** and **James Strong**,  
 University of Alaska Fairbanks  
 (1077-91-326)

**AMS Special Session on Optimal Control in Applied Mathematical Modeling, I**

2:15 PM – 6:05 PM Clarendon, 3rd Floor, Marriott

Organizers: **Natali Hritonenko**, Prairie View A&M University  
**Yuri Yatsenko**, Houston Baptist University

- 2:15PM Optimal control of HIV treatment.  
 (405) **Ellina Grigorieva\***, Texas Woman's University, **Evgenii Khailov**, Lomonosov Moscow State University, and **Andrei Korobeinikov**, Limerick University, Ireland (1077-49-1354)
- 2:45PM Similarity solutions for some model  
 (406) equations appearing in the gas dynamics.  
**Anahit Galstyan**, University of Texas-Pan American (1077-35-1983)
- 3:15PM Stationary distributions of semistochastic  
 (407) processes with disturbances at random times and with random severity.  
**Maria C.A. Leite\***, University of Toledo, **Nikola P. Petrov**, University of Oklahoma, and **Ensheng Weng Weng**, Department of Botany and Microbiology, University of Oklahoma (1077-60-606)
- 3:45PM Parameter Optimization of Glassy-winged  
 ▶ (408) Sharpshooter Population Model.  
 Preliminary report.  
**Jeong-Mi Yoon\***, **Volodymyr Hryniv**, **Lisa Morano**, **Sara Wilder**, **Anh Tuan Nguyen**, University of Houston-Downtown, and **Forrest Michell**, Department of Entomology, Texas A&M University (1077-92-948)
- 4:15PM Large Deviations for Two-Time-Scale  
 (409) Systems Driven by Nonhomogeneous Markov Chains and Associated Optimal Control Problems.  
**Qi He\***, **George Yin**, Wayne State University, and **Qing Zhang**, University of Georgia (1077-60-272)
- 4:45PM Mathematical Modeling and Analysis of  
 ▶ (410) Atmospheric Vortices.  
**Lynn R. Greenleaf**, University of Oklahoma, Norman, OK (1077-49-2047)
- 5:15PM Near Optimal Selling Rule for a  
 (411) Mean-Reverting Asset.  
**Eunju Sohn\*** and **Qing Zhang**, University of Georgia (1077-49-1345)
- 5:45PM Optimal control in age-dependent models  
 ▶ (412) in epidemiology and demography.  
**Amie Rollie\***, **Ryan Baxter** and **Natali Hritonenko**, Prairie View A&M University (1077-92-1993)

**AMS Special Session on Set-Valued Optimization and Variational Problems, II**

2:15 PM – 6:05 PM Fairfield, 3rd Floor, Marriott

Organizers: **Andreas H. Hamel**, Yeshiva University  
**Akhtar A. Khan**, Rochester Institute of Technology  
**Miguel Sama**, E.T.S.I. Industriales

- 2:15PM An Epigraph-Based Approach to  
 (413) Second-Order Sensitivity Analysis in Set-Valued Optimization. Preliminary report.  
**Douglas E Ward**, Miami University (1077-49-485)
- 2:45PM Applications of Banach Space Geometry  
 (414) for Optimization Problems and Variational Inequalities.  
**Yakov Alber**, Boston, MA (1077-49-2466)
- 3:15PM First and Second Order Tangent Cones  
 (415) and Their Applications in Set Constrained Optimization.  
**Elena Constantin**, University of Pittsburgh-Johnstown (1077-90-179)
- 3:45PM Conical Regularization for Abstract  
 (416) Constrained Optimization Problems in Hilbert Spaces.  
**Akhtar A. Khan\***, Rochester Institute of Technology, and **Miguel Sama**, Universidad Nacional de Educacion a Distancia, Madrid Spain (1077-49-2196)
- 4:15PM Selection of an optimal source to make  
 (417) the optical tomography problem less ill-posed.  
**Bonnie C. Jacob**, National Technical Institute for the Deaf at Rochester Institute of Technology (1077-46-2104)
- 4:45PM A set-valued approach to superhedging  
 (418) in markets with transaction costs.  
**Birgit Rudloff\***, Princeton University, and **Andreas Loehne**, Martin-Luther-University Halle-Wittenberg (1077-90-2070)
- 5:15PM On the characterization of solution sets  
 (419) of smooth and nonsmooth stochastic Nash games.  
**Uma V Ravat\*** and **Uday V Shanbhag**, University of Illinois at Urbana-Champaign (1077-91-1338)
- 5:45PM On the subdifferential regularity of  
 (420) functions of roots of polynomials.  
**Julia Eaton\***, University of Washington Tacoma, and **James V Burke**, University of Washington (1077-49-1976)

**AMS Special Session on Several Complex Variables and Multivariable Operator Theory, II**

2:15 PM – 6:05 PM Room 108, Hynes

Organizers: **Ronald Douglas**, Texas A&M University



*Boston, MA, Wednesday, January 4 – Program of the Sessions*

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- John McCarthy**, Washington University
- 2:15PM (421) *Stable symmetric polynomials, the Grace-Walsh-Szego theorem, and the Schur-Agler class.*  
**Greg Knese**, University of Alabama (1077-47-548)
- 2:45PM (422) *To get (or not to get) uniform approximation by interpolating Blaschke products.*  
**Pamela B. Gorkin**, Bucknell University (1077-47-972)
- 3:15PM (423) *Realization and interpolation theory for the Herglotz-Agler class over the poly-right-halfplane.* Preliminary report.  
**Joseph A. Ball**, Virginia Tech (1077-47-198)
- 3:45PM (424) *Schatten norms of operator derivatives.*  
**Anna Skripka**, University of Central Florida (1077-47-679)
- 4:15PM (425) *Gaps for proper holomorphic maps between balls.*  
**Xiaojun Huang\***, Rutgers University at New Brunswick, **Shanyu Ji**, University of Houston, and **Wanke Yin**, Wuhan University (1077-32-1113)
- 4:45PM (426) *“Noncommutative” Aleksandrov-Clark measures and function theory in the unit ball.* Preliminary report.  
**Michael T Jury**, University of Florida (1077-47-558)
- 5:15PM (427) *The truncated matrix valued multivariable K-moment problem.*  
**David P Kimsey**, Weizmann Institute, and **Hugo J Woerdeman\***, Drexel University (1077-47-758)
- 5:45PM (428) *A non-semialgebraic interpolation body.* Preliminary report.  
**Brian J. Cole**, Brown University (1077-30-1066)

***AMS Special Session on Stability Analysis for Infinite Dimensional Hamiltonian Systems, II***

2:15 PM – 5:35 PM Room 300, Hynes

- Organizers: **Wilhelm Schlag**, University of Chicago  
**Gene Wayne**, Boston University
- 2:15PM (429) *Radiative decay of bubble oscillations in a compressible fluid.*  
**Michael I. Weinstein**, Columbia University (1077-76-2796)
- 2:45PM (430) *Constructive methods for the global analysis of solutions of differential equations.*  
**Ovidiu Costin\***, **Rodica D Costin**, The Ohio State University, **Min Huang** and **Wilhelm Schlag**, The University of Chicago (1077-34-2322)
- 3:15PM (431) *Solitons on manifolds.*  
**Jeremy L Marzuola**, University of North Carolina, Chapel Hill (1077-35-337)

- 3:45PM (432) *Global existence for water wave equations.*  
**Pierre M Germain**, Courant Institute, New York University (1077-35-506)
- 4:15PM (433) *Unstable manifolds and  $L^2$  nonlinear instability of Euler equations.*  
**Zhiwu Lin** and **Chongchun Zeng\***, Georgia Institute of Technology (1077-35-941)
- 4:45PM (434) *Enstrophy growth in the viscous Burgers equation.*  
**Dmitry Pelinovsky**, McMaster University (1077-35-279)
- 5:15PM (435) *Water waves over a rough bottom in the shallow water regime.*  
**Catherine Sulem**, University of Toronto (1077-35-990)

***AMS Special Session on Stochastic Analysis (in honor of Hui-Hsiung Kuo), II***

2:15 PM – 6:05 PM Room 107, Hynes

- Organizers: **Julius Esunge**, University of Mary Washington  
**Aurel Stan**, Ohio State University
- 2:15PM (436) *Renormalization, Lie algebras and infinite divisibility.* Preliminary report.  
**Luigi Accardi**, Centro V. Volterra, Università di Roma Torvergata (1077-00-2304)
- 3:15PM (437) *MRM triples associated with Brenke type generating functions.* Preliminary report.  
**Nobuhiro Asai**, Aichi University of Education (1077-33-714)
- 3:45PM (438) *Recovering a Function from the Gauss Radon Transform in White Noise Analysis.*  
**Jeremy J Becnel**, Stephen F. Austin State University (1077-46-1090)
- 4:15PM (439) *Smooth Measures and Stochastic Analysis in Abstract Wiener Space.*  
**Fariborz Asadian**, Fort Valley State University (1077-60-695)
- 4:45PM (440) *The Clark Formula of Generalized Lévy Functionals.* Preliminary report.  
**Yuh-Jia Lee**, National University of Kaphsiung (1077-60-808)
- 5:15PM (441) *Unitarizing measure for the representation of a Lie group.*  
**Habib Ouerdiane**, University of Tunis El Manar, Tunisia (1077-60-2407)
- 5:45PM (442) *Free noise stochastics and geometry.*  
**Ambar Niel Sengupta**, Louisiana State University (1077-60-1332)

***AMS Special Session on Topological Graph Theory: Structure and Symmetry, II***

2:15 PM – 5:05 PM Room 102, Hynes

- Organizers: **Jonathan L. Gross**, Columbia University

Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)

- Thomas W. Tucker**, Colgate University
- 2:15PM (443) *Orthogonal Heffter systems, current graphs, and bi-embedding graphs on surfaces.* Preliminary report.  
**Dan Archdeacon**, The University of Vermont (1077-05-1827)
- 2:45PM (444) *Locally maximal embeddings of graph.*  
**Martin Skoviera\***, Comenius University, Bratislava, Slovakia, and **Michal Kotrbčik**, Comenius University, Bratislava (1077-05-2335)
- 3:15PM (445) *On the total embeddings for some types of graphs.*  
**Yichao Chen**, College of Mathematics and Econometrics, Hunan University (1077-05-1696)
- 3:45PM (446) *Genus Distributions of 4-Regular Outerplanar Graphs.*  
**Mehvish I. Poshni\***, **Imran F. Khan** and **Jonathan L. Gross**, Department of Computer Science, Columbia University, New York (1077-05-2688)
- 4:15PM (447) *Genus Distribution of  $P_3 \times P_n$ .*  
**Imran F. Khan\***, **Mehvish I. Poshni** and **Jonathan L. Gross**, Department of Computer Science, Columbia University (1077-05-2687)
- 4:45PM (448) *Embeddings for Bounded Treewidth and Bounded Degree.*  
**Jonathan L. Gross**, Columbia University (1077-05-1655)

**AMS Special Session on Trends in Representation Theory, II**

2:15 PM – 6:05 PM Room 103, Hynes

- Organizers: **Donald King**, Northeastern University  
**Alfred Noel**, University of Massachusetts, Boston
- 2:15PM (449) *Rational smoothness of K-orbits in the flag variety for  $GL(2n)$ .*  
**William M. McGovern**, University of Washington (1077-22-32)
- 2:45PM (450) *The singularities of slices in the nilpotent cone.* Preliminary report.  
**Eric Sommers**, University of Massachusetts at Amherst (1077-22-186)
- 3:15PM (451) *Generalized Cartan subspaces.* Preliminary report.  
**Aloysius G Helminck**, NC State University (1077-22-1342)
- 3:45PM Discussion
- 4:15PM (452) *The invariant Hilbert scheme of a spherical module.* Preliminary report.  
**Stavros Argyrios Papadakis**, Instituto Superior Tecnico, and **Bart Van Steirteghem\***, Medgar Evers College (City University of New York) (1077-20-1137)
- 4:45PM (453) *Changing highest weight theories for finite  $W$ -algebras.*  
**Jonathan Scott Brown**, University of Birmingham, UK (1077-20-117)

- 5:15PM (454) *A non commutative cluster structure on some hyperbolic algebras.* Preliminary report.  
**Ibrahim Abdou Saleh**, Kansas State University (1077-05-271)
- 5:45PM (455) *Polynomial functors and categorifications.*  
**Oded Yacobi**, University of Toronto (1077-20-2014)

**AMS Special Session on the Mathematics of Decisions, Elections, and Games, II**

2:15 PM – 6:05 PM Exeter, 3rd Floor, Marriott

- Organizers: **Karl-Dieter Crisman**, Gordon College  
**Michael Jones**, *Mathematical Reviews*  
**Michael Orrison**, Harvey Mudd College
- 2:15PM (456) *Changing Notions of Agreeability in Voting.*  
**Francis Edward Su**, Harvey Mudd College (1077-05-1487)
- 2:45PM (457) *Double-Interval Societies.* Preliminary report.  
**Maria Klawe**, Harvey Mudd College, **Kathryn L. Nyman\***, Willamette University, **Jacob N. Scott**, UC Berkeley, and **Francis Edward Su**, Harvey Mudd College (1077-05-1485)
- 3:15PM (458) *N-Person Cake-Cutting: There May Be No Perfect Division.* Preliminary report.  
**Steven J. Brams\***, New York University, **Michael A. Jones**, *Mathematical Reviews*, and **Christian Klamler**, University of Graz (Austria) (1077-91-1261)
- 3:45PM (459) *A Simple Bargaining Mechanism That Elicits Truthful Reservation Prices.*  
**Steven J. Brams**, New York University, **Todd R. Kaplan**, University of Haifa, and **D. Marc Kilgour\***, Wilfrid Laurier University (1077-91-1182)
- 4:15PM (460) *Dynamics of Consistent Bankruptcy Rules.* Preliminary report.  
**Michael A. Jones\***, *Mathematical Reviews*, and **Jennifer M. Wilson**, Eugene Lang College of the New School for Liberal Arts (1077-91-1480)
- 4:45PM (461) *Two-Step Coaliton Values for Multichoice Games.*  
**Michael A. Jones**, *Mathematical Reviews*, and **Jennifer Wilson\***, Eugene Lang College the New School for Liberal Arts (1077-91-1398)
- 5:15PM (462) *On the possibility of manipulation in voting rules with several levels of approval.* Preliminary report.  
**Josep Freixas\***, Technical University of Catalonia, Spain, and **Cameron Parker**, University of San Diego (1077-91-1350)

*Boston, MA, Wednesday, January 4 – Program of the Sessions*

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5:45PM *Redistricting: from theory to practice.*  
 ▶ (463) Preliminary report.  
**Karen Saxe**, Macalester College  
 (1077-91-1830)

3:00PM *Signed-graphic representations of matroids.*  
 (467) **Vaidy Sivaraman**, The Ohio State University (1077-05-2653)

**MAA Minicourse #3: Part A**

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2:15 PM – 4:15 PM **Salon AB, 4th Floor, Marriott**

*Problem-based courses for teachers, future teachers, and math majors.*

Presenters: **Gail Burrill**, Michigan State University  
**Darryl Yong**, Harvey Mudd College  
**Bowen Kerins**, Education Development Center  
**James King**, University of Washington

3:15PM *Covering length- $n$  permutations with  $n+1$ .*  
 ▶ (468) **Kathryn M Hawley\***, Harvey Mudd College, and **Taylor Allison**, North Carolina State University (1077-05-2608)

3:30PM *On Disjunctive Rado Numbers.*  
 (469) **Dusty Sabo\***, Southern Oregon University, **Daniel Schaal**, **Donald Vestal**, South Dakota State University, and **Jacent Tokaz**, Georgia Institute of Technology (1077-05-2699)

3:45PM Break.

4:00PM *Relation between the energy of a digraph and the energy of its underlying graph.*  
 (470) Preliminary report.  
**Nafiseh Jahanbakhht\***, New York, NY, and **Kourosh Tavakoli**, City University of New York (1077-05-2629)

**MAA Minicourse #7: Part A**

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2:15 PM – 4:15 PM **Salon CD, 4th Floor, Marriott**

*Study the masters: Using primary historical sources in mathematics teaching.*

Presenters: **Daniel Otero**, Xavier University  
**David Pengelley**, New Mexico State University

4:15PM *On 2 – 1 Graph Achievement Games.*  
 (471) **Curtis Clark**, Morehouse College (1077-05-2587)

4:30PM *The spectra of several random graph families.*  
 (472) **Fan Chung**, **Mary Radcliffe\*** and **Stephen Young**, University of California, San Diego (1077-05-2509)

**MAA Minicourse #11: Part A**

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2:15 PM – 4:15 PM **Salon HI, 4th Floor, Marriott**

*Teaching differential equations with modeling.*

Presenters: **Michael Huber**, Muhlenberg College  
**Dan Flath**, Macalester College  
**Tom LoFaro**, Gustavus Adolphus College

4:45PM *Consecutive Matches in Permutations and cycle structures of permutations.*  
 ▶ (473) **Miles Eli Jones\*** and **Jeffrey Rempel**, University of California, San Diego (1077-05-2450)

5:00PM *Hitting Set Size for Random Set Systems.*  
 ▶ (474) **Lucia C Petito\***, University of Rochester, **Jessie Deering**, **Anant Godbole** and **William Jamieson**, East Tennessee State University (1077-05-2436)

5:15PM *Descent pattern avoidance.*  
 (475) **Richard Ehrenborg** and **JiYoon Jung\***, University of Kentucky (1077-05-2487)

**AMS Session on Combinatorics and Graph Theory, II**

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2:15 PM – 5:25 PM **Room 111, Hynes**

2:15PM  *$K_3$ -decompositions of  $\lambda_1 K_m \vee \lambda_2 \lambda_1 K_n$ .*  
 (464) **Joseph R Chaffee\*** and **Chris Rodger**, Auburn University (1077-05-2708)

2:30PM *The (1, 2)-step competition number of a noninterval tree.*  
 (465) **K. A. Factor**, Marquette University, **S. K. Merz\*** and **S. Yun**, University of the Pacific (1077-05-2593)

2:45PM *Refined Inversion Statistics on Permutations.*  
 (466) **Joshua Sack\***, California State University Long Beach, and **Henning Arnor Ulfarsson**, Reykjavik University, School of Computer Science (1077-05-2672)

**AMS Session on Finite Differences and Functional Equations: Sequences, Series, and Expansion**

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2:15 PM – 5:25 PM **Room 308, Hynes**

2:15PM *Existence of Solutions to Boundary Value Problems at Full Resonance.*  
 (476) **Kristen K Abernathy\***, Winthrop University, and **Jesus Rodriguez**, North Carolina State University (1077-39-1389)

2:30PM *Studying the Solutions and Stability of Difference Equations with Time-Varying Coefficients.*  
 ▶ (477) **Paul R Bouthellier**, University of Pittsburgh-Titusville (1077-39-385)

**Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)**

- 2:45PM *Difference equations for long-term simulation of mechanical systems.*  
▶ (478) Preliminary report.  
**Kenneth R. Ball\*** and **Dmitry V. Zenkov**, North Carolina State University (1077-39-113)
- 3:00PM *Neutral Equation of Mixed.*  
(479) **Charles L Lamb\*** and **Erik S Van Vleck**, University of Kansas (1077-39-2885)
- 3:15PM *Asymptotic summation of right almost diagonal difference systems.*  
(480) **Fei Xue\***, University of Hartford, and **Harry Gingold**, West Virginia University (1077-39-539)
- 3:30PM *The devil's series, did it fool Euler?*  
▶ (481) Preliminary report.  
**Thomas J. Osler**, Rowan University (1077-40-1124)
- 3:45PM Break
- 4:00PM *Optimality of spherical codes subject to symmetries.* Preliminary report.  
▶ (482) **Gregory Minton\***, Massachusetts Institute of Technology, and **Henry Cohn**, Microsoft Research (1077-52-2363)
- 4:15PM *Coset sum: an alternative to the tensor product in wavelet construction.*  
(483) **Youngmi Hur** and **Fang Zheng\***, Johns Hopkins University (1077-41-1107)
- 4:30PM *Asymptotic analysis in migration ecology and simple SIR epidemiology.*  
▶ (484) **Xiangsheng Wang\*** and **Jianhong Wu**, York University (1077-41-1277)
- 4:45PM *Geometry of Numbers and Sumsets.*  
▶ (485) **Jaewoo Lee**, The City University of New York (Borough of Manhattan Community College) (1077-52-1690)
- 5:00PM *Piecewise  $C^1$  Biorthogonal Multiwavelets on  $[-1, 1]$ .*  
(486) **Phan Nguyen**, New Mexico State University (1077-41-807)
- 5:15PM *Approximate Rational Solutions to Rational ODEs Defined on Discrete Differentiable Curves.*  
(487) **Hongbo Li\***, **Ruiyong Sun**, **Shoubin Yao** and **Ge Li**, Academy of Mathematics and Systems Science, Chinese Academy of Sciences (1077-41-810)

**AMS Session on General Topology**

2:15 PM – 4:10 PM Room 305, Hynes

- 2:15PM *Correspondences between ideals and  $z$ -filters for rings of continuous functions between  $C^*$  and  $C$ .*  
(488) **Joshua Sack** and **Saleem Watson\***, California State University Long Beach (1077-54-2745)
- 2:30PM *Amalgamating Factor Spaces of Generalized Inverse Limits.*  
(489) **Scott M. Varagona**, Auburn University (1077-54-2702)

- 2:45PM *Numerability in sets, spaces and covers.*  
▶ (490) Preliminary report.  
**Nigar Tuncer Ozarslan**, Istanbul (1077-54-2315)
- 3:00PM *A  $P$ - and  $C^*(D)$ -filters process of compactifications and any Hausdorff compactification.*  
(491) **Hueyzen J. Wu\***, Texas A & M University - Kingsville, and **Wan-Hong Wu**, University of Texas at San Antonio (1077-54-440)
- 3:15PM *Knots in the canonical book representation of complete graphs.*  
▶ (492) **Dana P. Rowland\*** and **Andrea Politano**, Merrimack College (1077-54-1393)
- 3:30PM *Homeomorphisms of Compact Sets in Certain Hausdorff Spaces.*  
(493) **Arthur D. Grainger**, Morgan State University (1077-54-165)
- 3:45PM *Oriented skein relation and a biological application.* Preliminary report.  
(494) **Candice R Price**, University of Iowa (1077-54-2270)
- 4:00PM *The Disambiguated Temperley-Lieb Algebra.* Preliminary report.  
▶ (495) **Ellie A Grano**, University of California, Santa Barbara (1077-54-2761)

**AMS Session on Mathematical Biology and Related Fields, II**

2:15 PM – 5:40 PM Room 105, Hynes

- 2:15PM *Results on a discrete, age-class population model.* Preliminary report.  
▶ (496) **David Chan\*** and **Hye Jin Ban**, Virginia Commonwealth University (1077-92-2316)
- 2:30PM *Construction of prior models for EEG source estimation with weighted graph descriptions of anatomical brain connectivity.* Preliminary report.  
▶ (497) **David K Hammond\***, Neuroinformatics Center / University of Oregon, and **Benoit Scherrer**, Computational Radiology Laboratory / Children's Hospital / Harvard University (1077-92-2142)
- 2:45PM *Toward a Vaccine: Modeling the Immune Response Against Shigella.*  
(498) **Courtney L Davis**, University of Maryland, College Park (1077-92-1848)
- 3:00PM *Phenotype Sequencing.*  
(499) **Marc Allen Harper**, UCLA (1077-92-1807)
- 3:15PM *A second-order finite difference approximation for a mathematical model of erythropoiesis.* Preliminary report.  
(500) **Azmy S. Ackleh**, University of Louisiana at Lafayette, and **Jeremy J. Thibodeaux\***, Loyola University New Orleans (1077-92-1680)
- 3:30PM *Studying the recovery algorithm for the time-dependent transmission rate in epidemic models.* Preliminary report.  
(501) **Anna Mummert**, Marshall University (1077-92-2697)

*Boston, MA, Wednesday, January 4 – Program of the Sessions*

- 3:45PM (502) *Optimal Control for a VRE Model.* Preliminary report.  
**Mohammed Yahdi\*** and **Michael Dunlea**, Ursinus College (1077-92-2818)
- 4:00PM Break.
- 4:15PM (503) *Biodiversity dynamics under intransitive competition and habitat destruction.* Preliminary report.  
**Matthew J Labrum**, Washington State University (1077-92-1606)
- 4:30PM (504) *Predicting the ecological outcomes of species invasions and parasite transmission in the upper Mississippi River.*  
**James P Peirce\*** and **Gregory J Sandland**, University of Wisconsin - La Crosse (1077-92-1505)
- 4:45PM (505) *Cancer Classification of Microarray Data by Denoising Methods on Graphs.* Preliminary report.  
**Yue Fan**, **Mark A. Kon**, Department of Mathematics and Statistics and Program in Bioinformatics, Boston University, **Shinuk Kim**, **Charles DeLisi**, Program in Bioinformatics, Boston University, and **Louise A. Raphael\***, Howard University (1077-92-338)
- 5:00PM (506) *Forecasting Cancer: Finding the Initial Conditions for Spatiotemporal Dynamical Models.* Preliminary report.  
**Eric J. Kostelich\***, Arizona State University (1077-92-2640)
- 5:15PM (507) *The Dynamics Underlying Pseudo-Plateau Bursting in a Pituitary Cell Model.* Preliminary report.  
**Wondimu W. Teka\***, **Joel Tabak**, Florida State University, **Theodore Vo**, **Martin Wechselberger**, University of Sydney, and **Richard Bertram**, Florida State University (1077-92-1489)
- 5:30PM (508) *Homogenization of Large-Scale Movement Models in Ecology.*  
**Martha J. Garlick\***, **James A. Powell**, Utah State University, **Mevin B. Hooten**, USGS Colorado Cooperative Fish and Wildlife Research Unit; Colorado State University, and **Leslie R. McFarlane**, Utah Division of Wildlife Resources (1077-92-1051)
- 2:30PM (510) *Relative Equilibria in the Four-Vortex Problem with Two Pairs of Equal Vorticities.* Preliminary report.  
**Gareth E Roberts\***, College of the Holy Cross, **Marshall Hampton**, University of Minnesota, Duluth, and **Manuele Santoprete**, Wilfrid Laurier University (1077-70-2598)
- 2:45PM (511) *A regularization technique for oscillating slender bodies in low Reynolds number flow.*  
**Bree Cummins**, Tulane University (1077-76-1394)
- 3:00PM (512) *Second Harmonic Generation at Metal/Dielectric Interfaces via Density Functional Theory.* Preliminary report.  
**Justin Droba**, Michigan State University (1077-78-343)
- 3:15PM (513) *Mathematical Problems in Residential Geothermal Heating Systems.*  
**B S Tilley**, Worcester Polytechnic Institute (1077-80-2766)
- 3:30PM (514) *Unsteady blood flow in an artery with an overlapping stenosis.*  
**Ranadhir Roy\*** and **Daniel N Riahi**, University of Texas-Pan American (1077-76-95)
- 3:45PM Break.
- 4:00PM (515) *Exact solution to the 1d one component Coulomb gas at fixed energy.*  
**Timothy D Andersen**, Daniel H. Wagner Associates, Inc. (1077-82-837)
- 4:15PM (516) *The Reality Game: A Process Theory Approach to Quantum Foundations.*  
**William H Sulis**, McMaster University and The University of Waterloo (1077-81-2281)
- 4:30PM (517) *Periodic Ising model and Ising Correlations.*  
**Grethe Hystad**, The University of Arizona (1077-82-1752)
- 4:45PM (518) *Scalar Field Dark Matter and Spiral Structures of Galaxies: Higher Order Effects and Gravitational Lensing.* Preliminary report.  
**Nicholas P Robbins**, Gettysburg College (1077-85-2083)
- 5:00PM (519) *On conformal mappings of spherical domains.*  
**Liudmila Bourchtein\*** and **Andrei Bourchtein**, Pelotas State University, Brazil (1077-86-254)
- 5:15PM (520) *High dimension control for quantum system.*  
**Quan-Fang Wang**, The Chinese University of Hong Kong (1077-81-19)
- 5:30PM (521) *3-D Vortex Rings Instabilities and Collision: Numerical Approach.*  
**Leon Kaganovskiy\***, Touro College, NY, and **Robert Krasny**, University of Michigan, Ann Arbor (1077-76-809)

**AMS Session on Mechanics and Mathematical Physics, II**

2:15 PM – 5:40 PM Room 303, Hynes

- 2:15PM (509) *Computation of the linear and first-order solid fractions for a magneto-convective flow in an active mushy layer.*  
**Dambaru Bhatta**, The University of Texas-Pan American (1077-76-647)

Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)

**AMS Session on Probability Theory, Stochastic Processes, and Statistics, II**

2:15 PM – 4:40 PM

Room 209, Hynes

- 2:15PM *On the Stochastic Beverton-Holt Difference Equation with Survival Rates.* (522) **Paul H Bezandry\***, **Toka Diagana**, Howard University, and **Saber Elaydi**, Trinity University (1077-60-1957)
- 2:30PM *Primitive Recursive Representations of “Skorokhod Sequences” for the Standard Normal.* (523) **Marina Skyers**, Lehigh University (1077-60-1748)
- 2:45PM *On Spectral Properties of Certain Large Matrices That Arise in the Study of Processor Shared Queues.* (524) **Qiang Zhen\***, University of North Florida, and **Charles Knessl**, University of Illinois at Chicago (1077-60-1484)
- 3:00PM *Effects of cell division on stochastic intracellular chemical reaction systems.* (525) **John K McSweeney\*** and **Lea Popovic**, Concordia University (1077-60-1191)
- 3:15PM *Occupation Times for Stable-like Processes.* (526) **Brian M. Whitehead**, Eastern Connecticut State University (1077-60-746)
- 3:30PM *Target Shooting and Normal Distribution.* (527) Preliminary report. **Zhaochi Zhang\***, Northwestern Polytechnical University, and **Zengxiang Tong**, Otterbein University (1077-60-1475)
- 3:45PM *Forecasting Foreign Exchange rates with Simultaneous Nearest Neighbor Algorithm using Mahalanobis Distance as the Distance Measure.* Preliminary report. **Vindya Kumari Pathirana\*** and **Kandethody M Ramachandran**, University of South Florida (1077-60-2072)
- 4:00PM *Rate of Convergence of Weak Euler Approximation for Nondegenerate Itô Diffusion and Jump Processes.* (529) **C. Y. Zhang**, Xi’an Jiaotong-Liverpool University (1077-60-595)
- 4:15PM *Percolation threshold bounds derived by the substitution method without a reference lattice.* Preliminary report. **John C Wierman**, Johns Hopkins University (1077-60-1243)
- 4:30PM *Characterizations of Logistic Distribution via Distributional Properties of Order Statistics.* Preliminary report. **George P Yanev\***, The University of Texas - Pan American, and **M Ahsanullah**, Rider University (1077-62-2496)

**AMS Session on Undergraduate Research, II**

2:15 PM – 4:40 PM

Room 110, Hynes

- 2:15PM *On  $d$ -modular labelings of the union of two cycles.* (532) **Joseph Buchanan\***, **Ryan C. Bunge**, Illinois State University, **Erik Pelttari**, Northern Illinois University, **Greg Rasmuson**, Roanoke-Benson High School, IL, **Alexander Su**, Illinois State University High School, and **Sevasti Tagaris**, Illinois Wesleyan University (1077-05-2647)
- 2:30PM *Extremal Graphs Without 4-Cycles.* (533) **Frank A. Firke\***, Carleton College, **Evan D. Nash**, University of Nebraska-Lincoln, and **Peter M. Kosek**, The College at Brockport, SUNY (1077-05-2136)
- 2:45PM *The Abelian Sandpile Model.* (534) **J K Herring\***, **E Meza** and **C M Nieuwoudt**, Sam Houston State University (1077-05-2920)
- 3:00PM *A Family of Algorithms Yielding a Solution to the Hermite Problem.* (535) Preliminary report. **Sarah Peluse\***, Lake Forest College and The University of Chicago, **Krishna Dasaratha**, Harvard University, **Laure Flapan**, Yale University, **Tom Garrity**, **Chansoo Lee**, Williams College, **Cornelia Mihaila**, Wellesley College, **Nicholas Neumann-Chun**, Williams College, and **Matt Stoffregen**, The University of Pittsburgh (1077-11-2325)
- 3:15PM *A Generalized Family of Multidimensional Continued Fractions?* Preliminary report. **Krishna Dasaratha**, Harvard University, **Laure Flapan**, Yale University, **Thomas Garrity**, **Chansoo Lee**, Williams College, **Cornelia Mihaila\***, Wellesley College, **Nicholas Neumann-Chun**, Williams College, **Sarah Peluse**, Lake Forest College, University of Chicago, and **Matt Stoffregen**, University of Pittsburgh (1077-11-2614)
- 3:30PM *Finite-Dimensional Frame Theory over Arbitrary Fields.* Preliminary report. **Suren Jayasuriya\***, University of Pittsburgh, and **Pedro Perez**, Columbus State University (1077-15-294)
- 3:45PM *Multidimensional Continued Fraction Pell Equations.* Preliminary report. **Michael Baiocchi**, Stanford University, **Krishna Dasaratha**, Harvard University, **Laure Flapan\***, Yale University, **Thomas Garrity**, **Chansoo Lee**, Williams College, **Cornelia Mihaila**, Wellesley College, **Nicholas Neumann-Chun**, Williams College, **Sarah Peluse**, University of Chicago, and **Matthew Stoffregen**, University of Pittsburgh (1077-11-2129)

*Boston, MA, Wednesday, January 4 – Program of the Sessions*

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- ▶ 4:00PM *Unique Sequences for Multidimensional Continued Fractions.* Preliminary report.  
**Krishna Dasaratha\***, Harvard University, **Thomas Garrity**, Williams College, **Laure Flapan**, Yale University, **Chansoo Lee**, Williams College, **Cornelia Mihaila**, Wellesley College, **Nicholas Neumann-Chun**, Williams College, **Sarah Peluse**, Chicago University, and **Matthew Stoffregen**, University of Pittsburgh (1077-11-2499)
- ▶ 4:15PM *The n-House Problem.*  
**Amanda Kovacs**, Molloy College (1077-11-2743)
- ▶ 4:30PM *Fraction of Nonnegative Polynomials that are Sums of Squares.*  
**Caitlin A Lownes**, Massachusetts Institute of Technology (1077-14-312)

- ▶ 4:35PM *Mystery Plots: Motivating Algebraic Function Models using Dynamic Mathematics Software.*  
**Michael Todd Edwards\***, Miami University, **Robert M. Klein**, Ohio University, and **Steve Phelps**, Madeira High School and University of Cincinnati - Clermont College (1077-D5-1357)
- ▶ 4:55PM *The Power of Symbolic Spreadsheets.*  
**Rejoice Mudzimiri**, Montana State University (1077-D5-2589)
- ▶ 5:15PM *Visualizing Lagrange Multiplier Optimization using CalcPlot3D.* Preliminary report.  
**Paul E Seeburger**, Monroe Community College (1077-D5-1952)

**MAA Session on Effective Use of Dynamic Mathematical Software in the Classroom, II**

2:15 PM – 5:30 PM **Back Bay Ballroom C, 2nd Floor, Sheraton**

- Organizers: **M. E. Waggoner**, Simpson College  
**Therese Shelton**, Southwestern University
- ▶ 2:15PM *Becoming One with Bifurcations in 3D!*  
**Itai Seggev**, Wolfram Research, Inc. (1077-D5-787)
  - ▶ 2:35PM *Taylor Polynomials in R.* Preliminary report.  
**Andrew J Rich\***, **Daniel T. Kaplan**, Macalester College, **Randall J Pruim**, Calvin College, **Nicholas J Horton**, Smith College, and **JJ Allaire**, RStudio (1077-D5-778)
  - ▶ 2:55PM *Student Voice Waves: Investigations using Calculus and Freeware.* Preliminary report.  
**Phil Gustafson**, Colorado Mesa University (1077-D5-2604)
  - ▶ 3:15PM *Communicating calculus concepts using graphically presented functions in Adobe Flash applets embedded in WebWork.*  
**Daniel J Gries**, Hopkins School (1077-D5-2616)
  - ▶ 3:35PM *Team Activities for the First Day of Class Using a Computer Algebra System.* Preliminary report.  
**J Alfredo Jimenez**, Penn State Hazleton (1077-D5-2453)
  - ▶ 3:55PM *Taking Instruction with Numerical Computations to the Next Octave.*  
**Talitha M Washington**, Howard University (1077-D5-1554)
  - ▶ 4:15PM *Teaching Transformations of Functions Using Sage.* Preliminary report.  
**Susan L Schmoyer**, Worcester State University (1077-D5-2556)

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

2:15 PM – 5:50 PM **Room 311, Hynes**

- Organizers: **David Strong**, Pepperdine University  
**Gil Strang**, Massachusetts Institute of Technology  
**David Lay**, University of Maryland
- ▶ 2:15PM *Discovery learning in linear algebra using dynamical geometry software.*  
**Martha Ellen Waggoner**, Simpson College (1077-F1-1720)
  - ▶ 2:35PM *Using Dynamic Geometry Software to Foster Students' Understanding of Vectors.*  
**Tanya Berezovski**, St. Joseph's University, Philadelphia, and **Tyler Gaspich\***, St. Joseph's University, Philadelphia (1077-F1-872)
  - ▶ 2:55PM *Teaching geometry using linear algebra.* Preliminary report.  
**Dragu Atanasiu\***, University of Boras, Sweden, and **Piotr Mikusinski**, University of Central Florida (1077-F1-828)
  - ▶ 3:15PM *Using N-dimensional Geometry as a Thread to Increase Geometric and Abstract Reasoning in Linear Algebra.* Preliminary report.  
**Stephen Hilbert**, Ithaca College, Ithaca NY (1077-F1-2689)
  - ▶ 3:35PM *Group Theory in the Linear Algebra Classroom.* Preliminary report.  
**Paul E. Becker\*** and **Mark Medwid**, Penn State Erie, The Behrend College (1077-F1-1698)
  - ▶ 3:55PM *A Physical Laboratory for Linear Algebra.*  
**Jeffrey M Hokanson\***, **Steven J Cox** and **Mark Embree**, Rice University (1077-F1-2686)
  - ▶ 4:15PM *Discrete Dynamical Fibonacci.*  
**Edward Early**, St. Edward's University (1077-F1-711)

**Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)**

- 4:35PM ▶ (559) *Combinatorial Scheduling: a way to motivate matrix multiplication and other important concepts.*  
**Donna A. Dietz**, University of Pennsylvania (1077-F1-274)
- 4:55PM ▶ (560) *Linear Algebra Projects for Computer Science Majors in Costa Rica.* Preliminary report.  
**Michael Josephy**, Universidad de Costa Rica (1077-F1-879)
- 5:15PM (561) *A Hypothetical Learning Trajectory for Conceptualizing Matrices as Linear Transformations.*  
**Megan Wawro\***, Virginia Tech, and **Christine Larson**, Vanderbilt University (1077-F1-2328)
- 5:35PM ▶ (562) *Linear: Maxima Edition.*  
**Don Spickler**, Salisbury University (1077-F1-1071)

- 5:35PM ▶ (573) *A Connection Between Cross Country Scoring and Election Tallying.* Preliminary report.  
**Jacob Erb**, Taylor University (1077-G1-2837)
- 5:55PM ▶ (574) *An introduction to quantitative analysis in hockey.*  
**Brian A. Macdonald**, United States Military Academy (1077-G1-2930)

**MAA Session on Mathematics and Sports, II**

2:15 PM – 6:10 PM Room 203, Hynes

- Organizer: **R. Drew Pasteur**, College of Wooster
- 2:15PM ▶ (563) *Rule of Tangent for Win-By-Two Games.*  
**Reza D Noubary**, Bloomsburg University (1077-G1-2571)
- 2:35PM ▶ (564) *Hot Hands on the PGA Tour.* Preliminary report.  
**Roland Minton**, Roanoke College (1077-G1-2364)
- 2:55PM ▶ (565) *A Logistic Regression Analysis of the NFL Overtime.*  
**Nicholas Gorgievski\***, Nichols College, and **Thomas C. DeFranco**, University of Connecticut (1077-G1-2844)
- 3:15PM ▶ (566) *The Quarterback Passer Rating: Analyzing and Tweaking the QBPR.*  
**Paul von Dohlen**, William Paterson University (1077-G1-2098)
- 3:35PM ▶ (567) *An Adjustment to the Colley Matrix Method.*  
**Mike Weimerskirch**, Augsburg College (1077-G1-1091)
- 3:55PM ▶ (568) *Paradoxes in Colley Matrix Sports Rankings.*  
**T. S. Michael**, U. S. Naval Academy (1077-G1-2049)
- 4:15PM ▶ (569) *Using Sports Ranking in a Numerical Linear Algebra Course.*  
**Chuck Wessell**, Gettysburg College (1077-G1-2685)
- 4:35PM (570) *Modeling a Baseball Defense as a Network.*  
**Tina Hartley**, United States Military Academy (1077-G1-2508)
- 4:55PM ▶ (571) *A Century of Baseball Statistics.* Preliminary report.  
**Alan Levine**, Franklin and Marshall College (1077-G1-1361)
- 5:15PM ▶ (572) *Pythagorean Prognostication.*  
**Yousuf George**, Nazareth College (1077-G1-2858)

**MAA Session on Touch It, Feel It, Learn It: Tactile learning Activities in the Undergraduate Mathematics Classroom, II**

2:15 PM – 5:30 PM Room 313, Hynes

- Organizers: **Jessica Mikhaylov**, U.S. Military Academy  
**Julie Barnes**, Western Carolina University
- 2:15PM ▶ (575) *The Cheese Stands Alone.* Preliminary report.  
**Sarah E. Wright**, College of the Holy Cross (1077-O1-2710)
- 2:35PM ▶ (576) *The Touchy-Feely Integral and Basic Properties of Integration.*  
**Benjamin J Thirey\*** and **Robert D Wooster**, West Point (1077-O1-2810)
- 2:55PM ▶ (577) *Using Models to Help Students Understand Calculus Topics.*  
**Sharon L Crumpton**, Belmont University; Nashville, TN (1077-O1-373)
- 3:15PM ▶ (578) *Raising Calculus to the Surface.*  
**Aaron D Wangberg**, Winona State University (1077-O1-2696)
- 3:35PM ▶ (579) *Using 3-D Manipulatives to Teach Calculus.*  
**Dennis C. Ebersole**, Northampton Community College (1077-O1-2709)
- 3:55PM ▶ (580) *The Chain Rule Dance.*  
**Mariah Birgen**, Wartburg College (1077-O1-1033)
- 4:15PM ▶ (581) *Getting the "feel" for centers of mass.*  
**James A Sellers**, Penn State University (1077-O1-709)
- 4:35PM ▶ (582) *Curve Sketching with Puzzle Pieces.*  
**Teena Carroll**, St. Norbert College (1077-O1-847)
- 4:55PM ▶ (583) *Grocery Bags and Lasers.*  
**Randall E Cone**, Virginia Military Institute (1077-O1-1578)
- 5:15PM ▶ (584) *Project CAGE: Integrating mathematical and moral imagination through a hands-on learning project.* Preliminary report.  
**Rebecca Bamford, Aminul Huq and Wei Wei\***, Center for Learning Innovation, University of Minnesota Rochester (1077-O1-2016)



*Boston, MA, Wednesday, January 4 – Program of the Sessions*

**MAA Session on the Capstone Course: Innovations and Implementations, II**

2:15 PM – 5:30 PM                      Room 310, Hynes

Organizers: **Kathryn Weld**, Manhattan College  
**Agnes Rash**, St. Joseph's College

- 2:15PM *Communication, Problem Solving and Independence in a Capstone Course.*  
 ▶ (585) **Kristin A Camenga**, Houghton College (1077-C1-2198)
- 2:35PM *Optimizing Capstone With Multiple Constraints.*  
 (586) **Risto Atanasov\***, **Tuval Foguel** and **Jeffrey Lawson**, Western Carolina University (1077-C1-410)
- 2:55PM *A Vertically Integrated Model for a Mathematics "Capstone".*  
 ▶ (587) **Aaron Luttmann\***, **Joseph Skufca**, Clarkson University, **Brian Leventhal**, University of Pittsburgh, and **Clarice Dziak**, Clarkson University (1077-C1-280)
- 3:15PM *Surveying U.S. Mathematics Teacher Preparation Programs: What is the status of the capstone course?* Preliminary report.  
 ▶ (588) **Dana C. Cox**, Miami University, and **Mary Beisiegel\***, Harvard University (1077-C1-770)
- 3:35PM *A Capstone Course in January.*  
 ▶ (589) Preliminary report.  
**Jeremy Case**, Taylor University (1077-C1-2823)
- 3:55PM *Fostering Communication Skills and Independence in a Capstone Project.*  
 (590) Preliminary report.  
**Karolyne Fogel\*** and **Chris Brown**, California Lutheran University (1077-C1-2690)
- 4:15PM *A formative three-semester capstone experience.*  
 (591) **Daniel E. Otero** and **Joseph F. Wagner\***, Xavier University (1077-C1-1121)
- 4:35PM *Senior Seminar, Across a Department and Across the Years.* Preliminary report.  
 ▶ (592) **Meredith L Greer\*** and **Chip Ross**, Bates College (1077-C1-151)
- 4:55PM *Online Discussion Boards in Seminar: Discovering Exciting Tidbits Missed Inside the Classroom Walls on the Outside.*  
 ▶ (593) **Daniel R. Shifflet**, Clarion University of Pennsylvania (1077-C1-2592)
- 5:15PM *Starting a capstone experience: A user's guide.* Preliminary report.  
 ▶ (594) **Kurt Herzinger\***, **Beth Schaubroeck** and **Dale Peterson**, United States Air Force Academy (1077-C1-2449)

**MAA Session on the Mathematics of Sudoku and Other Pencil Puzzles, I**

2:15 PM – 4:50 PM                      Room 312, Hynes

Organizers: **Laura Taalman**, James Madison University  
**Jason Rosenhouse**, James Madison University

- 2:15PM *A Sampler of Sudoku Studies.*  
 ▶ (595) **Jason Rosenhouse\*** and **Laura Taalman**, James Madison University (1077-H1-2053)
- 2:35PM *Al-Maghribi meets Sudoku.*  
 ▶ (596) **Andrew J Simoson\***, King College, and **Ilhan M Izmirlı**, George Mason University (1077-H1-1036)
- 2:55PM *Clue-Symmetric Sudoku.*  
 ▶ (597) **Darrah P. Chavey**, Beloit College (1077-H1-2330)
- 3:15PM *Minimal connected Shidoku symmetry groups.*  
 ▶ (598) **Rebecca E Field\***, **Beth Arnold**, **Steve Lucas** and **Laura Taalman**, James Madison University (1077-H1-2861)
- 3:35PM *MultiSudoku: A Game of Divisors and Multiples.*  
 ▶ (599) **Agnes M. Rash**, Saint Joseph's University (1077-H1-2003)
- 3:55PM *Counting on KenKen Puzzles.* Preliminary report.  
 ▶ (600) **Robert W. Vallin**, Slippery Rock University (1077-H1-367)
- 4:15PM *Minimal 6 × 6 Ken Ken puzzles.*  
 ▶ (601) **Philip Cobb**, Queensborough Community College (1077-H1-2639)
- 4:35PM *Critical sets in Futoshiki squares.*  
 ▶ (602) Preliminary report.  
**Daniel J Katz**, Guilford College (1077-H1-1423)

**MAA Session on the Scholarship of Teaching and Learning in Collegiate Mathematics, II**

2:15 PM – 5:50 PM                      Room 202, Hynes

Organizers: **Jacqueline Dewar**, Loyola Marymount University  
**Thomas Banchoff**, Brown University  
**Pam Crawford**, Jacksonville University  
**Edwin Herman**, University of Wisconsin-Stevens Point  
**Nathan Wodarz**, University of Wisconsin-Stevens Point

- 2:15PM *How does mathematics contribute to a liberal education?*  
 ▶ (603) **Curtis D. Bennett\*** and **Jacqueline M. Dewar**, Loyola Marymount University (1077-N1-2791)
- 2:35PM *Using Wikis in a Geometry Class for Future Teachers.*  
 ▶ (604) **Gregory A Kelsey**, Immaculata University (1077-N1-1560)

**Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)**

- 2:55PM *Implementing Mathematics Research Experiences into Teacher Preparation Programs.*  
▶ (605) **David D Barker\***, **Saad El-Zanati**, Illinois State University, and **Wendy O'Hanlon**, Illinois Central College (1077-N1-2377)
- 3:15PM *A First Attempt at Categorizing and Assessing Different Levels of Student Understanding.* Preliminary report.  
(606) **Paula Shorter\*** and **Mairead Greene**, Rockhurst University (1077-N1-2747)
- 3:35PM *Using Inquiry Based Learning to Enhance Student Attitudes in Complex Analysis.* Preliminary report.  
▶ (607) **Edwin P Herman**, University of Wisconsin-Stevens Point (1077-N1-2740)
- 3:55PM *Does "Thinking about Thinking" Impact Completion Rates of Pre-class Assignments?* Preliminary report.  
▶ (608) **James S Rolf\***, **Lauren Scharff** and **Thomas Hodge**, United States Air Force Academy (1077-N1-1972)
- 4:15PM *Collaborative peer review between two IBL number theory courses.*  
▶ (609) **Dana C. Ernst\***, Plymouth State University, **Angela Hodge**, University of Nebraska of Omaha, and **Andrew Schultz**, Wellesley College (1077-N1-1154)
- 4:35PM *A Semi-IBL Finite Mathematics Course: Is it possible and can it be successful?* Preliminary report.  
▶ (610) **Mindy Capaldi**, Valparaiso University (1077-N1-1032)
- 4:55PM *An analysis of the effectiveness of using exclusively workshop-style instruction in the College Algebra classroom.* Preliminary report.  
(611) **Jennifer Vandenbussche\***, **Christina Scherrer**, **Alexandra Brigham** and **Anastasia Semenova**, Southern Polytechnic State University (1077-N1-793)
- 5:15PM *A cross-disciplinary analysis of math students' writing.* Preliminary report.  
(612) **Patrick Bahls\***, University of North Carolina, Asheville, **Amy Mecklenburg-Faenger**, **Marguerite Scott-Copses** and **Chris Warnick**, College of Charleston (1077-N1-47)
- 5:35PM *Pedagogy in large lectures and the age of digital media: Keep up or be left out!*  
(613) **Fabiana Cardetti\*** and **Amit Savkar**, University of Connecticut (1077-N1-2051)
- 2:15PM *Math Days for Women.*  
▶ (614) **Violeta Vasilevska\***, Utah Valley University, and **Clare Wagner**, University of South Dakota (1077-VA-2892)
- 2:30PM *Investigating Gender Differences in UMTYMP Entrance Exam.*  
▶ (615) **Justin Edward Sukiennik**, University of Minnesota (1077-VA-2538)
- 2:45PM *Strategies to Help Underrepresented and First Generation Students in the STEM Fields.*  
▶ (616) **Joseph E Hibdon, Jr\***, **Melissa Yates**, **Marilyn Saavedra-Leyva** and **Stephanie Levi**, Northeastern Illinois University (1077-VA-1913)
- 3:00PM *Report on the First Kenyan Maths Camp.*  
▶ (617) **Tom Denton\***, York University, **Emily Hobbs**, Queens College, London, **David Stern**, **Zach Mbasu**, **Michael Obiero**, Maseno University, Kenya, and **Jeff Goodman**, London, England (1077-VA-645)
- 3:15PM *ABACUS International Math Challenge.*  
▶ (618) **Tivadar Diveki**, Grace Church School, and **Zsuzsanna Szaniszló\***, Valparaiso University (1077-VA-2540)
- 3:30PM *Closing the loop!*  
▶ (619) **Nooreen Khan**, University of North Texas at Dallas (1077-VA-314)
- 3:45PM *Increasing Math Proficiency in High School Teaching.*  
▶ (620) **Bradley Forrest**, **Pamela Kosick\*** and **Chia-Lin Wu**, Richard Stockton College of New Jersey (1077-VA-452)
- 4:00PM *Another approach to Pre-service Teachers' preparation programs.*  
▶ (621) **Ali S Shaqlaih**, University of North Texas at Dallas (1077-VA-2551)
- 4:15PM *Teacher Created Multiple-Choice Assessments and the Use of Assessment Data for Planning Instruction.*  
▶ (622) **Sue Brown**, University of Houston-Clear Lake (1077-VA-462)
- 4:30PM *Mathematics Partnering with Computer Science to Improve Calculus Instruction and Investigate Student Learning Difficulties.*  
▶ (623) **Marilyn Reba**, **Calvin Williams**, **Roy Pargas**, **Allen Guest** and **Ellen Breazel\***, Clemson University (1077-VA-2134)
- 4:45PM *What Calculus do students learn after Calculus?* Preliminary report.  
▶ (624) **Todd Moore**, Kansas State University (1077-VA-1977)
- 5:00PM *An effort to coordinate conceptual development in math and physics education for engineering undergraduate students.* Preliminary report.  
▶ (625) **Gregory R Baker**, The Ohio State University (1077-VA-1881)

**MAA General Contributed Paper Session: Assessment and Outreach**

2:15 PM – 6:10 PM

**Back Bay Ballroom B, 2nd Floor, Sheraton**

Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College

*Boston, MA, Wednesday, January 4 – Program of the Sessions*

- 5:15PM ► (626) *Development and validation of an instrument to assess college student's statistical inference-an argument based approach to validity.* Preliminary report. **Jiyoon Park\*** and **Robert delMas**, University of Minnesota (1077-VA-1373)
- 5:30PM (627) *How to start a discussion on your campus about assessing general education mathematics.* **Leah Childers**, **Karla Childs\*** and **Bobby Winters**, Pittsburg State University (1077-VA-993)
- 5:45PM ► (628) *CONNECT Math: A Partnership in Higher Education.* **Rebecca C. Metcalf**, Bridgewater State University (1077-VA-691)
- 6:00PM ► (629) *An Alternative Approach to Assessing Instructional Effectiveness: Implications to Teaching and Learning Undergraduate Mathematics.* **Jerry C Obiekwe**, The University of Akron-Wayne College (1077-VA-931)

- 3:45PM (636) *Enhancing Student Learning: The Use of CalcPlot3D Graphing Technology in Developing Core Competencies in Multivariable Calculus.* Preliminary report. **Karen L. Hulsebosch\***, Olympic College, and **Paul E. Seeburger**, Monroe Community College (1077-VC-2636)
- 4:00PM (637) *Analysis of Student Achievement and Retention Regarding Online Calculus Homework.* **Daniel L Kern**, Florida Gulf Coast University (1077-VC-2601)
- 4:15PM (638) *Multiple Choice Versus Open Response Assessment in Calculus.* **Shannon R Lockard\*** and **Irina Seceleanu**, Bridgewater State University (1077-VC-929)
- 4:30PM ► (639) *The Big 'BUT' about Blogs in Online Calculus.* Preliminary report. **Denise LeGrand**, University of Arkansas at Little Rock (1077-VC-529)
- 4:45PM ► (640) *The POGIL project: Student-Centered Learning in Calculus.* Preliminary report. **Laurie Lenz\***, Marymount University, **Jill Guerra**, University of Arkansas Fort Smith, **Catherine Beneteau**, University of South Florida, and **Zdenka Guadarrama**, Rockhurst University (1077-VC-1448)
- 5:00PM ► (641) *Moving Toward a More Effective Learning Environment in First Semester Calculus.* Preliminary report. **Javier Garza**, Tarleton State University (1077-VC-2654)
- 5:15PM (642) *Reducing anxiety and increasing interest in business calculus.* **Janet L Fierson**, La Salle University (1077-VC-2909)
- 5:30PM ► (643) *Using students' tests to improve teaching and learning.* Preliminary report. **Radoslav Dimitric**, CUNY (1077-VC-97)

**MAA General Contributed Paper Session: Calculus**

2:15 PM – 5:40 PM Room 201, Hynes

- Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University
- 2:15PM (630) *Student understanding and misconceptions of infinite repeating decimals in a Sequences and Series Bridge course.* Preliminary report. **Rebecca J. Schmitz\***, Michigan Technological University, and **Harvey Keynes**, University of Minnesota (1077-VC-1859)
- 2:30PM ► (631) *Convergences of Catalan Series.* **Thomas Koshy** and **Zhenguang Gao\***, Framingham State University (1077-VC-2178)
- 2:45PM ► (632) *Search for the Stokes-vergence Theorem.* Preliminary report. **Todd G Will\***, University of Wisconsin - La Crosse, and **David Finn**, Rose-Hulman Institute of Technology (1077-VC-2368)
- 3:00PM ► (633) *Reverse Mathematics and the Lost Proofs of Calc One.* **Stephen M Walk**, St. Cloud State University, St. Cloud, Minnesota (1077-VC-2618)
- 3:15PM ► (634) *Generalized trigonometric substitution.* **Robert D. Poodiack**, Norwich University (1077-VC-2798)
- 3:30PM ► (635) *Resequencing Calculus: An Early Multivariate Approach.* Preliminary report. **Mark E Gruenwald** and **David J Dwyer\***, University of Evansville (1077-VC-1130)

**MAA General Contributed Paper Session: Mathematics and Technology, II**

2:15 PM – 5:25 PM Back Bay Ballroom D, 2nd Floor, Sheraton

- Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University
- 2:15PM ► (644) *Time management and student success using the computer-based instructional system Aleks.* Preliminary report. **Steven D. Wallace**, Macon State College (1077-VI-999)
- 2:30PM (645) *A Decade of Improving Pass Rates in Mathematics using Interactive Software.* **Michelle DeDeo**, University of North Florida (1077-VI-2620)

**Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)**

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- 2:45PM *Mobile Mathlets with Google Web Toolkit.*  
▶ (646) Preliminary report.  
**Thomas E Leathrum**, Jacksonville State University (1077-VI-2670)
- 3:00PM Lurch, *a free math word processor that can check your work.*  
▶ (647) **Nathan C Carter\***, Bentley University, and **Kenneth G Monks**, University of Scranton (1077-VI-2534)
- 3:15PM *Learning with the iPad: Does this technology help or hinder student understanding?*  
(648) **Eric Thornburg\***, **Benjamin Hung** and **John Jackson**, United States Military Academy (1077-VI-1955)
- 3:30PM *Wiki Technology Supporting Learning (I).*  
▶ (649) Preliminary report.  
**Elizabeth Thoren\***, University of California, Santa Barbara, and **Brian Katz**, Augustana College (1077-VI-1622)
- 3:45PM *Wiki Technology Supporting Learning (II).*  
(650) Preliminary report.  
**Brian Katz\***, Augustana College, and **Elizabeth Thoren**, University of California, Santa Barbara (1077-VI-1620)
- 4:00PM *Increasing Student Engagement in Undergraduate Mathematics with Tablet PCs.*  
▶ (651) **Carla A Romney\***, **Juan Pedro Paniagua** and **Fabian Torres-Ardila**, Boston University (1077-VI-164)
- 4:15PM *Teaching mathematics online, is it even possible?*  
▶ (652) **Aldo R. Maldonado**, Park University (1077-VI-2725)
- 4:30PM *Perspectives on the Use of Dynamic Mathematical Software in Classrooms.*  
▶ (653) Preliminary report.  
**Heba Bakr Khoshaim**, Ohio university/ Ministry of Higher Education, Kingdom of Saudi Arabia (1077-VI-2641)
- 4:45PM *Virtual Pin Board Pinterest.com Motivating Gen Ed Group Project and Connecting Math Majors.* Preliminary report.  
▶ (654) **Daniel Kiteck**, Indiana Wesleyan University (1077-VI-1652)
- 5:00PM *Neuro Mathematics Education and Technology.*  
▶ (655) **Alexander Y Vaninsky**, City University of New York, Hostos Community College (1077-VI-756)
- 5:15PM *A Nomograph For The Trigonometric Functions.*  
▶ (656) **Timothy Hall**, PQI Consulting (1077-VI-273)

**MAA-AMS Invited Paper Session on the Philosophy of Mathematics**

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2:15 PM – 6:40 PM **Room 302, Hynes**  
Organizers: **Thomas Drucker**, University of Wisconsin-Whitewater

- Bonnie Gold**, Monmouth University  
**Daniel Sloughter**, Furman University
- 2:15PM *Is Mathematics the Language of Physics?*  
▶ (657) **Arthur M Jaffe**, Harvard University (1077-AJ-71)
- 3:00PM *Structuralism and its discontents.*  
▶ (658) **Charles Parsons**, Harvard University (1077-AJ-1755)
- 3:45PM *Explanation and Existence.* Preliminary report.  
▶ (659) **Stephen Yablo**, Massachusetts Institute of Technology (1077-AJ-59)
- 4:30PM *A Trivialist Account of Mathematics.*  
▶ (660) **Agustin Rayo**, MIT (1077-AJ-83)
- 5:15PM *The relationship of derivations in artificial languages to ordinary rigorous mathematical proof.* Preliminary report.  
▶ (661) **Jody Azzouni**, Tufts University (1077-AJ-1994)
- 6:00PM *Turing and Wittgenstein.* Preliminary report.  
▶ (662) **Juliet Floyd**, Boston University (1077-AJ-1045)

**SIAM Minisymposium on Vistas in Applied, Computational, and Discrete Mathematics**

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2:15 PM – 6:00 PM **Room 206, Hynes**  
Organizers: **Zuhair Nashed**, University of Central Florida  
**Luminita Vese**, University of California Los Angeles

2:15PM *Finding Needles in Exponential Haystacks.* Preliminary report.  
▶ (663) **Joel Spencer**, Courant Institute (1077-05-832)

3:15PM *Frames and applied harmonic analysis.*  
(664) **John J Benedetto**, Norbert Wiener Center, University of Maryland, College Park (1077-43-877)

4:15PM *MINOTAUR: A New Toolkit for Mixed-Integer and Nonlinear Optimization.*  
(665) **Sven Leyffer\*** and **Ashutosh Mahajan**, Argonne National Laboratory (1077-90-2357)

5:15PM *Recent Results in Computational Geometry.*  
▶ (666) **Erik D. Demaine**, Massachusetts Institute of Technology (1077-68-2755)

**AMS-MAA Joint Panel Discussion**

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2:15 PM – 3:35 PM **Room 306, Hynes**  
*Administrative strategies for dealing with budget cuts.*  
Organizers: **Al Boggess**, Texas A&M University  
**Don Allen**, Texas A&M University

Boston, MA, Wednesday, January 4 – Program of the Sessions

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Jill Zarestky, Texas A&M  
University

**YMN/Project NEXt Poster Session**

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2:15 PM – 4:15 PM      **Veteran's Auditorium,  
2nd floor, Hynes**

Organizers: **Mike Axtell**, University of St.  
Thomas  
**Kim Roth**, Juniata College

**MAA Panel Discussion**

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2:15 PM – 3:35 PM      **Room 304, Hynes**

*Reporting progress: A minisymposium of  
projects from the NSF Mathematics and  
Science Partnership program.*

Organizers: **Richard Alo**, National  
Science Foundation  
**Ron Buckmire**, National  
Science Foundation  
**Daniel Maki**, Indiana  
University  
**Lee Zia**, National Science  
Foundation

Panelists: **Amy Cohen**, Rutgers  
University  
**Sabrina Hessinger**,  
Armstrong Atlantic State  
University  
**Jim Lewis**, University of  
Nebraska  
**Glenn Stevens**, Boston  
University

**SIGMAA on Statistics Education/ASA-MAA  
Joint Committee on Statistics Education  
Panel Discussion**

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2:15 PM – 3:35 PM      **Room 309, Hynes**

*Statistics and probability in the Common  
Core State Standards.*

Organizers: **Nancy Boynton**, SUNY  
Fredonia  
**Gail Burrill**, Michigan State  
University  
**Ann Watkins**, California  
State University, Northridge

Panelists: **Christine Franklin**,  
University of Georgia  
**Joan Garfield**, University of  
Minnesota  
**Roxy Peck**, California  
Polytechnic State University,  
San Luis Obispo  
**J. Michael Shaughnessy**,  
National Council of Teachers  
of Mathematics  
**Andrew Zieffler**, University  
of Minnesota

**AWM Panel Discussion**

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2:15 PM – 3:40 PM      **Room 208, Hynes**

*Maintaining an active research career  
through collaboration.*

Organizers: **Christina Sormani**, CUNY  
and Lehman College  
**Ami Radunskaya**, Pomona  
College  
**Ruth Haas**, Smith College

Moderator: **Ami Radunskaya**

Panelists: **Ruth Haas**  
**Trachette L. Jackson**,  
University of Michigan  
**Jill Pipher**, Brown University  
**Urlica Wilson**, Morehouse  
College

**MAA Invited Address**

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3:20 PM – 4:10 PM      **Ballrooms A/B, 3rd floor, Hynes**

(667) *Phylogenetic algebraic geometry.*  
**Seth M. Sullivant**, North Carolina State  
University (1077-A0-5)

**AWM Business Meeting**

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3:45 PM – 4:15 PM      **Room 208, Hynes**

**MAA Panel Discussion**

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3:50 PM – 5:10 PM      **Room 304, Hynes**

*Reporting progress: A minisymposium  
of projects from the NSF Course,  
Curriculum, and Laboratory  
Improvement/Transforming  
Undergraduate Education in STEM  
program.*

Organizers: **Richard Alo**, National  
Science Foundation  
**Ron Buckmire**, National  
Science Foundation  
**Lee Zia**, National Science  
Foundation

Panelists: **Patrick Van Fleet**, University  
of St. Thomas  
**Jerry Lodder**, New Mexico  
State University  
**Lang Moore**, Duke  
University  
**Deborah Nolan**, University  
of California, Berkeley

**MAA Section Officers**

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4:00 PM – 5:00 PM      **Salon E, 4th Floor, Marriott**

Chair: **Rick Gillman**, Valparaiso  
University

**Reception for Undergraduate Students**

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4:00 PM – 5:00 PM      **Ballroom C, 3rd floor, Hynes**

Program of the Sessions – Boston, MA, Wednesday, January 4 (cont'd.)

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**AMS Committee on the Profession Panel Discussion**

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4:30 PM – 6:00 PM Room 208, Hynes

*Supply, demand, and the math Ph.D. program.*

Organizer: **Julius Zelmanowitz**,  
University of California,  
Santa Barbara

Moderator: **Julius Zelmanowitz**

Panelists: **Nancy Heinschel**, National  
Science Foundation  
**Ellen Kirkman**, Wake Forest  
University  
**Richard McGehee**,  
University of Minnesota  
**Carol Wood**, Wesleyan  
University

**MAA Minicourse #5: Part A**

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4:45 PM – 6:45 PM Salon AB, 4th Floor, Marriott

*Dance and mathematics.*

Presenters: **Leon Harkleroad**, Bowdoin  
College  
**Karl Schaffer**, De Anza  
College

**MAA Minicourse #12: Part A**

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4:45 PM – 6:45 PM Salon HI, 4th Floor, Marriott

*Using randomization methods to build  
conceptual understanding of statistical  
inference.*

Presenters: **Robin Lock**, St. Lawrence  
University  
**Patti Frazer Lock**, St.  
Lawrence University  
**Kari F. Lock**, Harvard  
University/Duke University  
**Eric F. Lock**, University of  
North Carolina  
**Dennis F. Lock**, Iowa State  
University

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

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5:30 PM – 7:30 PM Room 304, Hynes

5:30PM Reception and business meeting.

6:30PM *Heron, Newton, Euler, and Barney.*

► (668) **William Dunham**, Muhlenberg College  
(1077-A0-2560)

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

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5:30 PM – 6:30 PM Salon FG, 4th Floor, Marriott

**AMS Josiah Willard Gibbs Lecture**

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8:30 PM – 9:30 PM Ballrooms A/B, 3rd floor, Hynes

(669) *A 250-year argument: Belief, behavior,  
and the bootstrap.*

**Bradley Efron**, Stanford University  
(1077-62-13)

## Thursday, January 5

**Joint Meetings Registration**

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7:30 AM – 4:00 PM 2nd Floor Corridor,  
opposite Hall C, Hynes

**AMS-MAA Special Session on the History of  
Mathematics, III**

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8:00 AM – 11:50 AM Back Bay Ballroom  
A, 2nd Floor, Sheraton

Organizers: **Sloan Despeaux**, Western  
Carolina University  
**Craig Fraser**, University of  
Toronto  
**Deborah Kent**, Hillsdale  
College

8:00AM *The Genius in Mathematics.*  
► (670) **Anjing Qu**, Northwest University, Xian,  
China (1077-01-1459)

8:30AM *Analogies between algebra and number  
theory: Some uses of congruences in  
France between 1801 and 1850.*  
(671) **Jenny Boucard**, Institut de  
Mathématiques de Jussieu (Paris)  
(1077-01-1816)

9:00AM *The teaching of Algebra in France  
(1809-1914).*  
(672) **Caroline Ehrhardt**, ENS-Lyon/Institut  
français de l'éducation, Service d'histoire  
de l'éducation (1077-01-2033)

9:30AM *Linear groups in Galois fields between  
France and the U.S.A. at the turn of the  
20th century.*  
(673) **Frédéric Brechenmacher**, University  
of Lille-North of France (U. Artois).  
Laboratoire de mathématiques de Lens.  
(1077-01-1248)

10:00AM *Hans Frederik Blichfeldt.*  
(674) **Sebastien Gauthier**, Institut Camille  
Jordan, Université Lyon 1 - Claude  
Bernard (1077-01-1514)

10:30AM *Cambridge mathematics in the north:  
Peter Guthrie Tait, Philip Kelland and  
the local nature of mathematics in  
Edinburgh, 1858-1865.*  
► (675)

**Josipa Petrunic**, Institute for the  
History and Philosophy of Science and  
Technology, University of Toronto  
(1077-01-1532)

- 11:00AM *Mathematics for Public Consumption:*  
▶ (676) *Augustus De Morgan's Anonymous Reviews for the Athenaeum.* Preliminary report.  
**Sloan Evans Despeaux**, Western Carolina University (1077-01-1530)
- 11:30AM *Rhetorics of international communication and cooperation: Mittag-Leffler and Swedish mathematics, 1880-1920.* Preliminary report.  
▶ (677) **Laura E. Turner**, University of Artois (1077-01-2385)

- 11:00AM *A non-conforming Generalized Finite Element Method for Transmission Problems.*  
▶ (684) **Anna L. Mazzucato**, **Victor Nistor** and **Qingqin Qu\***, Penn State University (1077-65-2220)
- 11:30AM *A Two-grid Method for Semilinear Interface Problems.* Preliminary report.  
(685) **Holst Michael**, **Ryan Szypowski** and **Yunrong Zhu\***, University of California at San Diego (1077-65-1482)

**AMS-SIAM Special Session on the Mathematics of Computation: Differential Equations, Linear Algebra, and Applications, II**

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8:00 AM – 11:50 AM Room 109, Hynes

- Organizers: **Chi-Wang Shu**, Brown University  
**Susanne C. Brenner**, Louisiana State University
- 8:00AM *A balanced finite element method for singularly perturbed reaction-diffusion problems.*  
(678) **Runchang Lin\***, Texas A&M International University, and **Martin Stynes**, National University of Ireland (1077-65-635)
- 8:30AM *Finite Element Methods for the Displacement Obstacle Problem of Clamped Plates.*  
(679) **Susanne C. Brenner**, **Li-yeng Sung**, **Hongchao Zhang** and **Yi Zhang\***, Louisiana State University (1077-65-1754)
- 9:00AM *Finite dimensional approximations of nonlocal diffusion and peridynamic models.*  
(680) **Qiang Du**, Penn State University (1077-65-2140)
- 9:30AM *Domain decomposition preconditioners for the discontinuous Petrov-Galerkin method.* Preliminary report.  
(681) **Andrew T. Barker\***, **Susanne C. Brenner** and **Li-Yeng Sung**, Louisiana State University (1077-65-1579)
- 10:00AM *HDG Methods for the Vorticity-Velocity-Pressure Formulation of the Stokes Problem.*  
(682) **Bernardo Cockburn** and **Jintao Cui\***, University of Minnesota (1077-65-528)
- 10:30AM *Analysis of HDG methods for the Navier-Stokes equations.* Preliminary report.  
(683) **Aycil Cesmelioglu\***, University of Minnesota, **Bernardo Cockburn**, University of Minnesota, **Ngoc Cuong Nguyen** and **Jaime Peraire**, Department of Aeronautics and Astronautics, Massachusetts Institute of Technology (1077-65-1583)

**AMS-ASL Special Session on the Life and Legacy of Alan Turing, III**

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8:00 AM – 11:40 AM Room 207, Hynes

- Organizers: **Damir Dzhafarov**, University of Chicago and University of Notre Dame  
**Jeff Hirst**, Appalachian State University  
**Carl Mummert**, Marshall University
- 8:00AM *E-Recursion Theory.*  
(686) **Gerald E. Sacks**, Harvard University, MIT (1077-03-1686)
- 9:00AM *The universal Turing machine, and Turing operators.*  
▶ (687) **Julia F. Knight**, University of Notre Dame (1077-03-449)
- 9:30AM *Turing's Influence on Computational Complexity.*  
▶ (688) **Lance Fortnow**, Northwestern University (1077-68-398)
- 10:00AM *A small step beyond the Turing degrees.*  
(689) **Joseph S. Miller**, University of Wisconsin - Madison (1077-03-2897)
- 10:30AM *Ordinal logics and proof theory.*  
(690) **Grigori Mints**, Stanford University (1077-03-388)
- 11:00AM *The Mathematics of Relative Definability.*  
(691) **Theodore A Slaman**, University of California, Berkeley (1077-03-2706)

**AMS Special Session on Classical Fourier Analysis and Partial Differential Equations, III**

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8:00 AM – 11:50 AM Room 104, Hynes

- Organizers: **William O. Bray**, University of Maine  
**Mark A. Pinsky**, Northwestern University
- 8:00AM *Stationary Navier-Stokes equations with singular external forces.*  
(692) **Cong Phuc Nguyen**, Louisiana State University, and **Tuoc Van Phan\***, University of Tennessee (1077-35-510)

**Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)**

- 8:30AM (693) *The critical density property and Harnack's inequality in spaces of homogeneous type.* Preliminary report. **Sharad Deep Silwal\***, **Diego Maldonado**, Kansas State University, and **Sapto Indratno**, Bandung Institute of Technology (1077-35-74)
- 9:00AM (694) *Exponential Operator Splitting for the generalized Kawahara equation.* **Pablo U Suarez**, Delaware State University (1077-35-183)
- 9:30AM (695) *Dispersive estimates for Schrödinger operators in dimension two with obstructions at zero energy.* **M Burak Erdoĝan**, University of Illinois at Urbana-Champaign, and **William R Green\***, Eastern Illinois University (1077-35-64)
- 10:00AM (696) *The regularity problem for the Lamé system on curvilinear polygons in two dimensions.* **Katharine Ott\***, University of Kentucky, and **Irina Mitrea**, Temple University (1077-35-1836)
- 10:30AM (697) *A proof of a Theorem of Boutet de Monvel.* Preliminary report. **Matthew B. Stenzel**, Ohio State University at Newark (1077-58-1928)
- 11:00AM (698) *Unimodular Fourier Multipliers On Modulation Spaces.* Preliminary report. **Jiecheng Chen**, Zhejiang University, P.R.China, **Dashan Fan** and **Lijing Sun\***, University of Wisconsin-Milwaukee (1077-35-526)
- 11:30AM (699) *The Muckenhoupt-type estimations for the best constants in multidimensional modular inequalities over spherical cones.* **Chang-pao Chen\***, Hsuan Chuang University, **Jin-Wen Lan**, National Tsing Hua University, and **Dah-Chin Luor**, I-Shou University (1077-42-1056)

**AMS Special Session on Climate Modeling and Geophysical Fluid Dynamics, I**

8:00 AM – 11:20 AM Suffolk, 3rd Floor, Marriott

Organizers: **Qingshan Chen**, Florida State University  
**Nathan Glatt-Holtz**, Indiana University  
**Mickael Chekroun**, University of California, Los Angeles

- 9:00AM (700) *Impact of Non-Gaussian Random Boundary Conditions on a Burgers-Boussinesq System.* **Jinqiao Duan**, Institute for Pure and Applied Math, Los Angeles & Dept of Applied Math, Illinois Institute of Technology, Chicago (1077-60-2529)

- 9:30AM (701) *Parameter estimation for energy balance models with memory.* Preliminary report. **Mickael D. Chekroun\***, Department of Atmospheric & Oceanic Sciences and IGPP, UCLA, **Lionel Roques**, UR 546 Biostatistique et Processus Spatiaux, INRA, **Michel Cristofol**, Université Aix-Marseille, LATP, **Samuel Soubeyrand**, UR 546 Biostatistique et Processus Spatiaux, INRA, and **Michael Ghil**, Geosciences Department and Laboratoire de Météorologie Dynamique (CNRS and IPSL) (1077-35-2575)
- 10:00AM ► (702) *Uncertainty quantification in the simulation of quasi-one-dimensional nozzle flow.* Preliminary report. **Yanyan He\***, **Yousuff Hussaini** and **Jonghoon Bin**, Florida State University (1077-60-2126)
- 10:30AM ► (703) *Correcting flow estimates in Chesapeake Bay using data assimilation.* **Matthew J Hoffman**, Rochester Institute of Technology (1077-86-2741)
- 11:00AM ► (704) *A stochastic model for tropical rainfall and extreme events.* **Samuel N Stechmann\***, Department of Mathematics, and Department of Atmospheric and Oceanic Sciences, University of Wisconsin-Madison, and **J David Neelin**, Department of Atmospheric and Oceanic Sciences, and Institute of Geophysics and Planetary Physics, UCLA (1077-60-2405)

**AMS Special Session on Combinatorial Geometry of Polytopes, I**

8:00 AM – 11:50 AM Room 102, Hynes

Organizers: **Egon Schulte**, Northeastern University  
**Asia Ivic Weiss**, York University

- 8:00AM (705) *Semiregular Polytopes and Amalgamated C-Groups.* Preliminary report. **Egon Schulte**, Northeastern University (1077-05-801)
- 8:30AM ► (706) *Recent developments about Colorful Polytopes.* Preliminary report. **Deborah Oliveros\***, UNAM, **Gabriela Araujo**, **Hubard Isabel**, UNAM., and **Egon Schulte**, Northeastern University (1077-51-1483)
- 9:00AM ► (707) *Theory and examples of ghost symmetry.* **David Richter**, Western Michigan University (1077-51-544)
- 9:30AM (708) *Strengthening Fary's Theorem: Convex and Star-Shaped Realizations of Polyhedral Complexes.* **Stedman M. Wilson\*** and **Igor Pak**, University of California, Los Angeles (1077-52-878)
- 10:00AM (709) *Constructing self-Petrie and self-dual covers of regular polyhedra.* **Gabe Cunningham**, Northeastern University (1077-52-814)



- 10:30AM (710) *The width of 4-prismatoids.*  
**Francisco Santos**, Universidad de Cantabria, **Tamon Stephen\***, Simon Fraser University, and **Hugh Thomas**, University of New Brunswick (1077-52-1301)
- 11:00AM (711) *Two-Orbit Polytopes with Two Facet Types.* Preliminary report.  
**Ilanit Helfand**, Northeastern University (1077-05-811)
- 11:30AM Discussion

**AMS Special Session on Computational and Applied Topology (Mathematics Research Communities session), I**

8:00 AM – 11:50 AM Exeter, 3rd Floor, Marriott

- Organizers: **Radmila Sazdanovic**, University of Pennsylvania  
**Daniel Muellner**, Stanford University  
**Mikael Vejdemo-Johansson**, University of St. Andrews
- 8:00AM (712) *Oscillatory solutions of fourth order conservative systems via the Conley index.*  
**Miroslav Kramar\***, Rutgers, **J Van den Berg** and **R. Van der Vorst**, Free University Amsterdam (1077-55-1002)
- 8:30AM (713) *Quantifying Patterns in a Coupled-Patch Population Model.*  
**Sarah Day\***, The College of William and Mary, and **Benjamin Holman**, University of Arizona (1077-37-1362)
- 9:00AM (714) *Homology and Robustness of Level and Interlevel Sets.*  
**Paul Bendich**, Duke University, **Herbert Edelsbrunner**, IST Austria, **Dmitriy Morozov\***, Lawrence Berkeley National Lab, and **Amit Patel**, Rutgers University (1077-55-2265)
- 9:30AM (715) *Computing Well Diagrams for Vector Fields in  $\mathbb{R}^n$ .*  
**Primoz Skraba**, Jozef Stefan Institute (1077-68-2114)
- 10:00AM (716) *Obstruction-Theoretic Sensing.* Preliminary report.  
**Justin Michael Curry**, University of Pennsylvania (1077-55-1709)
- 10:30AM (717) *Evasion Paths in Mobile Sensor Networks.* Preliminary report.  
**Henry Adams**, Stanford University (1077-55-1678)
- 11:00AM (718) *Persistent homology and statistical inference.* Preliminary report.  
**Peter Bubenik**, Cleveland State University (1077-55-2042)
- 11:30AM (719) *Finite Coverage Processes and Homology of Random Sets.* Preliminary report.  
**Rafal Komendarczyk** and **Jeffrey Pullen\***, Tulane University (1077-57-985)

**AMS Special Session on Differential Algebraic Geometry and Galois Theory (in memory of Jerald Kovacic), I**

8:00 AM – 11:50 AM Room 103, Hynes

- Organizers: **Phyllis Joan Cassidy**, Smith College and the City University of New York  
**Richard Churchill**, Hunter College and Graduate Center at CUNY  
**Claude Mitschi**, Université de Strasbourg, France  
**Michael Singer**, North Carolina State University
- 8:00AM (720) *Automorphisms of Hurwitz series.*  
**William F. Keigher\***, Rutgers University, Newark Campus, and **V. Ravi Srinivasan**, Catholic University of America (1077-13-1231)
- 8:30AM (721) *Cohomology of Differential Schemes.* Preliminary report.  
**Raymond T Hoobler**, City College of New York and Graduate Center, CUNY (1077-14-511)
- 9:00AM (722) *Classification of Algebraic Subgroups of Lower Order Unipotent Algebraic Groups.* Preliminary report.  
**V. Ravi Srinivasan**, Catholic University of America (1077-12-530)
- 9:30AM (723) *Higher variationnal equations between Kolchin solvability and virtual Abelianity.*  
**Guillaume Duval**, INSA de Rouen (France) (1077-20-394)
- 10:00AM (724) *Descent for differential Galois theory of difference equations. Confluence and  $q$ -dependency.* Preliminary report.  
**Lucia Di Vizio\***, Laboratoire de Mathématiques de Versailles, and **Charlotte Hardouin**, Institut de mathématiques de Toulouse (1077-39-968)
- 10:30AM (725) *Solvability of difference Riccati equations.*  
**Seiji Nishioka**, Aoyama Gakuin University (1077-12-299)
- 11:00AM (726) *Galois theory of strongly normal differential and difference extensions.*  
**Michael Wibmer**, RWTH Aachen (1077-12-600)
- 11:30AM (727) *The ring of global sections of a differential scheme.*  
**Dmitry Trushin**, Hebrew University of Jerusalem (1077-12-596)

**AMS Special Session on Fractal Geometry in Pure and Applied Mathematics (in memory of Benoit Mandelbrot), II**

8:00 AM – 11:50 AM Room 200, Hynes

- Organizers: **Michael L. Lapidus**, University of California, Riverside

Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)

- Erin Pearse**, University of Oklahoma  
**Machiel van Frankenhuijsen**, Utah Valley University
- 8:00AM *The algebraic geometry of Harper operators.* (728)  
**Dan Li**, Florida State University (1077-70-1960)
- 8:30AM *Extreme risk and fractal regularity in finance.* (729)  
**Laurent E Calvet**, Department of Finance, HEC Paris (1077-91-2303)
- 9:00AM *The Weierstrass function and Fractional Brownian motion.* (730)  
**Murad S. Taqqu**, Boston University (1077-60-898)
- 9:30AM *Magic fractal distribution trees in living systems: 1-Implication for evolution theory 2-Role of randomness.* Preliminary report. (731)  
**Bernard Sapoval**, Physique de la Matière Condensée, Ecole Polytechnique-CNRS (1077-92-1494)
- 10:00AM *The landscape of Anderson localization in a disordered medium.* (732)  
**Marcel Filoche\***, Ecole Polytechnique, CNRS, and **Svitlana Mayboroda**, University of Minnesota (1077-35-2011)
- 10:30AM *Fractal Antennas, Resonators, and Invisibility Cloaks: Nuggets from the Tortuous Path.* (733)  
**Nathan Cohen**, Fractal Antenna Systems, Inc. (1077-94-2760)
- 11:00AM *Fractal geometry: a pathway to understanding biodiversity.* (734)  
**Mark E Ritchie**, Syracuse University (1077-92-2516)
- 11:30AM *Physical Analogues of Peano Curves: from genome folding to new symmetries.* (735)  
**Adrian Sanborn**, **Jian Li**, Harvard University, and **Erez Lieberman Aiden\***, Harvard Society of Fellows (1077-92-2339)

**AMS Special Session on Groups, Algorithms, Complexity, and Theory of Security, III**

8:00 AM – 11:50 AM Room 101, Hynes

- Organizers: **Maggie Habeeb**, City University of New York  
**Delaram Kahrobaei**, City University of New York
- 8:00AM *A More Efficient Approach to Bayesian Variable Selection.* (736)  
**Eric R Ruggieri**, Duquesne University (1077-62-1198)
- 8:30AM *Schreier graphs and Schreier dynamical system of the action of Thompson's group  $F$  on the Cantor set.* (737)  
**Dmytro M Savchuk**, Binghamton University (1077-20-1887)

- 9:00AM *Some Observations Involving the Baumslag groups  $G(m, n)$ .* (738)  
**Anthony E Clement**, Brooklyn College, City University of New York (1077-20-1297)
- 9:30AM *From indexed languages to generating functions.* (739)  
**Jared Adams**, **Eric M Freden\***, Southern Utah University, and **Marni Mishna**, Simon Fraser University (1077-05-864)
- 10:00AM *Abelian extensions of orthogonal Lie algebras in  $E_6$  and  $E_8$ .* (740)  
**Andrew Douglas\***, **Delaram Kahrobaei**, City University of New York, and **Joe Repka**, University of Toronto (1077-17-1454)
- 10:30AM *Twin Towers of Hanoi: diameters of coupled graphs.* Preliminary report. (741)  
**Zoran Sunic**, Texas A&M University (1077-20-2767)
- 11:00AM *Permutational isomorphism of permutation groups.* (742)  
**László Babai**, The University of Chicago, **Paolo Codenotti\***, IMA, University of Minnesota, and **Yuming Qiao**, Tsinghua University (1077-68-1334)
- 11:30AM *Quantum Algorithms for Fixed Points and Invariant Subgroups.* (743)  
**Stephen Majewicz**, Kingsborough Community College (1077-20-902)

**AMS Special Session on Hyperbolicity in Manifolds and Groups, III**

8:00 AM – 11:50 AM Berkeley, 3rd Floor, Marriott

- Organizers: **David Futер**, Temple University  
**Genevieve Walsh**, Tufts University
- 8:00AM *How do you build examples?* (744)  
**David Ben McReynolds**, Purdue University (1077-20-1826)
- 8:30AM *Hyperbolicity and measure in Teichmüller space.* (745)  
**Spencer Dowdall**, UIUC, **Moon Duchin\***, Tufts University, and **Howard Masur**, University of Chicago (1077-51-1685)
- 9:00AM *Dynamics of non-classical interval exchanges.* (746)  
**Vaibhav Gadre**, Harvard University (1077-51-933)
- 9:30AM *On convex and non-convex Fuchsian polyhedral realizations of hyperbolic surfaces with a single conical singularity.* (747)  
**Jaejeong Lee**, Seoul, South Korea, and **Kei Nakamura\***, Temple University (1077-57-2910)
- 10:00AM *Hyperbolic directions in Teichmüller space equipped with the Lipschitz metric.* (748)  
**Jing Tao**, University of Utah (1077-51-1007)

- 10:30AM *Embeddability between Right-Angled Artin Groups.*  
▶ (749) **Sang-hyun Kim\***, KAIST, and **Thomas Koberda**, Harvard University (1077-20-1209)
- 11:00AM *The geometry of right-angled Artin subgroups of mapping class groups.*  
(750) **Matt T. Clay**, Allegheny College, **Christopher J. Leininger**, University of Illinois at Urbana-Champaign, and **Johanna Mangahas\***, Brown University (1077-57-1331)
- 11:30AM *Invariant random subgroups of Lie groups.*  
(751) **Ian P Biringer**, New Haven (1077-51-2347)

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

8:00 AM – 11:50 AM **Provincetown, 4th Floor, Marriott**

- Organizers: **Tim Cochran**, Rice University  
**Shelly Harvey**, Rice University
- 8:00AM *Virtual Knot Theory - State Sum Invariants.* Preliminary report.  
(752) **Louis H Kauffman**, University of Illinois at Chicago (1077-57-699)
- 8:30AM *Virtual knots and Khovanov Homology.*  
(753) **Heather A Dye\***, McKendree University, **Louis Kauffman**, University of Illinois at Chicago, and **Aaron Kaestner**, North Park University (1077-57-508)
- 9:00AM *A new generalization of the Khovanov Homology.* Preliminary report.  
(754) **Ik Jae Lee**, Kansas State University (1077-18-114)
- 9:30AM *Strong L-Spaces and Left Orderability.*  
(755) **Adam Simon Levine\***, Brandeis University, and **Sam Lewallen**, Princeton University (1077-57-1801)
- 10:00AM *A relationship between categorified braid invariants from representation theory and Floer theory.* Preliminary report.  
(756) **Denis Auroux**, University of California, Berkeley, **J. Elisenda Grigsby\***, Boston College, and **Stephan M. Wehrli**, Syracuse University (1077-57-1882)
- 10:30AM *A new filtration of the Magnus kernel of the Torelli group.*  
(757) **R. Taylor McNeill**, Rice University (1077-57-1343)
- 11:00AM *Embeddings of contact solid tori and Legendrian cable knots.*  
(758) **Douglas J LaFountain\***, Aarhus University, **John B Etnyre** and **Bülent Tosun**, Georgia Institute of Technology (1077-57-749)
- 11:30AM *Unstable Vassiliev theory.*  
(759) **Chad D Giusti**, Willamette University (1077-55-98)

**AMS Special Session on Mathematics in Natural Resource Modeling, III**

8:00 AM – 11:50 AM **Simmons, 3rd Floor, Marriott**

- Organizer: **Catherine Roberts**, College of the Holy Cross
- 8:00AM *The environmental impact on sustainable forest management.* Preliminary report.  
▶ (760) **Natali Hritonenko\***, Prairie View A&M University, **Yuri Yatsenko**, HBU, and **Renan Goetz**, University of Girona (1077-92-608)
- 8:30AM *Optimally Fragmenting Graphs Against Stochastically-located Threats: Balancing Preventative and Real-time Actions in Wildfire Containment.*  
(761) **Gwen Spencer\*** and **David Shmoys**, Cornell University (1077-90-1978)
- 9:00AM *Effect of Gravity in Diffusive Thermal Instabilities of Diffusion Flames.*  
▶ (762) **Joseph E Hibdon, Jr\***, Northeastern Illinois University, and **Moshe Matalon**, University of Illinois at Urbana-Champaign (1077-76-1864)
- 9:30AM *Multiscale methods for seismic imaging.*  
▶ (763) **Susan E. Minkoff**, University of Maryland Baltimore County (1077-86-2488)
- 10:00AM *A Bayesian Model Identifying Locations At Risk From Human-Transported Exotic Pathogens.*  
▶ (764) **Steven C McKelvey\***, St. Olaf College, **Frank H Koch**, **William D Smith**, USDA Forest Service, and **Kelly R Hawley**, Best Buy, Inc. (1077-60-648)
- 10:30AM *Temporally variable dispersal and demography can accelerate the spread of invading species.*  
▶ (765) **Stephen P. Ellner**, Cornell University, and **Sebastian J. Schreiber\***, University of California, Davis (1077-92-1571)
- 11:00AM *Mathematical modeling for the improvement of sustainable pest management: a trap cropping example.*  
▶ (766) **Matthew H. Holden\***, Cornell University, **Stephen P Ellner**, Ecology and Evolutionary Biology/Cornell University, **Doo-Hyung Lee**, **Jan P Nyrop** and **John P Sanderson**, Entomology/Cornell University (1077-92-690)
- 11:30AM *To eradicate or not to eradicate: Economic optima for spatial immunizing infections.*  
▶ (767) **Petra Klepac**, Princeton University (1077-92-1871)

**AMS Special Session on New Perspectives in Multiplicative Number Theory (Mathematics Research Communities session), I**

8:00 AM – 11:40 AM **Fairfield, 3rd Floor, Marriott**

- Organizers: **Leo Goldmakher**, University of Toronto  
**Jonathan Kish**, University of Colorado at Boulder

Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)

- Micah Milinovich**, University of Mississippi  
**Paul Pollack**, University of British Columbia/Simon Fraser University
- 8:00AM (768) *A Weighted Selberg Sieve*. Preliminary report.  
**C S Franze**, Central Michigan University (1077-11-2445)
- 8:30AM (769) *On the maximum number of consecutive integers on which a character is constant*.  
**Enrique Trevino**, Swarthmore (1077-11-1736)
- 9:00AM (770) *The distribution of character sums*.  
**Jonathan W Bober\***, University of Washington, and **Leo Goldmakher**, University of Toronto (1077-11-2214)
- 9:30AM (771) *On the divisors of  $x^n - 1$* .  
**Lola Thompson**, Dartmouth College (1077-11-2093)
- 10:00AM (772) *Large odd order character sums*.  
**Youness Lamzouri\***, University of Illinois at Urbana-Champaign, and **Leo Goldmakher**, University of Toronto (1077-11-1742)
- 10:30AM (773) *When is a multiplicative function small on average?*  
**Dimitris Koukoulopoulos**, CRM, Universite de Montreal (1077-11-2166)
- 11:00AM (774) *The latest pretensions*. Preliminary report.  
**Andrew Granville**, University of Montreal (1077-11-1619)

- 9:00AM (777) *Optimization under Uncertainty and Algorithmic Correlation of Random Variables - Practice*.  
**Thomas R Fielden\***, Portland, Oregon, and **Steven A Bleiler**, Portland State University (1077-60-1659)
- 9:30AM (778) *Optimization under Uncertainty and Algorithmic Correlation of Random Variables: Theory*. Preliminary report.  
**Steven A Bleiler\***, Portland State University, and **Thomas R Fielden**, Portland, Oregon (1077-60-1105)
- 10:00AM (779) *Optimal Control of Variational Inequalities*.  
**Janos Turi\*** and **Alain Bensoussan**, University of Texas at Dallas (1077-49-936)
- 10:30AM (780) *Time-and-age distributed controls in economic and management applications*.  
**Natali Hritonenko\***, Prairie View A&M University, and **Yuri Yatsenko**, Houston Baptist University (1077-90-721)
- 11:00AM (781) *Optimal R & D Spending and Competition Between Firms*. Preliminary report.  
**Jannett Highfill** and **Michael McAsey\***, Bradley University (1077-49-365)
- 11:30AM (782) *Stochastic Multi-scale Modeling Suggests the Molecular Basis of Calcium-Entrained Cardiac Arrhythmia*.  
**M. Saleet Jafri\***, **Minh Tuan Hoang-Trong**, George Mason University, **George S. B. Williams** and **W. Jonathan Lederer**, University of Maryland Baltimore (1077-92-2345)

**AMS Special Session on Progress in Free Analysis, I**

8:00 AM – 11:40 AM Room 108, Hynes

Organizers: **J. William Helton**, University of California, San Diego  
**Paul S. Muhly**, University of Iowa

- 8:00AM (783) *Convex Positivstellensatz, linear matrix inequalities and complete positivity*. Preliminary report.  
**Igor Klep\***, Univerza v Ljubljani, **J. William Helton**, University of California at San Diego, **Scott McCullough**, University of Florida, Gainesville, and **Markus Schweighofer**, University of Konstanz (1077-46-1227)
- 9:00AM (784) *Free Biholomorphic Functions and Operator Model Theory*.  
**Gelu F Popescu**, University of Texas at San Antonio (1077-47-509)
- 10:00AM (785) *Some Applications of Non-Commutative Functions in Free Analysis*.  
**Mihai Popa**, Queen's University (1077-46-1791)
- 11:00AM (786) *What are the eigenvalues of the sum of two Hermitian matrices? A quantum information inspired answer*.  
**Alan Edelman**, Massachusetts Institute of Technology (1077-60-2170)

**AMS Special Session on Optimal Control in Applied Mathematical Modeling, II**

8:00 AM – 11:50 AM Clarendon, 3rd Floor, Marriott

Organizers: **Natali Hritonenko**, Prairie View A&M University  
**Yuri Yatsenko**, Houston Baptist University

- 8:00AM (775) *Two-dimensional interaction of weakly nonlinear solitary waves in shallow water: Mach reflection for the Benney-Luke equation and the KP equation*.  
**Kenichi Maruno\***, The University of Texas - Pan American, **Yuji Kodama**, Ohio State University, **Hidekazu Tsuji**, Kyushu University, and **Bao-Feng Feng**, The University of Texas - Pan American (1077-76-1190)
- 8:30AM (776) *Nonlinear parametric Neumann problems with bifurcation and control properties*.  
**Dumitru Motreanu**, University of Perpignan, France (1077-35-515)

**AMS Special Session on Rational Points on Varieties, I**

8:00 AM – 11:50 AM Arlington, 3rd Floor, Marriott

Organizers: **Jennifer Balakrishnan**, Massachusetts Institute of Technology  
**Bjorn Poonen**, Massachusetts Institute of Technology  
**Bianca Viray**, Brown University  
**Kirsten Wickelgren**, Harvard University

- 8:00AM *The rational points on a recalcitrant genus 12 curve.* (787)  
**Ralph Greenberg**, University of Washington, **Karl Rubin**, UCI, **Michael Stoll**, Universitat Bayreuth, and **Alice Silverberg\***, University of California, Irvine (1077-11-777)
- 8:30AM *Twists of Shimura Curves.* (788)  
**James Henry Stankewicz**, University of Georgia (1077-11-1155)
- 9:00AM *A descent map for curves with totally degenerate semi-stable reduction.* (789)  
**Shahed Sharif**, CSU San Marcos (1077-11-1592)
- 9:30AM *Siegel's Theorem and the Shafarevich Conjecture.* Preliminary report. (790)  
**Aaron Levin**, Michigan State University (1077-11-1753)
- 10:00AM *Hilbert's Tenth Problem for function fields of positive characteristic.* (791)  
**Kirsten Eisentraeger**, The Pennsylvania State University (1077-11-1200)
- 10:30AM *Integral points on elliptic curves and explicit valuations of division polynomials.* (792)  
**Katherine E Stange**, Stanford University (1077-11-1233)
- 11:00AM *The Distribution of 2-Selmer Ranks of Quadratic Twists of Elliptic Curves.* (793)  
**Zev Klagsbrun**, University of Wisconsin - Madison (1077-11-1268)
- 11:30AM *Elliptic division and unramified correspondence.* (794)  
**Fedor A. Bogomolov**, Courant Institute of Mathematical Sciences, New York University (1077-11-1884)

**AMS Special Session on Theory and Applications of Stochastic Differential and Partial Differential Equations, I**

8:00 AM – 11:50 AM Room 107, Hynes

Organizers: **Edward Allen**, Texas Tech University  
**Mahmoud Anabtawi**, American University of Sharjah

**Armando Arciniega**, University of Texas at San Antonio  
**Gangaram S. Ladde**, University of South Florida  
**Sivapragasam Sathananthan**, Tennessee State University

- 8:00AM *Energy/Lyapunov Function Method for Solving Stochastic Differential Equations.* (795)  
**Gangaram S. Ladde**, University of South Florida at Tampa (1077-34-1092)
- 8:30AM *Qualitative Analysis of Stochastic Theta Methods for SDEs.* (796)  
**Henri Schurz**, Southern Illinois University (1077-60-1065)
- 9:00AM *Stochastic Differential Equations of the Wick Type.* Preliminary report. (797)  
**Fariborz Asadian**, Fort Valley State University (1077-60-915)
- 9:30AM *Stability properties of stochastic logistic models.* Preliminary report. (798)  
**Janusz S Golec**, Fordham University (1077-60-1003)
- 10:00AM *Hybrid Impulsive Control of Stochastic Systems with Multiplicative Noise under Markovian Switching.* (799)  
**S. Sathananthan**, **N. Jordan Jameson\*** and **M. J. Knap**, Tennessee State University (1077-93-325)
- 10:30AM *Pathwise Convergence Rate for Numerical Solutions of Stochastic Differential Equations.* (800)  
**Son Luu Nguyen\***, Carleton University, and **George Yin**, Wayne State University (1077-60-1797)
- 11:00AM *Asymptotic Properties of Consensus-Type Algorithms for Networked Systems with Regime-Switching Topologies.* (801)  
**G. Yin**, **Yu Sun\*** and **Le Yi Wang**, Wayne State University (1077-60-330)
- 11:30AM *Existence Results for Some Higher-Order Nonautonomous Differential Equations in Hilbert Space.* Preliminary report. (802)  
**Toka Diagana**, Howard University - Washington DC (1077-34-681)

**AMS Special Session on the Geometry of Real Projective Structures (Mathematics Research Communities session), I**

8:00 AM – 11:50 AM Dartmouth, 3rd Floor, Marriott

Organizers: **Jeffrey Danciger**, Stanford University  
**Kelly Delp**, Buffalo State College  
**Sean Lawton**, University of Texas, Pan American  
**Kathryn Mann**, University of Chicago

**Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)**

- 8:00AM (803) *Open problems in real projective structures on low-dimensional orbifolds.*  
**Suhyoung Choi**, KAIST (1077-57-970)
- 9:00AM (804) *On Embedded Spheres of Closed Affine Manifolds.* Preliminary report.  
**Weiqliang Wu**, University of Maryland - College Park (1077-51-408)
- 9:30AM (805) *Bi-Lipschitz Extension from Boundaries of Certain Gromov Hyperbolic Spaces.*  
**Anton Lukyanenko**, University of Illinois Urbana-Champaign (1077-51-371)
- 10:00AM (806) *Two-holed cross surfaces and their affine deformations.*  
**Todd A. Drumm\***, Howard University, **Virginie Charette**, University of Sherbrooke, and **William M. Goldman**, University of Maryland, College Park (1077-51-1456)
- 11:00AM (807) *The Simple  $S^2$ -branched Cover Area of a Surface.* Preliminary report.  
**Aldo-Hilario Cruz-Cota\*** and **Teresita Ramirez-Rosas**, Grand Valley State University (1077-57-309)
- 11:30AM (808) *Volumes of Complex Hyperbolic Orbifolds.*  
**Ilesanmi Adebayo**, Wesleyan University (1077-57-621)

**AMS Session on Calculus of Variations, Optimal Control, and Optimization**

8:00 AM – 9:40 AM Room 303, Hynes

- 8:00AM (809) *Optimal Control of Projectile Motion with Sensitivity-Based Optimization.*  
**David C. Szurley**, Francis Marion University (1077-49-2448)
- 8:15AM (810) *A Comparison of Derivative-Free Optimization Methods with Constraint Methods.*  
**Ahmad R Almomani\*** and **Katie R. Fowler**, Clarkson University (1077-49-1734)
- 8:30AM (811) *Existence of isoperimetric regions in  $R^n$  with density.*  
**Frank Morgan\***, Williams College, and **Aldo Pratelli**, Universita di Pavia (1077-49-224)
- 8:45AM (812) *Solution of optimal control problems via combined block-pulse functions and polynomial series.*  
**Mohsen Razzaghi**, Mississippi State University (1077-49-634)
- 9:00AM (813) *Geometric Applications of the Maximum Principle.*  
**Mostafa Ghandehari**, University of Texas at Arlington (1077-49-180)
- 9:15AM (814) *A variational characterization of the effective yield set for ionic polycrystals.*  
**Farhod Abdullayev**, North Dakota State University (1077-49-1034)

- 9:30AM (815) *Identification of Nerves in Ultrasound Scans Using a Modified Mumford-Shah Functional and Prior Information.*  
**Jung-Ha An\***, California State University, Stanislaus, **Paul Bigeleisen**, Department of Anesthesiology/University of Maryland, and **Steven Damelin**, Georgia Southern University (1077-49-1645)

**AMS Session on Combinatorics and Graph Theory, III**

8:00 AM – 11:25 AM Room 111, Hynes

- 8:00AM (816) *On the Permanent Rank of Matrices.*  
**Keivan Hassani Monfared**, Graduate Student / University of Wyoming (1077-05-2438)
- 8:15AM (817) *Zero Forcing Numbers and Graph Powers.*  
**Carolyn Kim**, Harvard University (1077-05-2793)
- 8:30AM (818) *Weak Discrepancy of Grids.* Preliminary report.  
**Katherine V. Johnson\*** and **A. J. Radcliffe**, University of Nebraska-Lincoln (1077-05-2425)
- 8:45AM (819) *Spectral properties of complex unit gain graphs.*  
**Nathan H Reff**, Binghamton University (1077-05-2387)
- 9:00AM (820) *Fair Duels, Bad Shots, and Thue-Morse.*  
**Joshua N Cooper** and **Aaron M Dutle\***, University of South Carolina (1077-05-2473)
- 9:15AM (821) *Counting Large Distances in Convex Polygons: A Computational Approach.*  
**Filip Moric** and **David Pritchard\***, EPFL (1077-05-2386)
- 9:30AM Break.
- 9:45AM (822) *Some Results on Permutation Patterns.* Preliminary report.  
**Taylor F Allison**, North Carolina State University (1077-05-2372)
- 10:00AM (823) *Maximizing the number of edges in optimal  $k$ -rankings.*  
**Rigoberto Florez**, University of South Carolina Sumter, and **Darren A Narayan\***, Rochester Institute of Technology (1077-05-2358)
- 10:15AM (824) *Degree Matrices of  $k$ -edge Colored Graphs.*  
**Kathleen M. Ryan\*** and **Garth Isaak**, Lehigh University (1077-05-2351)
- 10:30AM (825) *Generating Differential Equations for Multi-restricted Stirling numbers.* Preliminary report.  
**Ji Young Choi**, Shippensburg University of PA (1077-05-2348)
- 10:45AM (826) *The negative  $q$ -Binomial.*  
**Shishuo Fu\***, KAIST, Republic of Korea, **Victor Reiner**, University of Minnesota, and **Nathaniel Thiem**, University of Colorado at Boulder (1077-05-2310)

*Boston, MA, Thursday, January 5 – Program of the Sessions*

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- 11:00AM *Modular-Distance Labelings of Graphs.*  
 ▶ (827) Preliminary report.  
**Joshua Hanes\***, Mississippi University for Women, and **Tristan Denley**, Austin Peay State University (1077-05-2548)
- 11:15AM *Strong Circuit Double Cover Conjecture in Special Cubic Graphs.* Preliminary report.  
 (828) **Wenliang Tang\***, West Virginia University, **Erling Wei**, Renmin University of China, and **Cunquan Zhang**, West Virginia University (1077-05-2284)

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

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8:00 AM – 9:40 AM Room 105, Hynes

- 8:00AM *Large autotopism groups on translation planes.* Preliminary report.  
 (829) **Oscar Vega\***, California State University, Fresno, **N. L. Johnson**, University of Iowa, and **Vikram Jha**, Glasgow United Kingdom. (1077-51-1591)
- 8:15AM *A note on a topological geometrical interpretation of Bell's inequality and Hardy's quantum entanglement.*  
 (830) **S. I. Nada\***, University of Qatar, and **El-naschie**, Alexandria university, Egypt (1077-51-1211)
- 8:30AM *Tetrahedron Discovers Itself : Frequency & Scale Change.* Preliminary report.  
 ▶ (831) **John Arden Hiigli**, Le Jardin a l'Ouest (1077-51-1162)
- 8:45AM *The Chen-type of some isoparametric hypersurfaces in the unit sphere.* Preliminary report.  
 (832) **Ivko M Dimitric**, Pennsylvania State University Fayette, The Eberly Campus (1077-53-2899)
- 9:00AM *Complete geometry on a Riemannian  $\mathcal{A}$ -module. Sylvester's theorem.*  
 (833) **Adaeze Christiana Anyaegbunam**, University of Port Harcourt, Nigeria (1077-51-65)
- 9:15AM *Tiling a triangle with congruent triangles.*  
 ▶ (834) **Michael Beeson**, San Jose State University (1077-51-488)
- 9:30AM *Differential forms on contact quotients.* Preliminary report.  
 (835) **Fatima Mahmood**, Cornell University (1077-53-2485)

**AMS Session on Manifolds, Cell Complexes, and Global Analysis, I**

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8:00 AM – 10:40 AM Room 305, Hynes

- 8:00AM *Paths in the pants complex and bridge splittings of knots.*  
 (836) **Alexander M Zupan**, University of Iowa (1077-57-2952)
- 8:15AM *The  $sl(3)$  skein module.*  
 (837) **Jeffrey Boerner**, Westminster College (1077-57-2806)

- 8:30AM *The asymptotic expansion of the Witten-Reshetikhin-Turaev invariants.*  
 (838) **Benjamin Himpel\*** and **Jørgen Ellegaard Andersen**, Aarhus University, Denmark (1077-57-2374)
- 8:45AM *Knots in handlebodies with handlebody surgeries.*  
 (839) **R. Sean Bowman**, University of Texas, Austin (1077-57-2123)
- 9:00AM *Squarepegs and Inscribed Polygons.* Preliminary report.  
 (840) **Jason Cantarella**, University of Georgia, Athens, **Elizabeth Denne\***, Smith College, and **John McCleary**, Vassar College (1077-57-1536)
- 9:15AM *Mapping Cylinder Neighborhoods in Manifold Stratified Pairs.* Preliminary report.  
 (841) **Stacy L. Hoehn\*** and **C. Bruce Hughes**, Vanderbilt University (1077-57-2116)
- 9:30AM *Genus 2 mutation of knots.* Preliminary report.  
 ▶ (842) **Allison H Moore**, The University of Texas at Austin (1077-57-2235)
- 9:45AM *Algebras Counting Minimal Intersection and Self-Intersection Numbers of Loops on a Surface.*  
 (843) **Patricia Cahn**, Dartmouth College (1077-57-2121)
- 10:00AM *The adjoint action on homotopy-associative H-spaces.*  
 (844) **Nicholas D. Nguyen**, University of California San Diego (1077-57-1401)
- 10:15AM *Circle Valued Generating Families and Legendrian Link Invariants.*  
 (845) **Christopher A Micklewright**, Bryn Mawr College (1077-57-860)
- 10:30AM *On the rotation class of knotted Legendrian tori in  $\mathbb{R}^3$ .* Preliminary report.  
 (846) **Ben McCarty\*** and **Scott Baldridge**, Louisiana State University (1077-57-760)

**AMS Session on Probability Theory, Stochastic Processes, and Statistics, III**

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8:00 AM – 10:40 AM Room 209, Hynes

- 8:00AM *Beta-cauchy distribution and its applications.* Preliminary report.  
 ▶ (847) **Etaf Alshwarbeh\***, **Felix Famoye** and **Carl Lee**, Central Michigan University (1077-62-1436)
- 8:15AM *Invariant Theory for Hypothesis Testing on Graphs.*  
 (848) **Andrey Rukhin**, Naval Surface Warfare Center Dahlgren Division (1077-62-428)
- 8:30AM *Investigation of a Random Graph Model for Neuronal Connectivity.*  
 ▶ (849) **David J. Marchette\***, Naval Surface Warfare Center, Dahlgren, VA, **Carey E. Priebe**, Johns Hopkins University, **Rebecca F. Goldin** and **Giorgio A. Ascoli**, George Mason University (1077-62-424)

**Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)**

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- 8:45AM ▶ (850) *Solving Tolerance Optimization Problems for Complex Manufacturing Systems.* **Paul L. Goethals\***, United States Military Academy, **Gregory L. Boylan** and **Byung Rae Cho**, Clemson University (1077-62-269)
- 9:00AM (851) *Identifying Gene Set Differences Between B-cell and T-cell Acute Lymphocytic Leukemia.* Preliminary report. **Jacob A Gagnon**, Worcester Polytechnic Institute (1077-62-112)
- 9:15AM (852) *A Bayesian Semiparametric Approach for Incorporating Longitudinal Information on Exposure History for Inference in Case-Control Studies.* **Dhiman Bhadra\***, Worcester Polytechnic Institute, **Michael Joseph Daniels**, University of Florida, Gainesville, **Sung Duk Kim**, Biostatistics and Bioinformatics Branch, Division of Epidemiology, Statistics, and Prevention Research, NIH, **Malay Ghosh**, University of Florida, Gainesville, and **Bhramar Mukherjee**, Department of Biostatistics, University of Michigan, Ann Arbor (1077-62-2202)
- 9:30AM ▶ (853) *On a hybrid method for variable selection.* **Daniel Vasiliu**, Christopher Newport University (1077-62-2870)
- 9:45AM (854) *A Study on Tests of Symmetry with Ordered Alternatives in Higher Dimensional Contingency Tables.* **Ping Ye\***, Quincy University, and **Bhaskar Bhattacharya**, Southern Illinois University, Carbondale (1077-62-138)
- 10:00AM (855) *Law of the iterated logarithm for the  $L_2$  error of the wavelet density estimator.* Preliminary report. **Lu Lu**, University of Connecticut (1077-62-119)
- 10:15AM ▶ (856) *Multivariate Nonparametric Ranking and Selection.* Preliminary report. **Jeremy Entner**, Syracuse University (1077-62-144)
- 10:30AM (857) *Combinatorics and statistical issues related to the Kruskal-Wallis statistic.* **Raymond N. Greenwell\***, Hofstra University, and **Anna E. Bargagliotti**, Loyola Marymount University (1077-62-53)
- 8:15AM ▶ (859) *Pondering and Posing Problems and Proofs Pertaining to Perfect Order Subset Groups.* Preliminary report. **Ashley R. Taylor\***, University of Central Oklahoma, and **Devin C Smith**, University of Central Oklahoma (1077-20-2020)
- 8:30AM ▶ (860) *Ecological Systems, Nonlinear Boundary Conditions, and  $\Sigma$ -Shaped Bifurcation Curves.* Preliminary report. **Kathryn Lois Ashley\***, Clemson University, **Jerome Goddard II**, Auburn University Montgomery, and **Victoria Sincavage**, Clemson University (1077-34-1293)
- 8:45AM ▶ (861) *An Analytical Approach to Solving Green Oxidation Processes.* **Diego Torrejon**, George Mason University (1077-34-1156)
- 9:00AM ▶ (862) *Tear-film dehydration of a soft contact lens.* Preliminary report. **Mihail Sharov**, George Mason University (1077-35-1888)
- 9:15AM ▶ (863) *Modeling the Effects of the Fukushima Daiichi Nuclear Meltdown on the Marine Environment.* Preliminary report. **Bernard R Lipat\*** and **Rusty Laracuenti**, New Jersey City University (1077-35-2065)
- 9:30AM ▶ (864) *On Li-Yorke Measurable Sensitivity.* Preliminary report. **Lucas Manuelli**, Princeton University, **Jared Hallett\*** and **Cesar E. Silva**, Williams College (1077-37-2394)
- 9:45AM Break.
- 10:00AM ▶ (865) *Global Dynamics of Pulse-Coupled Oscillators.* Preliminary report. **Allison L. Corish\***, **Sarah Day** and **M. Drew LaMar**, College of William & Mary (1077-37-2591)
- 10:15AM ▶ (866) *Nabla Discrete Fractional Calculus.* **Kevin Ahrendt**, University of Nebraska-Lincoln, **Lucas Castle\***, Lamar University, **Holm Michael**, University of Nebraska-Lincoln, and **Kathryn Yochman**, Rose Hulman Institute of Technology (1077-39-1406)
- 10:30AM ▶ (867) *Tilings with nonconvex pentagons.* Preliminary report. **Ping Ngai Chung\***, Massachusetts Institute of Technology, **Niralee K. Shah**, Williams College, **Luis A. Sordo Vieira**, Wayne State University, and **Miguel A. Fernandez**, Truman State University (1077-51-1486)

**AMS Session on Undergraduate Research, III**

8:00 AM – 11:25 AM Room 110, Hynes

- 8:00AM ▶ (858) *Diagram vectors of frames and the tight frame scaling problem.* **Martin S. Copenhaver\***, Georgia Institute of Technology, **Cortney Logan**, Stonehill College, **Kyanne Mayfield**, University of Portland, and **Jonathan Sheperd**, University of Notre Dame (1077-15-118)

- 10:45AM (868) *Minimal Pentagonal Tilings.* **Niralee Shah\***, Williams College, **Luis Sordo Vieira**, Wayne State University, **Ping Ngai Chung**, Massachusetts Institute of Technology, and **Miguel Fernandez**, Truman State University (1077-51-2565)



*Boston, MA, Thursday, January 5 – Program of the Sessions*

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- 11:00AM *Some Applications of Differential Geometry in Studying Grain Growth and Non-local Calculus.*  
 (869) **Thinh D Le**, Penn State University (1077-51-2771)
- 11:15AM *The Wecken Property for Random Maps on Surfaces with Boundary.*  
 ▶ (870) **Matthew Donovan Griisser\***, Georgia Institute of Technology, **Allison Miller**, Pomona College, and **Jacqueline Brimley**, Fairfield University (1077-55-1936)

**MAA Session on Arts and Mathematics, Together Again, II**

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**8:00 AM – 11:55 AM Room 311, Hynes**

- Organizer: **Douglas E. Norton**, Villanova University
- 8:00AM *Fourier Transform helps relaxation.*  
 ▶ (871) **Ricardo V Teixeira**, University of Houston - Victoria (1077-B1-207)
- 8:20AM *Semigroups, L-Systems, and Algorithmic Composition.* Preliminary report.  
 ▶ (872) **Marcus Pendergrass**, Hampden-Sydney College (1077-B1-2954)
- 8:40AM *On the geometry of music.* Preliminary report.  
 ▶ (873) **Benjamin Himpel**, Aarhus University, Denmark (1077-B1-2365)
- 9:00AM *Exploring the Mathematics of Tuning a Musical Instrument using Straws.*  
 ▶ (874) **Christine von Renesse**, Westfield State University, MA (1077-B1-698)
- 9:20AM *Composing with Mathematics: Final Projects in a Math and Music Course.*  
 ▶ (875) **Gareth E Roberts**, College of the Holy Cross (1077-B1-2572)
- 9:40AM *Three stories from the math-art frontier.* Preliminary report.  
 ▶ (876) **Luke Wolcott**, University of Washington (1077-B1-894)
- 10:00AM *Math/Art: Collaborative Practices.*  
 ▶ (877) **William Kronholm\***, Whittier College, and **Aaron Bocanegra**, SCI-Arc (1077-B1-559)
- 10:20AM *Creative Variations.*  
 ▶ (878) **Jennifer Wilson**, Eugene Lang College the New School for Liberal Arts (1077-B1-2825)
- 10:40AM *Fostering Artistic Explorations with Geometer's Sketchpad.*  
 ▶ (879) **Debra L. Hydorn**, University of Mary Washington (1077-B1-2486)
- 11:00AM *Improv Techniques for the Mathematics Classroom.* Preliminary report.  
 ▶ (880) **Andrea N Young**, Ripon College (1077-B1-229)
- 11:20AM *Mathematics in Literature and Cinema.* Preliminary report.  
 ▶ (881) **Mark Kozek**, Whittier College (1077-B1-2296)

- 11:40AM *Artists Respond to the Enigma of Alan Turing.*  
 ▶ (882) **Michael Olinick** and **Robert P. Martin\***, Middlebury College (1077-B1-219)

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

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**8:00 AM – 11:15 AM Room 203, Hynes**

- Organizers: **Carla D. Martin**, James Madison University  
**Phil Gustafson**, Mesa State College  
**Michael Monticino**, University of North Texas
- 8:00AM *Reduction of the operation cost via optimal control of an industrial wastewater biotreatment process.*  
 (883) **Ellina V. Grigorieva\***, Texas Woman's University, **Evgenii N. Khailov**, Lomonosov Moscow State University, Russia, and **Andrei Korobeinikov**, University of Limerick, Ireland (1077-G5-1378)
- 8:20AM *Tires, Insurance and Clutches: Applications of Undergraduate Consulting.* Preliminary report.  
 ▶ (884) **John R Ramsay**, The College of Wooster (1077-G5-2780)
- 8:40AM *Visualizing semantic data through the use of partially ordered sets.* Preliminary report.  
 ▶ (885) **Emilie Hogan\*** and **Cliff Joslyn**, Pacific Northwest National Laboratory (1077-G5-2674)
- 9:00AM *Cubic Splines, Local Extrema, and the Harmonic Mean: An Application to Graph Editors.*  
 ▶ (886) **James H. Fife**, Educational Testing Service (1077-G5-324)
- 9:20AM *Optimization in Fourier imaging for laser remote sensing.*  
 ▶ (887) **Thomas Höft**, Tufts University (1077-G5-1922)
- 9:40AM *Modeling GPS Interference.*  
 ▶ (888) **Joseph J. Rushanan**, The MITRE Corporation (1077-G5-2112)
- 10:00AM *Using Regression to Determine Cost Estimating Relationships for Costing of FAA Software.*  
 ▶ (889) **William S. Barfield**, Quantech Services, Inc. (1077-G5-2293)
- 10:20AM *New Metrics to Detect Suicide Bombers.*  
 ▶ (890) **William P. Fox**, Naval Postgraduate School, Monterey, CA (1077-G5-520)
- 10:40AM *Math in the City.*  
 ▶ (891) **Ananthnarayan Hariharan** and **Lauren Keough\***, University of Nebraska - Lincoln (1077-G5-775)
- 11:00AM *"Careers in Mathematics" speakers series.*  
 ▶ (892) **Michael Dorff**, Brigham Young University (1077-G5-2397)

Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)

**MAA Session on My Most Successful Math Club Activity**

8:00 AM – 11:55 AM **Back Bay Ballroom B, 2nd Floor, Sheraton**

Organizers: **Jacqueline Jensen**, Slippery Rock University  
**Deanna Haunsberger**, Carleton College

- 8:00AM *Math Club Bingo.*  
▶ (893) **Jacqueline A. Jensen-Vallin**, Slippery Rock University (1077-J5-658)
- 8:20AM *The Calculus Bowl: A Fundraising Activity for the Mathematics Club.*  
(894) **H. Smith Risser, Casey Clark\*, Jay Rosencrantz, JoAnne McAllister, Jeff Winter and Stuart Fortier**, Montana Tech (1077-J5-2111)
- 8:40AM *The Amazing Mathematical Race.*  
▶ (895) **Brooke E Buckley\*** and **Bethany A Noblitt**, Northern Kentucky University (1077-J5-755)
- 9:00AM *Bringing Down The House?*  
(896) **Kathryn Behrend Andrist**, Utah Valley University (1077-J5-1099)
- 9:20AM *Solidly Platonic: Hood College's Math Tea Love Affair with Vi Hart.*  
▶ (897) **Jill Bigley Dunham\*** and **Ann Stewart**, Hood College (1077-J5-2030)
- 9:40AM *Origami for Math Clubs.*  
▶ (898) **Dale K Hathaway**, Olivet Nazarene University (1077-J5-1386)
- 10:00AM *Celebrating Pi-Day with a Piathlon!*  
▶ (899) **Daniel M. Look**, St. Lawrence University (1077-J5-732)
- 10:20AM *University of Rochester's Annual Pi-Day Festival.*  
▶ (900) **Alicia M Cornelia**, University of Rochester (1077-J5-1723)
- 10:40AM *Interdisciplinary Lecture Series.*  
▶ (901) **Jennifer McCloud-Mann\*** and **Christina Graves**, The University of Texas at Tyler (1077-J5-1397)
- 11:00AM *Art Museum Field Trip.*  
▶ (902) **Kathi Crow**, Salem State University (1077-J5-2043)
- 11:20AM *Beautiful Minds: Getting hooked on Math through Literature.*  
▶ (903) **Maria Falidas**, American Community Schools of Athens (1077-J5-2267)
- 11:40AM *Math Awareness Week: Students Engaging Students.* Preliminary report.  
▶ (904) **Monika Kiss and Jacci White\***, Saint Leo University (1077-J5-871)

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

8:00 AM – 11:15 AM **Room 202, Hynes**

Organizers: **Sean Larsen**, Portland State University  
**Stacy Brown**, Pitzer College

**Karen Marrongelle**,  
Portland State University

- 8:00AM *Students' Understanding of Two-Variable Functions and Rates of Change.*  
(905) **Eric David Weber**, Arizona State University (1077-M1-33)
- 8:20AM *A circle of radius one: Pre-service teachers' notions of the unit circle.*  
▶ (906) **Kevin C. Moore\***, **Kevin R. LaForest** and **Hee Jung Kim**, University of Georgia (1077-M1-142)
- 8:40AM *Introducing the Concept of Derivative via the Calculus Triangle.*  
▶ (907) **Michael A. Tallman\*** and **Eric Weber**, Arizona State University (1077-M1-292)
- 9:00AM *The Proof is in the Practice? Graduate Teaching Assistants and Future Teachers.*  
▶ (908) **Kimberly Cervello Rogers**, Michigan State University (1077-M1-796)
- 9:20AM *To Prove or Disprove: How Do Undergraduate Students Decide? Preliminary report.*  
▶ (909) **Kelly M. Bubb**, Ohio University (1077-M1-805)
- 9:40AM *Authority dynamics in mathematics discussions.* Preliminary report.  
▶ (910) **Rebecca A. Dibbs, David M. Glassmeyer\*** and **Michael C. Oehrtman**, University of Northern Colorado (1077-M1-922)
- 10:00AM *Building Symbolic Meaning Through Dynamically-Connected Representations in Abstract Algebra.*  
▶ (911) **Douglas A. Lapp**, Central Michigan University (1077-M1-1004)
- 10:20AM *Experts' Reification of Complex Variables Concepts: The Role of Metaphor.*  
▶ (912) **Hortensia Soto-Johnson\***, **Michael Oehrtman**, **Kristin Noblet**, **Lee Roberson** and **Sarah Rozner**, University of Northern Colorado (1077-M1-1586)
- 10:40AM *Reaching for the Familiar: Example Generation in the Proving Process.*  
▶ (913) **James T Sandefur\***, Georgetown University, **John Mason**, **Gabriel J. Stylianides** and **Anne Watson**, Oxford University (1077-M1-1714)
- 11:00AM *A Model of Students' Combinatorial Thinking.*  
▶ (914) **Elise N Lockwood**, University of Wisconsin - Madison (1077-M1-1241)

**MAA Session on Touch It, Feel It, Learn It: Tactile learning Activities in the Undergraduate Mathematics Classroom, III**

8:00 AM – 11:15 AM **Room 313, Hynes**

Organizers: **Jessica Mikhaylov**, U.S. Military Academy  
**Julie Barnes**, Western Carolina University

*Boston, MA, Thursday, January 5 – Program of the Sessions*

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- 8:00AM *Riding the Ferris Wheel: A Sinusoidal Model.*  
▶ (915) **Kathleen Cage Mittag\***, The University of Texas at San Antonio, and **Sharon Taylor**, Georgia Southern University (1077-O1-1351)
- 8:20AM *Building Art Galleries for Geometric Proofs.*  
▶ (916) **B. Carrigan**, Auburn University (1077-O1-1420)
- 8:40AM *Learning Through Re-Arrangement of Patterns.*  
(917) **John C Mayer\*** and **William O Bond**, University of Alabama at Birmingham (1077-O1-2442)
- 9:00AM *Geometric Models in Many Classrooms.*  
▶ (918) Preliminary report. **Teresa E. Moore\***, Ithaca College, and **L. Christine Kinsey**, Canisius College (1077-O1-2553)
- 9:20AM *Building Mathematics Understanding with Toys.*  
▶ (919) **Mike Long**, Shippensburg University (1077-O1-2554)
- 9:40AM *Investigating Polytopes of the Fourth Dimension by Building Models.*  
▶ (920) **John F Putz**, Alma College (1077-O1-1426)
- 10:00AM *Tearing Plastic: A laboratory exercise on fractals and hyperbolic geometry.*  
▶ (921) **Ron Taylor\*** and **Todd Timberlake**, Berry College (1077-O1-2597)
- 10:20AM *Traffic Jam: Teaching Critical Thinking through Games.* Preliminary report.  
▶ (922) **Melissa A Stoner**, Salisbury University (1077-O1-1689)
- 10:40AM *Hands-on Activity for Mutually Orthogonal Latin Squares.*  
▶ (923) **Julie F Rogers**, Auburn University (1077-O1-2343)
- 11:00AM *Hands-On SET<sup>®</sup>.*  
▶ (924) **Elizabeth McMahon\***, Lafayette College, and **Rebecca Gordon**, Queen Margaret College, Wellington NZ (1077-O1-2843)
- 8:30AM *Looking for a few good means.*  
▶ (927) **Bruce R. Ebanks**, Mississippi State University (1077-VJ-1335)
- 8:45AM *a CLT for independent non-identical processes.*  
(928) **Yuping Yang**, Texas A&M University (1077-VJ-2869)
- 9:00AM *Benford's Law and Dependent Random Variables.*  
▶ (929) **Thealexa G Becker\***, Smith College, **Alec Greaves-Tunnell**, Williams College, **Ryan Ronan**, Cooper Union, and **Steven J Miller**, Williams College (1077-VJ-2495)
- 9:15AM *The Necessary Condition For  $\bar{\delta}$ -equation in Hölder space in  $\mathbb{C}^3$ .*  
(930) **Young Hwan You**, Indiana University East (1077-VJ-2578)
- 9:30AM *Dynamical deltoids.* Preliminary report.  
▶ (931) **Joshua P. Bowman**, Stony Brook University (1077-VJ-1360)
- 9:45AM *Existence of Solutions for Nonconvex  $n^{\text{th}}$  Order Differential Inclusions.*  
(932) **Michael Fulkerson** and **Kristi Karber\***, University of Central Oklahoma (1077-VJ-1077)
- 10:00AM *Bifurcations of Inverse Functions: A Story of Undergraduate Research.*  
▶ (933) **Jody M Sorensen**, Augsburg College (1077-VJ-2559)
- 10:15AM *Proof of the density hypothesis.*  
(934) **Yuanyou F. Cheng**, Waltham, MA (1077-VJ-949)
- 10:30AM *On quasi-diagonality of continuous fields.*  
(935) Preliminary report. **Jose L. Lugo**, Purdue University (1077-VJ-1706)
- 10:45AM *How Fast does a Sequence of Positive Integers Grow? An Elementary Perspective based on Multiplication.*  
▶ (936) Preliminary report. **Michael A Brilleslyper\*** and **Bradley A Warner**, U. S. Air Force Academy, Colorado Springs, CO (1077-VJ-845)
- 11:00AM *A tail of two series.* Preliminary report.  
(937) **Johann A Thiel**, United States Military Academy (1077-VJ-2564)
- 11:15AM *Low-lying zeros of cuspidal Maass forms.*  
▶ (938) **Liyang Zhang\***, **Steven J Miller**, Williams College, **Oleg Lazarev**, Princeton University, **Geoffrey Iyer**, University of Michigan, and **Nadine Amersi**, University College London (1077-VJ-740)
- 11:30AM *Quantitative Approximation by Fractional Smooth General Singular Operators.*  
(939) **George A Anastassiou**, University of Memphis, and **Razvan A. Mezei\***, Lander University (1077-VJ-450)
- 11:45AM *On the Linear Generating Function for the Charlier Polynomials.* Preliminary report.  
▶ (940) **Daniel Joseph Galiffa**, Penn State Erie, The Behrend College (1077-VJ-2638)

**MAA General Contributed Paper Session:  
Research in Analysis**

8:00 AM – 11:55 AM Room 201, Hynes

Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University

- 8:00AM *Minimizing the Jacobian Integral.*  
(925) **Colin Carroll**, Rice University (1077-VJ-2942)
- 8:15AM *The Poisson Geometry of  $SU(1,1)$ .*  
(926) **McKenzie R Lamb\***, Ripon College, and **Philip Foth**, University of Arizona (1077-VJ-2736)

Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)

**MAA General Contributed Paper Session:  
Statistics**

8:00 AM – 11:40 AM **Back Bay Ballroom  
D, 2nd Floor, Sheraton**

Organizers: **Jennifer Beineke**, Western  
New England College  
**Lynette Boos**, Providence  
College  
**Aliza Steurer**, Dominican  
University

- 8:00AM *Estimation of eigenvalues and their multiplicities of a covariance operator.* (941)  
▶ **Krishna Kaphle\***, Illinois Wesleyan University, **Frits H. Ruymgaart** and **George Gaines**, Texas Tech University (1077-VE-2346)
- 8:15AM *Linear Tests of Uniformity for Data Defined on Distance Transitive Graphs.* (942)  
▶ Preliminary report.  
**Connor Ahlback**, **John Choi**, **Michael Orrison**, Harvey Mudd College, **Laura Passarelli**, Scripps College, and **Shujing Xu\***, Claremont Graduate University (1077-VE-2286)
- 8:30AM *Approximation to the Generalized Gamma Distribution.* (943)  
**Salam Md. Mahbubush Khan**, Alabama A&M University (1077-VE-2009)
- 8:45AM *Detection of slightly expressed changes in random environment.* (944)  
**Veera Holdai**, Salisbury University (1077-VE-1317)
- 9:00AM *Prediction on Random Fields with Maximum Entropy Models.* (945)  
▶ **Priya Kohli\*** and **Mohsen Pourahmadi**, Texas A&M University (1077-VE-1117)
- 9:15AM *Bounded influence nonlinear signed-rank regression.* (946)  
**Huybrechts Bindelle\*** and **Asheber Abebe**, Auburn University (1077-VE-954)
- 9:30AM *Rank-based estimation for generalized linear models.* (947)  
**Guy-vanie M Miakonkana\*** and **Ashere Abebe**, Auburn University (1077-VE-478)
- 9:45AM *A Robust Dispersion Estimator and its Applications.* (948)  
**Jianfeng Zhang\***, Chattanooga TN, **David Olive**, Southern Illinois Univeristy Carbondale, and **Ping Ye**, Quincy University (1077-VE-293)
- 10:00AM *Exact Confidence Intervals for the Ratio of Two Proportions.* (949)  
**Paul R. Coe**, Dominican University (1077-VE-2753)
- 10:15AM *Using Linear Mixed-Effects Models to Examine Correlates of stress, anxiety, depression to find the factors affecting psychosocial attributes.* (950)  
▶ **Sumona Mondal\***, Clarkson University, **Tina Norton**, Lycoming College, **Sarah Andres**, **Hosana Mamata**, Clarkson University, and **Steven Foti**, University of Florida at Gainesville (1077-VE-2350)

- 10:30AM *Using Mixed Distributions to Model Count Data with Application.* (951)  
**Mehdi Razzaghi**, Bloomsburg University (1077-VE-2947)
- 10:45AM *Life Expectancy Estimate with Bivariate Weibull Distribution using Archimedean Copula.* (952)  
**Seung-Hwan Lee\***, Illinois Wesleyan University, and **Eun-Joo Lee**, Millikin University (1077-VE-951)
- 11:00AM *Census at School: An Outreach Program to Teach Statistical Problem Solving in Grades 4-12 Using Real Student Data.* (953)  
▶ **Rebecca Nichols**, American Statistical Association (1077-VE-2627)
- 11:15AM *Teaching Statistics through the years: What works? What doesn't? What's next?* (954)  
▶ **Barbara A. Wainwright**, Salisbury University (1077-VE-1422)
- 11:30AM *Introducing The Idea of Fitting a Distribution to Data in a Probability Course.* Preliminary report. (955)  
▶ **Christopher J Lacke**, Rowan University (1077-VE-2948)

**SIAM Minisymposium on Computational  
Geometry**

8:00 AM – 11:25 AM **Room 206, Hynes**

- Organizer: **Suresh Venkatasubramanian**, University of Utah
- 8:00AM *Computing interesting topological features on surface embedded graphs.* (956)  
**Erin Chambers**, Saint Louis University (1077-68-2460)
- 8:30AM *Optimal stochastic planarization.* (957)  
**Anastasios Sidiropoulos**, Toyota Technological Institute at Chicago (1077-68-1790)
- 9:00AM *An Introduction to Davenport-Schinzel Sequences, Forbidden 0-1 Matrices, and Their Geometric Applications.* (958)  
▶ **Seth Pettie**, University of Michigan (1077-05-2046)
- 9:30AM *Toward understanding complex data: graph Laplacians on singular manifolds.* (959)  
**Mikhail Belkin**, **Qichao Que**, **Yusu Wang\***, The Ohio State University, and **Xuanyuan Zhou**, University of Chicago (1077-68-1943)
- 10:00AM *Horoball Hulls and Extents in Positive Definite Space.* (960)  
**P. Thomas Fletcher**, **John Moeller**, **Jeff M Phillips** and **Suresh Venkatasubramanian\***, University of Utah (1077-51-2840)
- 10:30AM *Computational Geometry on Uncertain Data.* (961)  
**Jeff M Phillips**, University of Utah (1077-51-2277)
- 11:00AM *Geometric Aspects of Compressive Sensing.* (962)  
▶ **Eric Price**, MIT (1077-51-2732)

**Employment Center**

8:00 AM – 6:00 PM                      Exhibit Hall C, Hynes

**AMS Special Session on Enumerative and Algebraic Combinatorics, I**

8:30 AM – 11:50 AM                      Room 204, Hynes

Organizers: **Ira Gessel**, Brandeis University  
**Alexander Postnikov**, Massachusetts Institute of Technology  
**Richard Stanley**, Massachusetts Institute of Technology

- 8:30AM *On the bunkbed conjecture and related problems.*  
▶ (963) **Svante Linusson**, KTH, Stockholm, Sweden. (1077-05-2062)
- 9:00AM *Monotone Hurwitz numbers and the HCIZ integral.*  
▶ (964) **Jonathan Novak**, Massachusetts Institute of Technology (1077-05-1569)
- 9:30AM *The Potts model on random lattices.*  
(965) **Olivier Bernardi**, MIT (1077-05-1438)
- 10:00AM *Enumerations deciding the weak Lefschetz property.*  
(966) **David W. Cook II\*** and **Uwe Nagel**, University of Kentucky (1077-05-545)
- 10:30AM *Lifted generalized permutohedra and composition polynomials.* Preliminary report.  
▶ (967) **Federico Ardila\***, San Francisco State University, and **Jeffrey Doker**, University of California, Berkeley (1077-05-2311)
- 11:00AM *Flow polytopes and the Kostant partition function for signed graphs.*  
▶ (968) **Alejandro H. Morales\***, MIT, and **Karola Mészáros**, University of Michigan (1077-05-1965)
- 11:30AM *Algebra based on real hyperplane arrangements.*  
(969) **Marcelo Aguiar\***, Texas A&M University, and **Swapneel Mahajan**, IIT Mumbai (1077-05-1574)

**AMS Special Session on Some Nonlinear Partial Differential Equations: Theory and Application, I**

8:30 AM – 11:50 AM                      Wellesley, 3rd Floor, Marriott

Organizers: **Jerry L. Bona**, University of Illinois, Chicago  
**Laihan Luo**, New York Institute of Technology

- 8:30AM *Concentration compactness and KdV-NLS solitary waves.*  
(970) **John P. Albert\*** and **Santosh Bhattarai**, University of Oklahoma (1077-35-2704)

- 9:00AM *Comparisons between Uni-directional and Bi-directional Models for Surface Water Waves.*  
(971) **Jerry L. Bona**, University of Illinois at Chicago (1077-35-2119)

- 9:30AM *Asymptotic Behavior of Solutions to the Liquid Crystals Systems in  $\mathbb{R}^3$ .*  
(972) **Mimi Dai\***, **Jie Qing** and **Maria Schonbek**, University of California, Santa Cruz (1077-35-1932)

- 10:00AM *Recent Developments in Conformal Ricci Flow.*  
(973) **Arthur E. Fischer**, University of California, Santa Cruz (1077-53-2015)

- 10:30AM *Solutions to the Sine-Gordon Equation of Low Differentiability.* Preliminary report.  
(974) **Josef F. Dorfmeister**, Technische Universität München, and **Ivan C. Sterling\***, St. Mary's College of Maryland (1077-53-2863)

- 11:00AM *Periodic Rippling in Hyperbolic Non-Euclidean Plates.*  
(975) **John Gemmer\*** and **Shankar Venkataramani**, University of Arizona (1077-35-1729)

- 11:30AM *Global Well Posedness for a system of KdV-type Equations with Coupled Quadratic nonlinearities.*  
(976) **Jerry L. Bona**, University of Illinois, Chicago, **Jonathan Cohen\*** and **Gang Wang**, DePaul University (1077-35-2013)

**AMS Special Session on Stability Analysis for Infinite Dimensional Hamiltonian Systems, III**

8:30 AM – 11:20 AM                      Room 300, Hynes

Organizers: **Wilhelm Schlag**, University of Chicago  
**Gene Wayne**, Boston University

- 8:30AM *Global Stability Results for Relativistic Fluids in Expanding Spacetimes.*  
(977) **Jared Speck**, Massachusetts Institute of Technology (1077-35-736)

- 9:00AM *On the modulational instability for the Benjamin-Ono equation.*  
(978) **Vera Mikyoung Hur**, University of Illinois at Urbana-Champaign (1077-35-2370)

- 9:30AM *Phase-driven interaction of widely separated nonlinear Schrödinger solitons.*  
(979) **Justin Holmer\*** and **Quanhui Lin**, Brown University (1077-35-1701)

- 10:00AM *On the continuum limit for discrete NLS with long-range lattice interactions.*  
▶ (980) **Gigliola Staffilani\***, MIT, **Kay Kirkpatrick**, UIUC, and **Enno Lenzmann**, University of Basel (1077-35-1632)

- 10:30AM *Stability analysis via Backlund transform in completely integrable PDE.*  
(981) **Aaron Hoffman**, Franklin W. Olin College of Engineering (1077-35-1784)

Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)

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11:00AM (982) *Stability of Solitary Waves on Water of Finite Depth.*  
**Shu-Ming Sun**, Virginia Tech  
(1077-76-705)

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

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8:40 AM – 11:55 AM Room 312, Hynes

Organizers: **David Strong**, Pepperdine University  
**Gil Strang**, Massachusetts Institute of Technology  
**David Lay**, University of Maryland

8:40AM (983) *Web 2.0 for Linear Algebra Classes.*  
**Tom Edgar**, Pacific Lutheran University  
(1077-F1-2712)

9:00AM (984) *On Generating Large Dimensional, Hand-Calculable Exercises and Applications.*  
**Jeff R. Knisley**, East Tennessee State University  
(1077-F1-1585)

9:20AM (985) *Mobile Math Applications for the Second Course of Linear Algebra.*  
**Sang-Gu Lee**, Sungkyunkwan University  
(1077-F1-1813)

9:40AM (986) *Full Sage Contents of Introductory Linear Algebra.*  
**Sang-Gu Lee** and **Kyung-Won Kim\***, Sungkyunkwan University (1077-F1-1812)

10:00AM (987) *Reinforcing Basic Linear Algebra Skills Using Computer Animation.*  
**Nathan M Wodarz**, University of Wisconsin - Stevens Point (1077-F1-920)

10:20AM (988) *Muggle Magic with Matrix Arithmetic.*  
► **Tim Chartier**, Davidson College  
(1077-F1-1437)

10:40AM (989) *The Wronskian as a method for introducing vector spaces.*  
► **Daniel A. Ramras**, New Mexico State University (1077-F1-1022)

11:00AM (990) *LINE (Linear Algebra in New Environments): Using Learning Theories to Design Linear Algebra Modules.*  
► Preliminary report.  
**William O. Martin\***, North Dakota State University, **Jeff Suzuki**, Brooklyn College, **Draga Vidakovic**, Georgia State University, **Sergio Loch**, Grand View University, **Laurel A Cooley**, Brooklyn College, City University of New York, **Catalin Ciuperca**, North Dakota State University, and **Scott Dexter**, Brooklyn College, City University of New York (1077-F1-1193)

11:20AM (991) *A Comparison of Different Pedagogical Approaches to Linear Algebra.*  
**Sukanya Basu**, Grand Valley State University (1077-F1-1242)

11:40AM (992) *Connecting Linear Algebra Concepts.*  
► **C. Ray Rosentrater**, Westmont College  
(1077-F1-421)

**MAA Invited Address**

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9:00 AM – 9:50 AM Ballrooms A/B,  
3rd floor, Hynes

(993) *The sound of geometry.*  
**Carolyn Gordon**, Dartmouth College  
(1077-A0-3)

**MAA Invited Paper Session on the Beauty and Power of Number Theory**

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9:00 AM – 11:45 AM Room 302, Hynes

Organizers: **Thomas Koshy**, Framingham State University  
**Shannon Lockard**, Bridgewater State University

9:00AM (994) *Patterns in partitions.*  
**Amanda Folsom**, Yale University  
(1077-AC-1670)

9:45AM (995) *The beauty and power of some recent REU papers in number theory.*  
► **Ken Ono**, Emory University (1077-AC-52)

10:30AM (996) *Number Theory and Dynamical Systems.*  
► Preliminary report.  
**Joseph H. Silverman**, Brown University  
(1077-AC-176)

11:15AM (997)  $1 + 2 + 3 + 4 + \dots$   
**Frank H Thorne**, University of South Carolina (1077-AC-857)

**MAA Minicourse #4: Part A**

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9:00 AM – 11:00 AM Salon AB, 4th Floor, Marriott

*Elementary mathematics in architecture.*  
Presenter: **Alexander J. Hahn**, University of Notre Dame

**MAA Minicourse #13: Part A**

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9:00 AM – 11:00 AM Salon HI, 4th Floor, Marriott

*Interactive applets for calculus and differential equations.*  
Presenter: **Haynes Miller**, Massachusetts Institute of Technology

**MAA Minicourse #1: Part A**

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9:00 AM – 11:00 AM Salon CD, 4th Floor, Marriott

*Mathematics and backgammon.*  
Presenters: **Arthur Benjamin**, Harvey Mudd College  
**Robert Koca**, Community College of Baltimore County

**MAA Session on Preparing College Students for Calculus**

Theresa Anderson, Brown University

9:00 AM – 11:15 AM **Back Bay Ballroom C, 2nd Floor, Sheraton**

Organizer: **Andrew Bennett**, Kansas State University

- 9:00AM (998) *Making connections with Precalculus.*  
**Ramanjit K Sahi**, Austin Peay State University (1077-K5-903)
- 9:20AM (999) *Tangent lines: a multifaceted concept.*  
▶ **Peter J. Byers**, Boston University (1077-K5-2801)
- 9:40AM (1000) *Preparing students for proofs and deeper conceptual thinking by implementing collaborative learning projects in Intermediate Algebra and Trigonometry.*  
▶ **Alla Morgulis\*** and **Claire Wyn Wladis**, BMCC/CUNY (1077-K5-2684)
- 10:00AM (1001) *Mathematical Reasoning in Calculus: Moving Between Representations.*  
**Mairead Greene\*** and **Paula Shorter**, Rockhurst University (1077-K5-2721)
- 10:20AM (1002) *Identifying Crucial Concepts and Skills, and Preparing College Students for Success in Calculus.* Preliminary report.  
**Alison Ahlgren\***, University of Illinois, and **Marc Harper**, UCLA (1077-K5-1271)
- 10:40AM (1003) *Long-Term National Impact of the Calculus Reform Initiative.* Preliminary report.  
▶ **Susan L Ganter\***, East Carolina University, and **Jack Bookman**, Duke University (1077-K5-2880)
- 11:00AM (1004) *Preparing your calculus students: An inquiry-based algebra review.*  
**Angie Hodge**, University of Nebraska at Omaha (1077-K5-1565)

**MAA Poster Session on Mathematical Outreach Programs for Underrepresented Populations**

9:00 AM – 11:00 AM **Veteran's Auditorium, 2nd floor, Hynes**

Organizer: **Elizabeth Yanik**, Emporia State University

**MAA Panel Discussion**

9:00 AM – 10:20 AM **Room 309, Hynes**

*Are we selling mathematics as a major?*  
Organizers: **Steve Deckelman**, University of Wisconsin Stout  
**Mary Kay Abbey**, Montgomery College  
Panelists: **Michael Dorff**, Brigham Young University  
**Sandy Ganzell**, St. Mary's College  
**Daniel Kaplan**, Macalester College

**MAA Committee on Graduate Students/Young Mathematicians Network Panel Discussion**

9:00 AM – 10:20 AM **Room 306, Hynes**

*Graduate school: Choosing one, getting in, staying in.*

Organizers: **Aaron Luttmann**, Clarkson University

**Kristi Meyer**, Wisconsin Lutheran College

Panelists: **Richard McGehee**, University of Minnesota  
**Kim Ruane**, Tufts University  
**Bogdan Vernescu**, Worcester Polytechnic Institute

**MAA Session for Chairs**

9:00 AM – 10:20 AM **Room 304, Hynes**

*Timely and timeless aspects of chairing a mathematical sciences department.*

Organizers: **Daniel Maki**, Indiana University  
**Catherine M. Murphy**, Purdue University Calumet

Panelists: **Richard Cleary**, Bentley University  
**Dennis Luciano**, Western New England College  
**Catherine Roberts**, College of the Holy Cross  
**Sheryl Stump**, Ball State University

**Student Hospitality/Information Center**

9:00 AM – 5:00 PM **2nd Floor Corridor by Veterans Auditorium, Hynes**

**MAA Session on Trends in Undergraduate Mathematical Biology Education**

9:20 AM – 11:55 AM **Room 310, Hynes**

Organizer: **Timothy D. Comar**, Benedictine University

- 9:20AM (1005) *Deviation from the Norms – Algebra, Trigonometry, & Calculus for the Aspiring Life Scientist.*  
▶ **Mike Martin**, Johnson County Community College (1077-P1-352)
- 9:40AM (1006) *So, why do you require Calculus?*  
**Carrie Diaz Eaton**, Unity College (1077-P1-728)

## Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)

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- 10:00AM Undergraduate Research Projects in  
(1007) *Mathematical Biology: Modeling and Simulation in MATLAB.*  
**Timothy D Comar**, Benedictine University (1077-P1-561)
- ▶ 10:20AM *Mathematical epidemiology without differential equations.* Preliminary report.  
(1008) **Matthew Glomski**, Marist College (1077-P1-1288)
- 10:40AM *Mathematical Concepts and Methods in Modern Biology: Using Modern Discrete Models - A Book in Progress.*  
(1009) **Terrell L. Hodge\***, Western Michigan University, and **Raina Robeva**, Sweet Briar College (1077-P1-2849)
- 11:00AM *Undergraduate Research in Modeling the Response of Chaparral Plants to Wildfires.*  
(1010) **Timothy A Lucas**, Pepperdine University (1077-P1-2145)
- ▶ 11:20AM *Cross Disciplinary Research by Undergraduates in Mathematics and Biology to Examine Cellular Processes.*  
(1011) **Sepideh Khavari**, **Tara Sansom**, **Bradley Slabe**, **Jonathan Caguait** and **George T Yates\***, Youngstown State University (1077-P1-1860)
- ▶ 11:40AM *When the Bloom is Off the Rose, or, How to Avoid Depression After the Stimulus Package Runs Out.*  
(1012) **Christopher C. Leary**, SUNY Geneseo (1077-P1-2482)

### Exhibits and Book Sales

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9:30 AM – 5:30 PM Exhibit Hall D, Hynes

### AWM Emmy Noether Lecture

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10:05 AM – 10:55 AM Ballrooms A/B, 3rd floor, Hynes

(1013) *Conservation Laws - Not Exactly a la Noether.*  
**Barbara Lee Keyfitz**, The Ohio State University (1077-35-1665)

### AMS Special Presentation

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10:30 AM – NOON Room 208, Hynes

*A conversation on nonacademic employment.*  
Moderator: **C. Allen Butler**, Daniel H. Wagner Associates, Inc.

### SIGMAA Officers Meeting

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10:30 AM – NOON Room 308, Hynes

Chair: **Amy Shell-Gelasch**, Beloit College

### MAA Panel Discussion

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10:35 AM – 11:55 AM Room 306, Hynes

*Improving college mathematics teaching through faculty development.*

Organizers: **Jerry Kobylski**, U. S. Military Academy  
**Alex Heidenberg**, U. S. Military Academy  
**Hilary Fletcher**, U. S. Military Academy  
**Howard McInvale**, U. S. Military Academy

Panelists: **Molli Jones**, Immaculata College  
**Laurice Garrett**, Edison State College  
**Cindy Soderstrom**, Salt Lake Community College  
**Philip Darcy**, Dutchess Community College

### MAA Workshop

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10:35 AM – 11:55 AM Room 304, Hynes

*Proposal writing for grant applications to the NSF Division of Undergraduate Education.*

Organizers: **Richard Alo**, National Science Foundation  
**Ron Buckmire**, National Science Foundation  
**Lee Zia**, National Science Foundation

### SIAM Invited Address

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11:10 AM – NOON Ballrooms A/B, 3rd floor, Hynes

(1014) *Navier-Stokes, Euler, and other relevant equations.*  
**Edriss S. Titi**, University of California at Irvine, and the Weizmann Institute of Science (1077-35-2719)

### AMS Special Presentation

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11:15 AM – 12:15 PM Room 209, Hynes

*Report on the findings of the 2010 CBMS survey of undergraduate mathematical and statistical sciences in the U.S.*

Organizer: **James W. Maxwell**, American Mathematical Society  
Presenter: **Ellen Kirkman**, Wake Forest University



*Boston, MA, Thursday, January 5 – Program of the Sessions*

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**AMS Colloquium Lectures: Lecture II**

1:00 PM – 1:50 PM      **Ballrooms A/B, 3rd floor, Hynes**

- (1015) *Langlands program, trace formulas, and their geometrization, II.*  
**Edward Frenkel**, University of California Berkeley (1077-14-11)

**AMS-MAA Special Session on the History of Mathematics, IV**

1:00 PM – 3:50 PM      **Back Bay Ballroom A, 2nd Floor, Sheraton**

Organizers: **Sloan Despeaux**, Western Carolina University  
**Craig Fraser**, University of Toronto  
**Deborah Kent**, Hillsdale College

- ▶ 1:00PM (1016) *Mathematics in the Republic of China: A Centennial Overview.* Preliminary report.  
**Yibao Xu\***, Borough of Manhattan Community College, CUNY, and **Wann-Sheng Horng**, National Taiwan Normal University (1077-01-418)
- ▶ 1:30PM (1017) *How to Assess Influence: Wu Wen-Tsun's Work in Measure, Number and Weight.*  
**Jiri Hudecek**, Needham Research Institute, Cambridge (1077-01-1508)
- 2:00PM (1018) *Elevating the ranking of American mathematics departments 1900-1940.*  
**David E Zitarelli**, Temple University (1077-01-1276)
- ▶ 2:30PM (1019) *"It Is No Good Baking Cakes If Pies Are Wanted": The American Mathematics Community in the 1970s Job Market Crisis.* Preliminary report.  
**Alma Steingart**, MIT (1077-01-1562)
- ▶ 3:00PM (1020) *On Pre Robinsonian Non-Standard Theories of the Twentieth-Century.* Preliminary report.  
**Emil Sargsyan**, Indiana University (1077-01-2898)
- ▶ 3:30PM (1021) *The Design of Intuition: Computing and Mathematical Proof.*  
**Stephanie Dick**, Harvard University, Department of History of Science (1077-01-2031)

**AMS-ASL Special Session on the Life and Legacy of Alan Turing, IV**

1:00 PM – 3:40 PM      **Room 207, Hynes**

Organizers: **Damir Dzhafarov**, University of Chicago and University of Notre Dame  
**Jeff Hirst**, Appalachian State University  
**Carl Mummert**, Marshall University

- ▶ 1:00PM (1022) *Alan Turing and Voice Encryption.* Preliminary report.  
**Craig Bauer**, NSA Scholar-in-Residence (1077-01-433)
- 2:00PM (1023) *Turing's work and Hilbert's Tenth Problem.*  
**Kirsten Eisentraeger**, The Pennsylvania State University (1077-11-1202)
- 2:30PM (1024) *Quantum Money from Knots.*  
**Peter W. Shor**, Massachusetts Institute of Technology (1077-68-2759)
- ▶ 3:00PM (1025) *Gödel's theorems, Turing's machines, and mathematical minds.*  
**Wilfried Sieg**, Carnegie Mellon University (1077-03-983)

**AMS-AWM Special Session on Nonlinear Hyperbolic Partial Differential Equations, I**

1:00 PM – 3:50 PM      **Room 300, Hynes**

Organizers: **Barbara Lee Keyfitz**, Ohio State University  
**Charis Tsikkou**, Ohio State University

- 1:00PM (1026) *On the size of the Navier - Stokes singular set.*  
**Walter Craig**, McMaster University (1077-35-1222)
- 1:30PM (1027) *Global well-posedness and decay for the viscous surface wave problem without surface tension.*  
**Ian T Tice**, Universite Paris-Est Creteil, LAMA (1077-35-1589)
- 2:00PM (1028) *Nonrelativistic Euler-Maxwell systems.*  
**Michael Sever**, The Hebrew University, Jerusalem, Israel (1077-35-141)
- ▶ 2:30PM (1029) *Broad Band Solitons in a Periodic and Nonlinear Maxwell System.*  
**Dmitry Pelinovsky**, McMaster University (1077-35-277)
- 3:00PM (1030) *Blow Up of Solutions to the Generalized Proudman Johnson Equation.* Preliminary report.  
**Alejandro Sarria** and **Ralph Saxton\***, University of New Orleans (1077-35-2274)
- 3:30PM (1031) *Two Phase Flow in Porous Media: the Saffman-Taylor Instability Revisited.*  
**Michael Shearer\***, **Kim Spayd** and **Zhengzheng Hu**, NC State University (1077-35-1037)

**AMS Special Session on Classical Fourier Analysis and Partial Differential Equations, IV**

1:00 PM – 3:50 PM      **Room 104, Hynes**

Organizers: **William O. Bray**, University of Maine  
**Mark A. Pinsky**, Northwestern University

**Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)**

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- 1:00PM *Problems related to the concentration of eigenfunctions.*  
(1032) **Christopher D Sogge**, Johns Hopkins University (1077-42-670)
- 2:00PM *Regularity properties of Green functions in non-smooth domains.*  
(1033) **Irina Mitrea**, Temple University (1077-35-2458)
- 3:00PM *Approximate reconstruction from circular mean data via classical summability.* Preliminary report.  
(1034) **W. R. Madych**, Univ. of Connecticut, Storrs, CT 06269 (1077-42-2041)
- 3:30PM *Applications of linear and multi-linear generalized Radon transforms.*  
(1035) **Alex Iosevich**, University of Rochester (1077-42-2959)

**AMS Special Session on Climate Modeling and Geophysical Fluid Dynamics, II**

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1:00 PM – 3:20 PM **Suffolk, 3rd Floor, Marriott**

Organizers: **Qingshan Chen**, Florida State University  
**Nathan Glatt-Holtz**, Indiana University  
**Mickael Chekroun**, University of California, Los Angeles

- ▶ 1:00PM *Dynamic Transition Theory for Thermohaline Circulation.*  
(1036) **Shouhong Wang**, IN (1077-86-2929)
- 1:30PM *Dynamic Transitions and Hexagonal Patterns in Surface Tension Driven Convection.*  
(1037) **M Taylan Sengul\***, **Shouhong Wang**, Indiana University, and **Henk Dijkstra**, Utrecht University (1077-76-1969)
- 2:00PM *Suppression of chaos at slow variables by rapidly mixing fast dynamics.*  
(1038) **Rafail V. Abramov**, University of Illinois at Chicago (1077-37-2019)
- 2:30PM *Stochastic perturbations to dynamical systems: a response theory approach.*  
(1039) **Valerio Lucarini**, Klimacampus, University of Hamburg (1077-82-2454)
- 3:00PM *A Discrete Dynamical Systems Model to Study the Interaction Between Arctic Sea-Surface Temperature and Sea-Ice Cover.*  
(1040) **Sukanya Basu\***, Grand Valley State University, **Auroop R. Ganguly** and **Evan Kodra**, Department of Civil and Environmental Engineering, Northeastern University (1077-39-2240)

**AMS Special Session on Combinatorial Geometry of Polytopes, II**

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1:00 PM – 3:50 PM **Room 101, Hynes**

Organizers: **Egon Schulte**, Northeastern University  
**Asia Ivic Weiss**, York University

- 1:00PM *Euler flag enumeration of Whitney stratified spaces.*  
(1041) **Richard Ehrenborg**, University of Kentucky, **Mark Goresky**, Institute for Advanced Study, and **Margaret Readdy\***, University of Kentucky (1077-05-896)
- ▶ 1:30PM *Combinatorial constructions of polytopes.* Preliminary report.  
(1042) **T. Bisztriczky**, University of Calgary (1077-52-917)
- ▶ 2:00PM *Matrices associated with polar dual pairs of polytopes.* Preliminary report.  
(1043) **Jim Lawrence**, George Mason University (1077-52-1841)
- 2:30PM *Deformations of surfaces and convex polytopes.*  
(1044) **Satyan L Devadoss**, Williams College (1077-52-284)
- ▶ 3:00PM *Minkowski length of 2D and 3D lattice polytopes.* Preliminary report.  
(1045) **Olivia Beckwith**, Harvey Mudd College, **Matthew Grimm**, UCSD, **Jenya Soprunova\***, Kent State University, and **Bradley Weaver**, Grove City College (1077-52-945)
- ▶ 3:30PM *Graphs of Polytopes.* Preliminary report.  
(1046) **Margaret M Bayer\*** and **William Espenschied**, University of Kansas (1077-05-2099)

**AMS Special Session on Computational and Applied Topology (Mathematics Research Communities session), II**

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1:00 PM – 3:50 PM **Exeter, 3rd Floor, Marriott**

Organizers: **Radmila Sazdanovic**, University of Pennsylvania  
**Daniel Mueller**, Stanford University  
**Mikael Vejdemo-Johansson**, University of St. Andrews

- ▶ 1:00PM  *$\Phi$ -somap: Estimating Intrinsic Distance Using Persistent Homology.* Preliminary report.  
(1047) **Paul Louis Bendich\***, Duke University, and **Jacob Harer**, North Carolina State University (1077-55-986)
- 1:30PM *Stratification Learning through Local Homology Transfer.*  
(1048) **Paul Bendich**, Duke University, **Bei Wang\***, SCI Institute, University of Utah, and **Sayan Mukherjee**, Duke University (1077-55-2288)
- 2:00PM *Topological dimensionality reduction.*  
(1049) **Vin de Silva**, Pomona College (1077-68-461)
- 2:30PM *Sheaf invariants for temporal logic.*  
(1050) **Michael Robinson**, University of Pennsylvania (1077-94-225)
- 3:00PM *Directed sheaf homology and information.* Preliminary report.  
(1051) **Sanjeevi Krishnan**, University of Pennsylvania (1077-55-2262)

3:30PM *Topology of Spaces of Micro-Images and Applications.*  
(1052) **Jose Perea\***, Duke University, and **Gunnar Carlsson**, Stanford University (1077-00-1013)

**AMS Special Session on Control Theory and Inverse Problems for Partial Differential Equations, I**

1:00 PM – 3:50 PM Clarendon, 3rd Floor, Marriott

Organizers: **Shitao Liu**, University of Helsinki  
**Ting Zhou**, Massachusetts Institute of Technology

1:00PM *Optimal control of PDE population models involving resources.*  
(1053) **Suzanne Lenhart**, University of Tennessee (1077-35-926)

1:30PM *Rational decay rates for fluid-structure interactive dynamics.*  
(1054) **George Avalos**, University of Nebraska-Lincoln (1077-35-2187)

2:00PM *On the linearization of a fluid-nonlinear elasticity interaction.*  
(1055) **Lorena Bociu**, North Carolina State University (1077-35-2355)

2:30PM *Uniform decays of energy and blow up of steady states in unstable systems arising in fluid structure interactions.*  
(1056) **Irena Lasiecka** and **Yongjin Lu\***, University of Virginia (1077-35-666)

3:00PM *Structural decomposition, spectral analysis, and exponential stability for a third order PDE arising in high-intensity ultrasound.*  
(1057) **Richard J. Marchand\***, U.S. Air Force Academy/Slippery Rock University, **Timothy J. McDevitt**, Elizabethtown College, and **Roberto Triggiani**, University of Virginia (1077-35-1725)

3:30PM *Attractor for a non-dissipative von Karman plate with damping in free boundary conditions.*  
(1058) **Lorena Bociu**, North Carolina State University, and **Daniel Toundykov\***, University of Nebraska-Lincoln (1077-35-1630)

**AMS Special Session on Dynamical Systems in Algebraic and Arithmetic Geometry, III**

1:00 PM – 3:50 PM Room 200, Hynes

Organizers: **Patrick Ingram**, University of Waterloo, Canada  
**Michelle Manes**, University of Hawaii, Honolulu  
**Clayton Petsche**, Hunter College (CUNY)

▶ 1:00PM *Recent results in arithmetic dynamics.*  
(1059) Preliminary report.  
**Michael E. Zieve**, University of Michigan (1077-11-2550)

1:30PM *Prime Divisors of Certain Polynomial Orbits.*  
(1060) **Kalyani K. Madhu**, State University of New York at Brockport (1077-11-2313)

2:00PM *Bounding the Height of a Postcritically Finite Map.*  
(1061) **Alon Levy**, Brown University (1077-11-2307)

2:30PM *Computing small canonical heights in arithmetic dynamics.*  
(1062) **Robert L. Benedetto**, Amherst College (1077-11-597)

3:00PM *Equidistribution of Preimages in Berkovich Projective Space.*  
(1063) **William Gignac**, University of Michigan (1077-37-2229)

3:30PM *Ergodic theory of  $p$ -adic rational maps.*  
(1064) **Juan Rivera-Letelier**, Pontificia Universidad Catolica de Chile (1077-37-1540)

**AMS Special Session on Enumerative and Algebraic Combinatorics, II**

1:00 PM – 3:50 PM Room 204, Hynes

Organizers: **Ira Gessel**, Brandeis University  
**Alexander Postnikov**, Massachusetts Institute of Technology  
**Richard Stanley**, Massachusetts Institute of Technology

1:00PM *Stable multivariate Eulerian polynomials and generalized Stirling permutations.*  
(1065) **J. Haglund\*** and **M. Visontai**, University of Pennsylvania (1077-05-1950)

1:30PM *The negative  $q$ -binomial.*  
(1066) **Dennis Stanton**, University of Minnesota (1077-05-1880)

▶ 2:00PM *Matrices with restricted entries and  $q$ -analogues of permutations.*  
(1067) **Joel Brewster Lewis\***, MIT, **Ricky Ini Liu**, University of Michigan, **Alejandro H. Morales**, MIT, **Greta Panova**, UCLA, **Steven V Sam** and **Yan X Zhang**, MIT (1077-05-1935)

2:30PM *Major Index for  $01$ -Fillings of Moon Polyominoes.*  
(1068) **Catherine Yan\***, Texas A&M University, **William Chen**, Nankai University, China, **Svetlana Poznanovik**, Georgia Institute of Technology, and **Arthur Yang**, Nankai University, China (1077-05-1328)

▶ 3:00PM *Bijections between  $k$ -triangulations,  $k$ -fans of Dyck paths, and certain pipe dreams.*  
(1069) **Luis G Serrano\*** and **Christian Stump**, Universite du Quebec a Montreal (1077-05-1636)

**Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)**

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3:30PM (1070) *The Möbius function of generalized subword order.*  
**Peter R. W. McNamara\***, Bucknell University, and **Bruce E. Sagan**, Michigan State University (1077-06-1135)

**AMS Special Session on Frontiers in Geomathematics, I**

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1:00 PM – 3:50 PM **Commonwealth, 3rd Floor, Sheraton**

Organizers: **Willi Freeden**, University of Kaiserslautern  
**Volker Michel**, University of Siegen  
**M. Zuhair Nashed**, University of Central Florida  
**Thomas Sonar**, Technical University of Braunschweig

1:00PM (1071) *Approximation based on integral formulas for star-shaped surfaces.*  
**Willi Freeden**, Geomathematics Group, University of Kaiserslautern (1077-41-1163)

2:00PM (1072) *Integration and approximation on the sphere.*  
**Ian H Sloan**, University of New South Wales (1077-65-1730)

▶ 3:00PM (1073) *Spherical Multiscale Methods and Applications in Geomagnetic Modeling.*  
**Christian Gerhards**, TU Kaiserslautern (1077-41-2300)

▶ 3:30PM (1074) *Modern Meteorology: An Overview over the Methods used in Numerical Weather Prediction and its Application to Hurricane Irene.*  
**Martin J. Fengler**, St. Gallen, Switzerland (1077-86-1986)

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

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1:00 PM – 3:50 PM **Provincetown, 4th Floor, Marriott**

Organizers: **Tim Cochran**, Rice University  
**Shelly Harvey**, Rice University

1:00PM (1075) *Knot Floer homology and Murasugi sum.* Preliminary report.  
**Matthew Hedden\***, Michigan State University, and **Sucharit Sarkar**, Columbia University (1077-57-1793)

1:30PM (1076) *A categorification of the Tutte polynomial.* Preliminary report.  
**Moshe Cohen**, Bar-Ilan University, and **Adam M Lowrance\***, University of Iowa (1077-57-1333)

2:00PM (1077) *Graph Floer homology.*  
**Shelly Harvey**, Rice University, and **Danielle O'Donnol\***, Smith College (1077-57-1413)

2:30PM (1078) *Why you should infect your knots with links.* Preliminary report.  
**John R. Burke**, Rhode Island College (1077-57-2018)

3:00PM (1079) *Classification of 0-solvable links.*  
**Taylor E Martin**, Rice University (1077-57-2148)

3:30PM (1080) *Cosmetic crossing changes on knots.*  
**Effie Kalfagianni**, Michigan State University (1077-57-1253)

**AMS Special Session on Linear Algebraic Groups: Their Arithmetic, Geometry, and Representations, I**

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1:00 PM – 3:50 PM **Berkeley, 3rd Floor, Marriott**

Organizers: **R. Skip Garibaldi**, Emory University  
**George McNinch**, Tufts University

1:00PM (1081) *A Unified Solution to Some Linear Preserver Problems.*  
**Hernando Bermudez\***, **Skip Garibaldi** and **Victor Larsen**, Emory University (1077-20-751)

1:30PM (1082) *The gamma filtration on projective homogeneous varieties.*  
**Kirill Zainoulline**, University of Ottawa (1077-14-1368)

2:00PM (1083) *Parity Sheaves and Tilting Modules.*  
**Daniel Juteau**, Uni. de Caen/CNRS, **Carl Mautner\***, Harvard Univ./NSF, and **Geordie Williamson**, MPIM Bonn (1077-22-2027)

▶ 2:30PM (1084) *Unipotent Classes in Disconnected Algebraic Groups.*  
**Robert M Guralnick\*** and **Jason Fulman**, University of Southern California (1077-20-123)

3:00PM (1085) *Weakly commensurable S-arithmetic subgroups in simple algebraic groups of types  $B_n$  and  $C_n$ .*  
**Andrei Rapinchuk**, University of Virginia (1077-11-217)

3:30PM (1086) *Cohomology for Finite Groups of Lie Type.*  
**Daniel K. Nakano**, University of Georgia (1077-20-774)

**AMS Special Session on Mathematics in Industry, II**

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1:00 PM – 3:40 PM **Room 109, Hynes**

Organizers: **Kirk E. Jordan**, IBM T. J. Watson Research  
**Donald Schwendeman**, Rensselaer Polytechnic Institute  
**Burt S. Tilley**, Worcester Polytechnic Institute  
**Suzanne L. Weekes**, Worcester Polytechnic Institute

*Boston, MA, Thursday, January 5 – Program of the Sessions*

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- ▶ 1:00PM (1087) *Impact of Modeling and Simulation on Decision-Making: Infectious Diseases.*  
**Sara Y Del Valle**, Los Alamos National Laboratory (1077-92-873)
- 1:30PM (1088) *Mathematical Problems in Metal Processing.*  
**Bogdan Vernescu**, WPI (1077-35-2814)
- 2:00PM (1089) *Design of radar and communication signals with perfect correlation properties.*  
**Andrzej K Brodzik**, The MITRE Corporation (1077-05-584)
- 2:30PM (1090) *Optimization Algorithms on a Quantum Computer.* Preliminary report.  
**Richard H. Warren**, Lockheed Martin Corporation, King of Prussia, PA (1077-81-646)
- 3:00PM Panel discussion on doing mathematics outside of academia moderated by Suzanne L. Weekes.

**AMS Special Session on Mathematics in Natural Resource Modeling, IV**

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1:00 PM – 3:50 PM Simmons, 3rd Floor, Marriott

Organizer: **Catherine Roberts**, College of the Holy Cross

- ▶ 1:00PM (1091) *On the Complexity of Competition.*  
**Roland H Lamberson**, Humboldt State University (1077-92-411)
- 1:30PM (1092) *Co-viability modelling for the sustainable management of biodiversity.*  
**Luc Doyen**, CNRS, Paris, France (1077-93-643)
- 2:00PM (1093) *The math and algorithms of mapping and valuing ecosystem services.* Preliminary report.  
**Erik J Nelson**, Department of Economics, Bowdoin College (1077-92-1152)
- ▶ 2:30PM (1094) *A Mathematical Model of Harbor Seal Haul-out.*  
**Jonathan D Cowles**, Department of Biology, Andrews University, **Shandelle M. Henson\***, Andrews University, and **James L Hayward**, Department of Biology, Andrews University (1077-92-2562)
- ▶ 3:00PM (1095) *Model of Marine Iguana Haulout on Fernandina, Galapagos.* Preliminary report.  
**Brianna G Payne\***, **James L Hayward**, Department of Biology, Andrews University, **Shandelle M. Henson**, Andrews University, **Libby C Megna**, Department of Biology, Andrews University, and **Susana del Rocio Velastegui Chavez**, Colegio Adventista del Ecuador (1077-92-1349)

- 3:30PM (1096) *The NW Power Conservation Council's Regional Portfolio Model and the R-tic PHOX computation environment: Overview.* Preliminary report.  
**Steven A Bleiler\***, Portland State University, and **Thomas R Fielden**, Portland, Oregon (1077-60-1103)

**AMS Special Session on Rational Points on Varieties, II**

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1:00 PM – 3:50 PM Arlington, 3rd Floor, Marriott

Organizers: **Jennifer Balakrishnan**, Massachusetts Institute of Technology  
**Bjorn Poonen**, Massachusetts Institute of Technology  
**Bianca Viray**, Brown University  
**Kirsten Wickelgren**, Harvard University

- 1:00PM (1097) *Failure of the Hasse principle on general K3 surfaces.*  
**Brendan Hassett** and **Anthony Varilly-Alvarado\***, Rice University (1077-11-797)
- 1:30PM (1098) *Density of rational points on Del Pezzo surfaces of degree one.*  
**Ronald van Luijk\***, Universiteit Leiden, and **Cecilia Salgado**, Max Planck Institute, Bonn (1077-14-2153)
- 2:00PM (1099) *Manin's Conjecture and Balanced line bundles.*  
**Sho Tanimoto**, Courant Institute of Mathematical Sciences, New York University (1077-14-1139)
- 2:30PM (1100) *Some Explicit Moduli Spaces of Elliptic Curves and Generalizations.* Preliminary report.  
**Wei Ho**, Columbia University (1077-11-1295)
- 3:00PM (1101) *Rational elliptic surfaces with Mordell-Weil lattice  $E_8$  and multiplicative reduction.*  
**Abhinav Kumar\***, Massachusetts Institute of Technology, and **Tetsuji Shioda**, Rikkyo University (1077-11-2430)
- 3:30PM (1102) *Abelian varieties with homotheties.* Preliminary report.  
**Yuri Zarhin**, Pennsylvania State University (1077-14-386)

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

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1:00 PM – 3:50 PM Wellesley, 3rd Floor, Marriott

Organizers: **Jerome Goddard II**, Auburn University Montgomery  
**Junping Shi**, College of William and Mary

Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)

- Ratnasingham Shivaji**,  
University of North Carolina  
Greensboro
- 1:00PM *Steady-states for a chemotaxis system.*  
(1103) **Marcello Lucia\***, City University of New York, CSI, and **Dirk Horstmann**, University of Cologne (1077-35-1283)
- 1:30PM *Alternate Stable States in Ecosystems.*  
(1104) **Sarath Sasi**, Mississippi State University (1077-35-1101)
- 2:00PM *Asymptotic properties of perturbed parabolic equations.*  
(1105) **Juraj Foldes**, Vanderbilt University (1077-35-655)
- 2:30PM *A Nonlinear Stability Analysis of Vegetative Turing Pattern Formation for an Interaction-Diffusion Plant-Surface Water Model System in an Arid Flat Environment.*  
► (1106) **Bonni J Kealy\*** and **David J Wollkind**, Washington State University (1077-35-55)
- 3:00PM *Analysis of classes of elliptic equations with nonlinear boundary conditions arising in combustion theory.*  
(1107) **Eunkyung Ko**, Mississippi State University (1077-35-305)
- 3:30PM *Existence of Multiple Positive Solutions to Some Semipositone Systems.*  
(1108) **Maya Chhetri**, University of North Carolina-Greensboro, **Sarah Raynor\*** and **Stephen Robinson**, Wake Forest University (1077-35-2737)

**AMS Special Session on Several Complex Variables and Multivariable Operator Theory, III**

1:00 PM – 3:50 PM Room 108, Hynes

Organizers: **Ronald Douglas**, Texas A&M University  
**John McCarthy**, Washington University

- 1:00PM *A Metric from a Reproducing Kernel Hilbert Space.* Preliminary report.  
(1109) **Richard Rochberg**, Washington University, St. Louis (1077-47-876)
- 1:30PM *Function algebras invariant under group actions.* Preliminary report.  
(1110) **Alexander J. Izzo**, Bowling Green State University (1077-32-415)
- 2:00PM *Schroeder's Equation in Several Variables.*  
(1111) **Robert A Bridges**, Purdue University (1077-32-439)
- 2:30PM *On a pair of commuting isometries.*  
(1112) **Rongwei Yang**, SUNY at Albany (1077-47-572)
- 3:00PM *Rational inner functions and the Nevanlinna-Pick problem on  $D^n$ .*  
► (1113) Preliminary report.  
**David Scheinker**, Drexel University (1077-32-959)

- 3:30PM *Polynomial Hulls of Certain Compact Manifolds.*  
(1114) **John Wermer**, Providence, RI (1077-30-1015)

**AMS Special Session on Stochastic Analysis (in honor of Hui-Hsiung Kuo), III**

1:00 PM – 3:50 PM Room 107, Hynes

Organizers: **Julius Esunge**, University of Mary Washington  
**Aurel Stan**, Ohio State University

- 1:00PM *Stationary Solutions of Parabolic Equations in Gauss-Sobolev Space.*  
(1115) **Pao-Liu Chow**, Wayne State University (1077-60-414)
- 1:30PM *On the 2D Navier-Stokes and Euler equations: A statistical study.*  
(1116) **Fernanda Cipriano**, FCT-UNL and GFM-UL (1077-60-2101)
- 2:00PM *Ergodic control for two-dimensional stochastic Navier-Stokes equations.* Preliminary report.  
(1117) **P. Sundar**, Louisiana State University (1077-60-1431)
- 2:30PM *Solvability of Forward-Backward Stochastic Partial Differential Equations.*  
(1118) **Hong Yin**, State University of New York, Brockport (1077-60-1425)
- 3:00PM *A Stochastic Delay Model for Pricing Corporates Liabilities.*  
(1119) **Elisabeth Kemajou**, Southern Illinois University Carbondale (1077-60-1446)
- 3:30PM *Portfolio Optimization under Convex Incentive Schemes.*  
(1120) **Maxim Bichuch** and **Stephan Sturm\***, Princeton University, ORFE Department (1077-91-1728)

**AMS Special Session on Topological Graph Theory: Structure and Symmetry, III**

1:00 PM – 3:50 PM Room 102, Hynes

Organizers: **Jonathan L. Gross**, Columbia University  
**Thomas W. Tucker**, Colgate University

- 1:00PM *The distinguishing chromatic numbers of graphs on surfaces.*  
(1121) **Seiya Negami**, Yokohama National University (1077-05-748)
- 1:30PM *Distinguishability of Infinite Groups, Graphs, and Graph Products.*  
(1122) **Simon Mark Smith**, Syracuse University, **Thomas W. Tucker**, Colgate University, and **Mark E. Watkins\***, Syracuse University (1077-05-1229)
- 2:00PM *Vertex Transitive Infinite Median Graphs.*  
(1123) **Wilfried Imrich**, Montanuniversity Leoben, Austria (1077-05-1894)

*Boston, MA, Thursday, January 5 – Program of the Sessions*

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- 2:30PM (1124) *Embeddability of infinite graphs.*  
**Robin Christian, R. Bruce Richter**, Department of Combinatorics and Optimization, University of Waterloo, and **Gelasio Salazar\***, Instituto de Fisica. Universidad Autonoma de San Luis Potosi (Mexico) (1077-05-1834)
- 3:00PM (1125) *Topological Models of 3-configurations.* Preliminary report.  
**Arthur T. White**, Western Michigan University (1077-05-80)
- 3:30PM (1126) *An orthogonal latin square construction for orientable hamiltonian embeddings of  $K_{n,n,n}$ .* Preliminary report.  
**M. N. Ellingham** and **Justin Z. Schroeder\***, Vanderbilt University (1077-05-1679)

**Kelly Delp**, Buffalo State College  
**Sean Lawton**, University of Texas, Pan American  
**Kathryn Mann**, University of Chicago

- 1:00PM (1133) *Immersed surfaces in the modular orbifold.*  
**Danny Calegari**, California Institute of Technology, and **Joel Louwsma\***, The University of Oklahoma (1077-57-310)
- 1:30PM (1134) *Dynamics of the outer automorphism group on the  $PSL(2, \mathbb{C})$  character variety of a 3-manifold.*  
**Aaron D Magid\***, University of Maryland, and **Richard D Canary**, University of Michigan (1077-57-397)
- 2:00PM (1135) *Polynomial Pick forms for affine spheres and real projective polygons.* Preliminary report.  
**Michael Wolf\***, Rice University, and **David Dumas**, University of Illinois at Chicago (1077-58-1138)
- 3:00PM (1136) *Cubic Differentials and Limits of  $RP^2$  Structures.* Preliminary report.  
**John C Loftin\***, Rutgers Newark, and **Michael Wolf**, Rice University (1077-53-1785)

**AMS Special Session on Trends in Representation Theory, III**

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1:00 PM – 3:50 PM Room 103, Hynes

- Organizers: **Donald King**, Northeastern University  
**Alfred Noel**, University of Massachusetts, Boston
- 1:00PM (1127) *On the adjoint representation of  $sl_n$  and the Fibonacci numbers.*  
**Pamela E Harris**, University of Wisconsin Milwaukee (1077-00-910)
- 1:30PM (1128) *Weights and Combinatorics Appearing in Certain Demazure Crystals.*  
**Julie Beier**, Mercer University (1077-17-1674)
- 2:00PM (1129) *Krein spaces and local deformation in representation theory of super Lie groups.*  
**Roland Knevel**, Bar-Ilan-University Ramat Gan, Israel (1077-43-1232)
- 2:30PM (1130) *Restriction to a maximal compact subgroup in the  $p$ -adic case.* Preliminary report.  
**Monica Nevins**, University of Ottawa (1077-22-830)
- 3:00PM (1131) *Formal degrees of discrete series for classical affine Hecke algebras and  $p$ -adic groups.*  
**Dan Ciubotaru\***, University of Utah, and **Syu Kato**, Kyoto University (1077-22-1380)
- 3:30PM (1132) *Geometric Structure in the Representation Theory of Reductive  $p$ -adic Groups.*  
**Paul Frank Baum**, Penn State University (1077-22-86)

**MAA Invited Paper Session on Clever Counting or Beautiful Bijection?**

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1:00 PM – 4:20 PM Room 302, Hynes

- Organizer: **Jennifer Quinn**, University of Washington, Tacoma
- ▶ 1:00PM (1137) *Counting on Students: Combinatorial Proofs with Undergraduates.*  
**Arthur T. Benjamin**, Harvey Mudd College (1077-AD-286)
- ▶ 1:30PM (1138) *Beautiful Bijections for Permutation Patterns.*  
**Lara K. Pudwell**, Valparaiso University (1077-AD-1760)
- ▶ 2:00PM (1139) *A Beautiful Bijection that Counts and Does More: The Robinson-Schensted-Knuth Correspondence.*  
**Tom Roby**, UConn/MIT (1077-AD-2904)
- ▶ 2:30PM (1140) *Beautiful Bijections and Clever Counting in Representations.*  
**Georgia Benkart**, University of Wisconsin-Madison (1077-AD-2139)
- ▶ 3:00PM (1141) *The Benefits of Bijections.* Preliminary report.  
**David M. Bressoud**, Macalester College (1077-AD-238)
- ▶ 3:30PM (1142) *Descriptive derangements for a sum of spheres.*  
**Bridget Eileen Tenner**, DePaul University (1077-AD-1478)
- ▶ 4:00PM (1143) *A not-quite-bijective enumeration of domino tilings of Aztec diamonds.*  
**James G. Propp**, UMass Lowell and UC Berkeley (1077-AD-345)

**AMS Special Session on the Geometry of Real Projective Structures (Mathematics Research Communities session), II**

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1:00 PM – 3:40 PM Dartmouth, 3rd Floor, Marriott

Organizers: **Jeffrey Danciger**, Stanford University

Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)

**MAA Invited Paper Session on Decoding Geometry**

1:00 PM – 3:50 PM Room 203, Hynes

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

- 1:00PM *The music of triangles.*  
(1144) **Christopher M. Judge\***, 47405, and **Luc Hillairet**, Universite de Nantes (1077-AI-862)
- 1:30PM *On the distribution of simple geodesics.*  
(1145) **Peter Buser\***, Ecole Polytechnique Federale, Lausanne, and **Hugo Parlier**, University of Fribourg, Switzerland (1077-AI-2471)
- 2:00PM *Building Polygons from Spectral Data.*  
(1146) **Emily B Dryden\***, Bucknell University, **Victor Guillemin**, MIT, and **Rosa Sena-Dias**, Instituto Superior Tecnico (1077-AI-2161)
- 2:30PM *Isospectral noncompact surfaces.*  
(1147) Preliminary report.  
**Pierre Albin**, University of Illinois at Urbana-Champaign (1077-AI-1911)
- 3:00PM *A nodal domain count mystery.*  
▶ (1148) **Gregory Berkolaiko**, **Peter Kuchment\***, Texas A&M University, and **Uzy Smilansky**, Weizmann Institute of Science and Cardiff University (1077-AI-988)
- 3:30PM *Distances between Riemannian Manifolds.*  
(1149) **Sajjad Lakzian**, CUNY GC, and **Christina Sormani\***, CUNY GC and Lehman College (1077-AI-1435)

**MAA Minicourse #2: Part A**

1:00 PM – 3:00 PM Salon AB, 4th Floor, Marriott

*A dynamical systems approach to the differential equations course.*

Presenters: **Paul Blanchard**, Boston University  
**Robert Devaney**, Boston University

**MAA Minicourse #10: Part A**

1:00 PM – 3:00 PM Salon HI, 4th Floor, Marriott

*Geometry and art: A liberal arts mathematics course.*

Presenter: **Anneke Bart**, Saint Louis University

**MAA Minicourse #9: Part A**

1:00 PM – 3:00 PM Salon CD, 4th Floor, Marriott

*Reading original sources in Latin for the historian and mathematician.*

Organizers: **Amy Shell-Gellasch**, Beloit College

**Dominic Klyve**, Central Washington University

Presenters: **Kim Plofker**, Union College  
**Stacy Langton**, University of San Diego

**AMS Session on Algebraic Geometry, I**

1:00 PM – 2:55 PM Room 209, Hynes

- 1:00PM *Variety of Finitely Generated  $k$ -algebra Homomorphisms.*  
(1150) **Jon Yaggie**, University of Illinois Chicago (1077-14-2727)
- 1:15PM *Cyclic Breuil modules and Hopf orders in characteristic  $p$ .* Preliminary report.  
(1151) **Alan Koch**, Agnes Scott College (1077-14-2378)
- 1:30PM *On the Secant Defectivity of Classically Studied Varieties.*  
(1152) **Jia Wan**, University of Idaho (1077-14-2724)
- 1:45PM *Realizing Cubic Hypersurfaces in  $\mathbb{P}^3$ .*  
(1153) **Robert Edward Campbell**, University of California, Irvine (1077-14-2524)
- 2:00PM *The Arithmetic-Geometric Mean of genus 1 with Applications to genus 2 and 3.* Preliminary report.  
(1154) **Eleanor S Farrington**, Massachusetts Maritime Academy (1077-14-2479)
- 2:15PM *Stable birational equivalence and geometric Chevalley-Waring.*  
(1155) **Xia Liao**, Florida State University (1077-14-2263)
- 2:30PM *Maximal rank conjecture for rational curves on hypersurfaces.*  
(1156) **Sara Gharahbeigi**, Washington University in St Louis (1077-14-671)
- 2:45PM *Dolbeault dgas and  $L_\infty$ -algebroids associated to subvarieties.*  
(1157) **Shilin Yu**, Pennsylvania State University (1077-14-2004)

**AMS Session on Combinatorics and Graph Theory, IV**

1:00 PM – 3:55 PM Room 111, Hynes

- 1:00PM *A new method for comparing chains of order statistics.* Preliminary report.  
▶ (1158) **Corey M Manack**, Amherst College (1077-05-2264)
- 1:15PM *Cyclic Closures of Finitely Simple Pattern Classes.*  
▶ (1159) **John D Berman**, Massachusetts Institute of Technology (1077-05-2257)
- 1:30PM *The Smith Normal Form of the Incidence Matrix of Skew Lines in  $PG(3, q)$ .*  
(1160) **Josh Ducey\***, James Madison University, **Andries Brouwer**, T. U. Eindhoven, and **Peter Sin**, University of Florida (1077-05-2248)
- 1:45PM *Random Set Systems.*  
▶ (1161) **William B Jamieson**, East Tennessee State University (1077-05-2210)



*Boston, MA, Thursday, January 5 – Program of the Sessions*

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- 2:00PM *Graphic Degree Sequences and Graphs with a  $k$ -factor.*  
(1162) **Xiaofeng Gu**, West Virginia University (1077-05-2200)
- 2:15PM *On real number labellings and graph invertibility.*  
(1163) **Jeong-Ok Choi, John P. Georges, David W. Mauro\***, Trinity College, and **Yan Wang**, Millsaps College (1077-05-2215)
- 2:30PM Break.
- 2:45PM *Universal Cycles Under Equivalence Relations.*  
▶ (1164) **Melinda D. Lanius\***, Wellesley College, and **Andre Kuney**, Oberlin College (1077-05-2176)
- 3:00PM *On the Classification of Stanley Sequences.*  
(1165) **David S Rolnick**, Massachusetts Institute of Technology (1077-05-2172)
- 3:15PM *Combinatorial Interpretations of the General Eulerian Numbers.* Preliminary report.  
▶ (1166) **Tingyao Xiong\***, Radford University, **Hung-ping Tsao**, Novato, CA, and **Jonathan I. Hall**, Michigan State University (1077-05-2137)
- 3:30PM *Cops and robbers location game.*  
(1167) **James Carraher\***, University of Nebraska-Lincoln, **Ilkyoo Choi, Michelle Delcourt** and **Lawrence Erickson**, University of Illinois-Urbana Champaign (1077-05-2075)
- 3:45PM *Complexity of Tenacity Parameter in Networks.*  
(1168) **Dara Moazzami\***, **Morteza Dadvand** and **Ali Moeini**, University of Tehran, School of Engineering (1077-05-364)

**AMS Session on Commutative Rings and Algebras, I**

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1:00 PM – 3:10 PM Room 105, Hynes

- 1:00PM *The Core of a Strongly Stable Ideal.*  
(1169) **Bonnie Smith**, University of Kentucky (1077-13-2789)
- 1:15PM *Classifying annihilator-ideal graphs of finite commutative rings- Part I.* Preliminary report.  
▶ (1170) **Amanda R. Curtis\***, University of California, Santa Barbara, **Alexander J. Diehl**, Wellesley College, and **Jane C. Rieck**, University of Wisconsin- Madison (1077-13-2622)
- 1:30PM *Classifying Annihilator-Ideal Graphs for Finite Commutative Rings: Part Two.*  
▶ (1171) **Amanda R Curtis**, University of California, Santa Barbara, **Alexander J Diehl**, Wellesley College, and **Jane C Rieck\***, University of Wisconsin, Madison (1077-13-2728)
- 1:45PM *Prime avoidance avoidance.* Preliminary report.  
(1172) **Brian Johnson**, University of Nebraska - Lincoln (1077-13-2650)

- 2:00PM *Group Actions on Arrangement Complements.*  
(1173) **Daniel R Moseley**, University of Oregon (1077-13-2424)
- 2:15PM *A Generalization of Integer-valued Polynomials Rings.*  
(1174) **K. Alan Loper**, Ohio State University Newark, and **Nicholas J. Werner\***, University of Evansville (1077-13-964)
- 2:30PM *On the Algebra Structure of Tor for Trivariate Monomial Ideals.* Preliminary report.  
(1175) **Jared L Painter**, The University of Texas at Arlington (1077-13-1918)
- 2:45PM *Generalized Factorization in the Integers.* Preliminary report.  
(1176) **Alina A Florescu**, University of Iowa (1077-13-861)
- 3:00PM *Normsets of almost Dedekind domains and atomicity.*  
▶ (1177) **Richard Erwin Hasenauer**, North Dakota State University (1077-13-536)

**AMS Session on Manifolds, Cell Complexes, and Global Analysis, II**

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1:00 PM – 3:10 PM Room 305, Hynes

- 1:00PM *The Unknotting Number of 3-Stranded Pretzel Knots.*  
▶ (1178) **Eric Staron**, The University of Texas at Austin (1077-57-757)
- 1:15PM *The finite group actions on prism manifolds.* Preliminary report.  
(1179) **Ryo Ohashi**, King's College (1077-57-471)
- 1:30PM *Analogy between knots and primes: number fields ramified over two primes.* Preliminary report.  
▶ (1180) **Moshe Cohen\***, Bar-Ilan University (Israel), and **Michael Friedman**, Bar-Ilan University (1077-57-391)
- 1:45PM *Small volume link orbifolds.* Preliminary report.  
(1181) **Christopher K Atkinson\*** and **David Futer**, Temple University (1077-57-2615)
- 2:00PM *Analytical Properties of the Conformal Dirac Operator on the Unit Sphere.* Preliminary report.  
▶ (1182) **Brett J. Pansano\*** and **John A. Ryan**, University of Arkansas, Fayetteville (1077-58-2141)
- 2:15PM *A combinatorial differential graded algebra for Legendrian knots from generating families.*  
(1183) **Michael Bradley Henry\***, Siena College, and **Daniel R Rutherford**, University of Arkansas (1077-57-370)
- 2:30PM *A Lie-Algebraic Approach to the Local Index Theorem on a Flag Variety.*  
(1184) **Seunghun Hong**, Pennsylvania State University (1077-58-2005)
- 2:45PM  *$MU(BG_2)$ ,  $CH(BG_2)$ , and descent.*  
(1185) **Rebecca E Field**, James Madison University (1077-58-2850)

**Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)**

3:00PM *Cosymplectic Metrics on Flag Manifolds and Partial Differential Equations.*  
 (1186) **Marlio Paredes**, Universidad del Turabo (1077-58-2931)

4:00PM *Multiplier sequences for simple sets of polynomials.* Preliminary report.  
 ▶ (1198) **Tamas Forgacs**, California State University, Fresno (1077-30-58)

**AMS Session on Real and Complex Analysis**

1:00 PM – 4:10 PM Room 308, Hynes

- 1:00PM *A Pointwise Convergence and Bessel Capacity.*  
 (1187) **Javad Namazi**, FDU (1077-26-649)
- 1:15PM *Some Subclasses of the Real-Valued Honorary Baire Two Functions on  $\mathbb{R}^n$ .* Preliminary report.  
 (1188) **Michael J. Evans**, Washington and Lee University, and **Manuel J. Sanders III\***, University of South Carolina Beaufort (1077-26-2795)
- ▶ 1:30PM *Generalized Fractional Integrals, Derivatives and their Mellin's transforms.*  
 (1189) **Udita Nalin Katugampola**, Delaware State University (1077-26-957)
- 1:45PM *Polynomial Coefficients of Differential Operators which are Diagonal with respect to the Hermite Basis.* Preliminary report.  
 (1190) **Tamas Forgacs**, California State University Fresno, and **Andrzej Piotrowski\***, University of Alaska Southeast (1077-30-2698)
- 2:00PM *Limit Behavior of Iterated Holomorphic Function Systems.*  
 (1191) **Kourosh Tavakoli**, City University of New York (1077-30-2312)
- 2:15PM *Fourier multipliers and Dirac operators.*  
 (1192) **G Wang\*** and **Craig Nolder**, Florida State University (1077-30-1564)
- 2:30PM Break.
- 2:45PM *Bohr's phenomenon for analytic functions into the exterior of a compact convex body.*  
 (1193) **R M Ali\***, Universiti Sains Malaysia, and **Y Abu-Muhanna**, American University of Sharjah (1077-30-147)
- 3:00PM *Convolutions of Complex-Valued Harmonic Mappings.* Preliminary report.  
 (1194) **Stacey Muir**, University of Scranton (1077-30-2765)
- 3:15PM *On a polynomial approximation problem.*  
 (1195) **Arthur A. Danielyan**, University of South Florida (1077-30-2718)
- 3:30PM *Coefficient Estimates for Bi-univalent Ma-Minda Starlike and Convex Functions.*  
 (1196) **See Keong Lee**, Universiti Sains Malaysia (1077-30-276)
- 3:45PM *Necessary Conditions for the Existence of Higher Order Extensions of Univalent Mappings from the Disk to the Ball.* Preliminary report.  
 (1197) **Jerry R. Muir**, University of Scranton (1077-32-2683)

**AMS Session on Recreational Mathematics: Miscellaneous Topics**

1:00 PM – 2:25 PM Room 303, Hynes

- ▶ 1:00PM *On Scaling Infinite Products and their Application in Operator Decomposition.*  
 (1199) **Wei Zhang\*** and **Jianzhong Wang**, Sam Houston State University (1077-00-1953)
- ▶ 1:15PM *Finding Asymmetric Drumming Rhythms.*  
 (1200) **Andrew P. Maturo\*** and **Nick Robbins**, Gettysburg College (1077-00-1539)
- ▶ 1:30PM *A fast finite difference method for fractional diffusion equations.* Preliminary report.  
 (1201) **Treena Basu\*** and **Dr. Hong Wang**, University of South Carolina (1077-00-513)
- ▶ 1:45PM *Multisite phosphorylation with substrate sequestration can robustly generate bistability.* Preliminary report.  
 (1202) **Kanadpriya Basu\*** and **Dr. Xinfeng Liu**, University of South Carolina (1077-00-512)
- 2:00PM *Integral Closures of number fields.*  
 (1203) **Fidele F Ngwane**, University of South Carolina, Salkehatchie, (1077-00-503)
- ▶ 2:15PM *Assessment of Enhanced College Algebra at Virginia State University in its Second Year.* Preliminary report.  
 (1204) **Robert E. Wieman**, Virginia State University (1077-97-2797)

**AMS Session on Undergraduate Research, IV**

1:00 PM – 3:55 PM Room 110, Hynes

- ▶ 1:00PM *On 2-fold graceful labelings of graphs.*  
 (1205) **Megan Cornett\***, Indiana State University, and **Ellen Sparks**, Illinois State University (1077-05-2671)
- ▶ 1:15PM *Covering Graphs, Voltage Assignments, and Hamiltonicity.*  
 (1206) **Sarah Alexander\***, Barnard College, **Matthew Hughes**, Bard College, and **Miriam Kuzbary**, The University of Texas at Dallas (1077-05-2463)
- ▶ 1:30PM *On Calculations of  $p$ -Typical Formal Group Laws.*  
 (1207) **Eddie Santiago Beck**, University of Georgia (1077-55-2774)
- ▶ 1:45PM *Minimal Degree Parameterization for the Trefoil and Figure Eight Knots.*  
 (1208) **Samantha Pezzimenti**, Ramapo College of New Jersey (1077-57-865)
- ▶ 2:00PM *Mean-reverting pricing models.* Preliminary report.  
 (1209) **Jody Trapier Shipp**, George Mason University (1077-60-1206)

*Boston, MA, Thursday, January 5 – Program of the Sessions*

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- 2:15PM *Stochastic Reduction of an SIR Model.*  
(1210) **Iulia Hociota\*** and **Bruno D Welfert**,  
Arizona State University (1077-60-2105)
- 2:30PM Break.
- 2:45PM *Black-Scholes Model with Markov*  
▶ (1211) *Parameters.*  
**Mark Goldfarb\*** and **Bruno Welfert**,  
Arizona State University (1077-60-2152)
- 3:00PM *The resulting weighted ranking.*  
(1212) Preliminary report.  
**Dmitry Andreevich Sumkin**, Moscow  
Institute of Physics and Technology,  
Moscow, Russia (1077-62-2957)
- 3:15PM *Modified Chambolle Method for Speckle*  
▶ (1213) *Image Denoising.*  
**Ethan Wyatt Lockhart\***, North Carolina  
State University, **Arundhati Bagchi Misra**  
and **Hyeona Lim**, Mississippi State  
University (1077-65-2184)
- 3:30PM *Relative Efficiencies of the Maximum*  
▶ (1214) *Partial Likelihood Estimators Under*  
*Sampling Schemes.*  
**Nils S Nelson\***, Utah State University,  
and **Haimeng Zhang**, Mississippi State  
University (1077-62-1802)
- 3:45PM *A Proemial Disquisition of Cardinality.*  
▶ (1215) **John Paul Jablonski**, Kutztown  
University of Pennsylvania (1077-03-336)

**MAA Session on Arts and Mathematics,  
Together Again, III**

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1:00 PM – 3:35 PM Room 311, Hynes

- Organizer: **Douglas E. Norton**,  
Villanova University
- 1:00PM *Modular construction of knot and link*  
(1216) *patterns from simple tangles on*  
*k-uniform tessellations.*  
**David A Reimann**, Albion College  
(1077-B1-1280)
- ▶ 1:20PM *Braids, Cables, and Cells: An Interesting*  
(1217) *Intersection of Mathematics, Computer*  
*Science, and Art.* Preliminary report.  
**Joshua Brandon Holden**, Rose-Hulman  
Institute of Technology (1077-B1-2731)
- ▶ 1:40PM *Building a Better Beaded Bracelet:*  
(1218) *Transformations, Tessellations, and Tori.*  
**Susan Goldstine\***, St. Mary's College of  
Maryland, and **Ellie Baker**, Lexington, MA  
(1077-B1-1776)
- ▶ 2:00PM *Using tiling theory to generate weaving*  
(1219) *patterns with beads.*  
**Gwen Laura Fisher\***, beAd Infitum,  
California, and **Blake Mellor**, Loyola  
Marymount University, Los Angeles,  
California (1077-B1-633)
- 2:20PM *A visual representation of the*  
(1220) *decomposition of the integers into prime*  
*factors.*  
**Margaret E. Kepner**, Washington, DC  
(1077-B1-2937)

- ▶ 2:40PM *The Projective Ornament of Claude*  
(1221) *Bragon.*  
**Susan McBurney**, Western Springs,IL  
(1077-B1-702)
- ▶ 3:00PM *Linear Iterative Systems and String Art.*  
(1222) **Samer S Habre**, Lebanese American  
University (1077-B1-412)
- ▶ 3:20PM *Diagrammatics: Art, Language, and*  
(1223) *Mathematics.*  
**Radmila Sazdanovic**, University of  
Pennsylvania (1077-B1-1792)

**MAA Session on Projects, Demonstrations,  
and Activities that Engage Liberal Arts  
Mathematics Students, I**

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1:00 PM – 3:55 PM Back Bay Ballroom  
C, 2nd Floor, Sheraton

- Organizer: **Sarah Mabrouk**,  
Framingham State University
- 1:00PM *The Real Cost of Home Ownership.*  
(1224) **Stan Perrine**, Charleston Southern  
University (1077-L1-214)
- ▶ 1:20PM *Beyond Formulas: A Collaboration*  
(1225) *Between Liberal Arts Underclassmen and*  
*Senior Math Majors.*  
**Alissa S. Crans\*** and **Robert J. Rovetti**,  
Loyola Marymount University  
(1077-L1-2272)
- ▶ 1:40PM *Try Trisecting by Bisecting.*  
(1226) **Theresa Jorgensen\*** and **Barbara**  
**Shipman**, University of Texas at  
Arlington (1077-L1-1106)
- ▶ 2:00PM *Geometric Constructions in*  
(1227) *Contemporary Problem Solving.*  
**Jeffrey L. Poet**, Missouri Western State  
University (1077-L1-974)
- ▶ 2:20PM *Candy Bar Election.*  
(1228) **Ben Galluzzo**, Shippensburg University  
(1077-L1-2651)
- ▶ 2:40PM *Balancing structure and creativity in*  
(1229) *projects for liberal arts mathematics.*  
Preliminary report.  
**Reva Kasman**, Salem State University  
(1077-L1-560)
- 3:00PM *Hexiclouds: Graph Theory Meets LEGO*  
(1230) *Bricks.*  
**Edward W. Welsh**, Westfield State  
University (1077-L1-2902)
- ▶ 3:20PM *Observing the Motion of the Sun and the*  
(1231) *Moon.*  
**Helmer Aslaksen**, Dept. of Math./Dept.  
of Teacher Education, Univ. of Oslo,  
Norway (1077-L1-1687)
- ▶ 3:40PM *Survey It! Using Surveys to Answer*  
(1232) *Student's Questions.*  
**Erin Smith**, Zayed University Abu Dhabi,  
United Arab Emirates (1077-L1-1526)

Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)

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

1:00 PM – 3:55 PM Room 202, Hynes

Organizers: **Sean Larsen**, Portland State University

**Stacy Brown**, Pitzer College

**Karen Marrongelle**, Portland State University

- 1:00PM (1233) *Assessing Suitability of Grades and Course-Taking Patterns as Measures of Long-term Student Outcomes following Inquiry-Based Learning Experiences.*  
**Marina Kogan\*** and **Sandra Laursen**, University of Colorado, Boulder (1077-M1-2034)
- ▶ 1:20PM (1234) *Definitions and Uses of Function Composition in Secondary and Early Collegiate Textbooks.*  
**Aladar K Horvath**, Michigan State University (1077-M1-2171)
- 1:40PM (1235) *From intuition to rigor: Calculus students' reinvention of the definition of sequence convergence.*  
**Michael Oehrtman**, University of Northern Colorado, **Craig Swinyard\***, University of Portland, **Jason Martin**, University of Central Kansas, **Catherine Hart-Weber** and **Kyeong Hah Roh**, Arizona State University
- ▶ 2:00PM (1236) *Students' Ways of Thinking about Enumerative Combinatorics Problems: Deletion and Equivalence Classes.*  
**Aviva Halani**, Arizona State University (1077-M1-2805)
- ▶ 2:20PM (1237) *Quantitative Reasoning During Definition Formation: The Case of Absolute Value.*  
**Jason Martin\***, University of Central Arkansas, **Michael Oehrtman**, University of Northern Colorado, **Craig Swinyard**, University of Portland, and **Beth Cory**, Sam Houston State University (1077-M1-2546)
- ▶ 2:40PM (1238) *A Controlled Study of Collaborative Learning in Intermediate Algebra.*  
**Claire Wyn Wladis\*** and **Alla Morgulis**, BMCC/CUNY (1077-M1-2580)
- 3:00PM (1239) *Identifying Student Difficulties in Combinatorial Proof Production.*  
**Nicole Engelke\*** and **Todd CadwalladerOlsker**, California State University, Fullerton (1077-M1-2679)
- ▶ 3:20PM (1240) *A Guided Reinvention of the Definitions of Ring, Integral Domain, and Field.*  
Preliminary report.  
**John Paul Cook**, University of Oklahoma (1077-M1-2693)

- ▶ 3:40PM (1241) *Student Conceptions and Misconceptions with Order of Operations in Calculus.*  
Preliminary report.  
**Ian G. Caldwell\***, **Eric Stade**, University of Colorado, Boulder, and **Hortensia Soto-Johnson**, University of Northern Colorado (1077-M1-2739)

**MAA Session on Touch It, Feel It, Learn It: Tactile learning Activities in the Undergraduate Mathematics Classroom, IV**

1:00 PM – 3:55 PM Room 313, Hynes

Organizers: **Jessica Mikhaylov**, U.S. Military Academy  
**Julie Barnes**, Western Carolina University

- ▶ 1:00PM (1242) *Euler Games for Differential Equations.*  
**Rodney X. Sturdivant**, United States Military Academy (1077-O1-599)
- ▶ 1:20PM (1243) *Does the Wave Equation Really Work?*  
**Donald C. Armstead** and **Michael A. Karls\***, Ball State University (1077-O1-1862)
- ▶ 1:40PM (1244) *Demonstrations That Work in the Mathematics Classroom.*  
**Elton Graves**, Rose-Hulman Institute of Technology (1077-O1-554)
- ▶ 2:00PM (1245) *Food for (Mathematical) Thought.*  
**Penelope H Dunham**, Muhlenberg College (1077-O1-897)
- ▶ 2:20PM (1246) *How Many Mints Do I Have?*  
**Nathan Axvig**, Virginia Military Institute (1077-O1-1767)
- ▶ 2:40PM (1247) *The Candy-Coated Mathematics Classroom.*  
**Erin Elizabeth Bancroft**, Grove City College (1077-O1-2603)
- ▶ 3:00PM (1248) *Origami as Hands-on Math.*  
**Thomas C. Hull**, Western New England University (1077-O1-2197)
- ▶ 3:20PM (1249) *Cookies, Sidewalk-chalk, and Office Chairs: Hands-on Activities from Calculus to Comets.*  
**Jessica M Mikhaylov**, U.S. Military Academy, West Point (1077-O1-2669)
- ▶ 3:40PM (1250) *Using feather boas to teach students about functions in pre-calculus, calculus, and real analysis.* Preliminary report.  
**Julie Barnes**, Western Carolina University (1077-O1-1726)

**MAA Session on the Mathematics of Sudoku and Other Pencil Puzzles, II**

1:00 PM – 3:35 PM Room 312, Hynes

Organizers: **Laura Taalman**, James Madison University  
**Jason Rosenhouse**, James Madison University

- ▶ 1:00PM (1251) *Arrowgrams.*  
**Kenneth L Price**, University of Wisconsin Oshkosh (1077-H1-426)

*Boston, MA, Thursday, January 5 – Program of the Sessions*

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| <p>▶ 1:20PM (1252) <i>Solitaire mancala games as pencil puzzles</i>. Preliminary report.<br/><b>Brant Jones*</b>, <b>Laura Taalman</b> and <b>Anthony Tongen</b>, James Madison University (1077-H1-2665)</p> <p>▶ 1:40PM (1253) <i>Quantitative Analysis of Crossword Puzzle Difficulty</i>.<br/><b>John K McSweeney</b>, Concordia University (1077-H1-1408)</p> <p>▶ 2:00PM (1254) <i>Finding closed knight's tours on annular chessboards</i>. Preliminary report.<br/><b>Gregory P. B. Dresden</b>, Washington &amp; Lee University (1077-H1-148)</p> <p>▶ 2:20PM (1255) <i>Radon-Kaczmarz Puzzles: CAT Scans Meet Sudoku</i>.<br/><b>Julian F Fleron*</b>, <b>Volker Ecke</b>, <b>Christine von Renesse</b> and <b>Philip K Hotchkiss</b>, Westfield State University (1077-H1-1603)</p> <p>▶ 2:40PM (1256) <i>Mutually Orthogonal Sudoku Latin Squares</i>. Preliminary report.<br/><b>Nate L. Coursey</b>, Kennesaw State University (1077-H1-844)</p> <p>▶ 3:00PM (1257) <i>Orthogonal Graph Colorings</i>.<br/><b>Serge C. Ballif</b>, Penn State University (1077-H1-850)</p> <p>▶ 3:20PM (1258) <i>Magic Squares and Sudoku</i>.<br/><b>John Lorch</b>, Ball State University (1077-H1-505)</p> | <p>▶ 2:15PM (1264) <i>A Nonparametric Expectation Maximization Algorithm for Multiscale Hawkes Processes</i>.<br/><b>Erik Lewis*</b>, UCLA, and <b>George Mohler</b>, Santa Clara University (1077-VG-2156)</p> <p>▶ 2:30PM (1265) <i>Laser propagation in biaxial liquid crystal polymers</i>.<br/><b>Eric P Choate</b>, Naval Postgraduate School (1077-VG-2510)</p> <p>▶ 2:45PM (1266) <i>Connections between bounded error parameter identification and confidence ellipsoids</i>. Preliminary report.<br/><b>Adam F Childers</b>, Roanoke, VA (1077-VG-527)</p> <p>▶ 3:00PM (1267) <i>Singularity of Cubic Bézier Curves and Surfaces</i>.<br/><b>Edmond Nadler*</b>, Eastern Michigan University, and <b>Tae-wan Kim</b>, Seoul National University (1077-VG-2617)</p> <p>▶ 3:15PM (1268) <i>A Posteriori Error Analysis of Finite Element Method for Linear Nonlocal Diffusion and Peridynamic Models</i>.<br/><b>Qiang Du</b>, Pennsylvania State University, <b>Lili Ju</b>, University of South Carolina, <b>Li Tian*</b> and <b>Kun Zhou</b>, Pennsylvania State University (1077-VG-1691)</p> <p>▶ 3:30PM (1269) <i>Computational Sensors As Mathematical Models</i>.<br/><b>Emek Kose</b>, Saint Mary's College Of Maryland (1077-VG-2918)</p> |
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**MAA General Contributed Paper Session:  
Modeling and Applications of Mathematics, I**

1:00 PM – 3:40 PM                      Room 201, Hynes

- Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University
- ▶ 1:00PM (1259) *Lagrangian Transport Patterns for Radioactive Particles after Fukushima*. Preliminary report.  
**Tim Lai**, Arizona State University (1077-VG-2157)
- ▶ 1:15PM (1260) *Skeletons of Lagrangian Transport in Hurricane Katrina*. Preliminary report.  
**Chris G. Wake**, Arizona State University (1077-VG-2158)
- ▶ 1:30PM (1261) *Linear instability in a combustion problem*.  
**Laura K. Gross\***, Bridgewater State University, **Yi Yang**, Emory University, and **Jun Yu**, University of Vermont (1077-VG-304)
- ▶ 1:45PM (1262) *Study on freezing in cylindrical domain with convective cooling and energy generation*. Preliminary report.  
**Sushil Kumar**, S. V. National Institute of Technology Surat, India (1077-VG-650)
- ▶ 2:00PM (1263) *A Boundary Value Problem for a Doublet*.  
**Kenneth H Luther**, Valparaiso University (1077-VG-1098)

**SIAM Minisymposium on Sparsity in Inverse Problems and Signal Processing**

1:00 PM – 3:55 PM                      Room 206, Hynes

- Organizer: **Otmar Scherzer**, University of Vienna
- ▶ 1:00PM (1270) *Statistical Multiscale Analysis: From Signal Detection to Nanoscale Photonic Imaging*.  
**Axel Munk**, U Goettingen and Max Planck Institute for Biophysical Chemistry (1077-62-2927)
- ▶ 1:30PM (1271) *A symbol-based approach to bar code decoding*.  
**Mark Iwen**, Duke University, **Fadil Santosa\***, University of Minnesota, and **Rachel A Ward**, University of Texas (1077-94-2962)
- ▶ 2:00PM (1272) *A nonlinear sampling problem about signals with finite rate of innovation*. Preliminary report.  
**Qiyu Sun**, University of Central Florida (1077-94-1865)
- ▶ 2:30PM (1273) *Recent Results and Open Problems in Sparse Regularisation*.  
**Markus Grasmair**, Computational Science Center, University of Vienna (1077-49-1818)
- ▶ 3:00PM (1274) *Expressions of smoothness in regularization*.  
**Bernd Hofmann**, Chemnitz University of Technology, Germany (1077-65-1315)

Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)

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3:30PM (1275) *Hoelder Stability and Iterative Rconstruction in Inverse Problems.*  
**Otmar Scherzer\***, University of Vienna,  
**Maarten de Hoop** and **Lingyun Qiu**,  
Purdue University (1077-46-1843)

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**AMS Panel Discussion**

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1:00 PM – 2:30 PM Room 208, Hynes

*Summer math camps: The AMS (and mathematician's) role.*  
Organizers: **Irwin Kra**, SUNY at Stony Brook  
**Glenn Stevens**, Boston University  
Panelists: **Moon Duchin**, Tufts University  
**Glenn Stevens**, Boston University  
**Max Warshauer**, Texas State University

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**MAA-Young Mathematicians Network Panel Discussion**

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1:00 PM – 2:20 PM Room 309, Hynes

*Career options for undergraduate mathematics majors.*  
Organizers: **Nyles Breecher**, Hamline University  
**Raluccca Gera**, Naval Postgraduate School  
Panelists: **Erin Corman**, National Security Agency  
**Michael Dorff**, Brigham Young University  
**Emily Kessler**, Society of Actuaries

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**MAA Committee on Minority Participation/MAA Office of Minority Participation Panel Discussion**

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1:00 PM – 2:20 PM Room 304, Hynes

*Summer research programs.*  
Organizers: **William Hawkins, Jr**, MAA and University of the District of Columbia  
**Robert Megginson**, University of Michigan  
Panelists: **Min-Lin Lo**, California State University, San Bernardino  
**Asamoah Nkwanta**, Morgan State University

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**The College Board/MAA Committee on Mutual Concerns Panel Discussion**

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1:00 PM – 2:20 PM Room 306, Hynes

*What can colleges and universities do to increase student success in calculus?*  
Organizers: **James R. Choike**, Oklahoma State University  
**Carl C. Cowen**, Indiana University Purdue University Indianapolis  
Panelists: **Alison Ahlgren**, University of Illinois, Urbana-Champaign  
**David M. Bressoud**, Macalester College  
**Marilyn Carlson**, Arizona State University  
**Bernard Madison**, University of Arkansas

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

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1:00 PM – 4:00 PM Back Bay Ballroom D, 2nd Floor, Sheraton

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

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**AMS Special Session on New Perspectives in Multiplicative Number Theory (Mathematics Research Communities session), II**

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1:30 PM – 3:50 PM Fairfield, 3rd Floor, Marriott

Organizers: **Leo Goldmakher**, University of Toronto  
**Jonathan Kish**, University of Colorado at Boulder  
**Micah Milinovich**, University of Mississippi  
**Paul Pollack**, University of British Columbia/Simon Fraser University

1:30PM (1276) *On the Correlation of completely multiplicative functions.*  
**Himadri Ganguli**, Simon Fraser University (1077-11-640)  
2:00PM Discussion moderated by Kannan Soundararajan  
3:00PM (1277) *Resonance method for large character sums.*  
**Bob Hough**, Stanford University (1077-11-858)  
3:30PM (1278) *Elliptic Carmichael numbers.*  
**Carl Pomerance**, Dartmouth College (1077-11-674)

*Boston, MA, Thursday, January 5 – Program of the Sessions*

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

2:00 PM – 4:00 PM

**Veteran’s Auditorium,  
2nd floor, Hynes**

Organizer: **Jon Scott**, Montgomery College

2:00PM (1279) *UTMOST: Undergraduate Teaching of Mathematics with Open Software and Textbooks.*

**Robert Beezer**, University of Puget Sound, **Jason Grout**, Drake University, **Marja-Liisa Hassi**, University of Colorado at Boulder, **Thomas Judson\***, Stephen F. Austin State University, **Kiran Kedlaya**, Massachusetts Institute of Technology, **Sandra Laursen**, University of Colorado at Boulder, and **William Stein**, University of Washington, Seattle

2:00PM (1280) *Change Agents for Teaching and Learning Statistics (CATALST).*

**Joan Garfield\***, **Bob delMas**, **Andy Zieffler**, University of Minnesota, **Allan Rossman**, **Beth Chance**, California Polytechnic State University, San Luis Obispo, **George Cobb**, Mount Holyoke College, and **John Holcomb**, Cleveland State University

2:00PM (1281) *Math in the City.*

**Petronela Radu**, **Stephen Hartke** and **Lauren Keough\***, University of Nebraska-Lincoln

2:00PM (1282) *Discovery Learning Projects in Introductory Statistics.*

**Brad Bailey**, **Dianna Spence\*** and **Sherry L Hix**, North Georgia College & State University

2:00PM (1283) *Research-Based Video for Teaching Undergraduate Proof.*

**Jim Sandefur\***, Georgetown University, **Connie Campbell**, Millsaps College, and **Kay Somers**, Moravian College

2:00PM (1284) *Quantitative Reasoning in the Contemporary World.*

**Stuart Boersma\***, Central Washington University, **Bernard L. Madison**, University of Arkansas, **Caren Diefenderfer**, Hollins University, and **Shannon Dingman**, University of Arkansas

2:00PM (1285) *Using Research to Shape Instruction and Placement in Algebra and Precalculus.*

**Bernard L. Madison\***, University of Arkansas, **Michael Pearson**, Mathematical Association of America, **Caren Diefenderfer**, Hollins University, and **Marilyn Carlson**, Arizona State University

2:00PM (1286) *Integrated Undergraduate Training in Mathematics and Life Sciences at NCSU.*

**Hien Tran\***, **Aloysius Helminck**, **James Gilliam** and **Alun Lloyd**, North Carolina State University

2:00PM (1287) *College Ready in Mathematics and Physics Partnership.*

**Bernard L. Madison\***, **Gay Stewart**, **Shannon Dingman**, University of Arkansas, **John Jones**, University of Arkansas at Fort Smith, and **Pete Joenks**, Springdale High School

2:00PM (1288) *Texas A&M UBM: Student Research Experience is the Key.*

**May Boggess\***, **Jay Walton**, **Masami Fujiwara**, Texas A&M University, **Kaibin Fu** and **Harriette Block**, Prairie View A&M University

2:00PM (1289) *REU Site: Modeling and Industrial Applied Mathematics.*

**Aloysius Helminck\*** and **Hien Tran**, North Carolina State University

2:00PM (1290) *The Statistics Taught Using Resampling and Randomization (STURR) Project.*

**Bob delMas**, University of Minnesota

2:00PM (1291) *Evaluation and Assessment of Teaching and Learning About Statistics (e-ATLAS).*

**Joan Garfield\***, **Bob delMas** and **Andy Zieffler**, University of Minnesota

▶ 2:00PM (1292) *Assessing Faculty Practice and Faculty Development on Inquiry-Based Learning and Teaching in Undergraduate Mathematics.*

**Sandra Laursen\*** and **Marina Kogan**, University of Colorado Boulder

2:00PM (1293) *The Poincare Institute: A Partnership for Mathematics Education.*

**Montserrat Teixidor\***, **Analucia Schliemann**, **David Carraher**, **Roger Tobin** and **Caroline J. Hagen**, Tufts University

2:00PM (1294) *Greater Birmingham Mathematics Partnership.*

**John Mayer\***, University of Alabama at Birmingham, **Bernadette Mullins**, Birmingham-Southern College, **Ruth Parker**, Mathematics Education Collaborative, **Ann Dominick** and **Tommy Smith**, University of Alabama at Birmingham

2:00PM (1295) *Native American-based Mathematics Materials for Integration into Undergraduate Courses.*

**Charles P. Funkhouser\***, **Scott A. Annin**, California State University Fullerton, and **Miles Pfahl**, Turtle Mountain Community College

2:00PM (1296) *Pathways to Calculus: Disseminating and Scaling a Professional Development Model for Algebra Through Precalculus Teaching and Learning.*

**Marilyn P. Carlson\***, **Wayne Raskind**, **Fabio Milner**, Arizona State University, **Michael Oehrtman**, Northern Colorado University, **Kevin Moore**, University of Georgia, and **Dawn Teuscher**, Brigham Young University

Program of the Sessions – Boston, MA, Thursday, January 5 (cont'd.)

- 2:00PM (1297) *Empowering Student Learning in Mathematical Analysis.*  
**Barbara Shipman**, The University of Texas at Arlington
- 2:00PM (1298) *MathDL Books Online.*  
**David Smith\*** and **Lang Moore**, Duke University
- 2:00PM (1299) *New Directions for MathDL.*  
**Lang Moore\*** and **David Smith**, Duke University
- 2:00PM (1300) *STEM Real World Applications of Mathematics.*  
**Darren Narayan\*** and **William Basener**, Rochester Institute of Technology
- 2:00PM (1301) *PREP: MAA's Professional Development Program.*  
**J. Michael Pearson**, Mathematical Association of America, **Nancy Baxter Hastings**, Dickinson College, **Barbara Edwards**, Oregon State University, **Nathaniel Dean**, Texas State University San Marcos, **Virginia Buchanan**, Hiram College, **Mike Brilleslyper**, United States Air Force Academy, and **Jon Scott\***, Montgomery College
- 2:00PM (1302) *Dynamic Visualization Tools for Multivariable Calculus.*  
**Paul Seeburger**, Monroe Community College
- 2:00PM (1303) *Lurch, Educational Software for Writing Proofs.*  
**Kenneth G. Monks\***, University of Scranton, and **Nathan Carter**, Bentley University
- 2:00PM (1304) *Flash Applets for WeBWork Online Homework System.*  
**Barbara Margolius\***, **Felipe Martins**, Cleveland State University, **Dan Gries**, Hopkins School, and **Yuping Wu**, Cleveland State University
- 2:00PM (1305) *Maplets for Calculus.*  
**Douglas B. Meade\***, University of South Carolina, and **Philip B. Yasskin**, Texas A & M University
- 2:00PM (1306) *Playing Games with a Purpose: A New Approach to Teaching and Learning Statistics.*  
**Shonda R. Kuiper**, Grinnell College, **Rodney Sturdivant\***, **Billy Kaczynski**, **John Jackson** and **Kevin Cummiskey**, United States Military Academy
- 2:00PM (1307) *UBM-Group: Collaborations on Riverine Ecology (CORE): Investigations into species invasion and disease transmission at the interface between mathematics and biology.*  
**James Peirce\*** and **Gregory Sandland**, University of Wisconsin - La Crosse
- 2:00PM (1308) *Texas Middle and Secondary Mathematics Project.*  
**Kimberly Childs**, Stephen F. Austin State University
- 2:00PM (1309) *Texas Leadership Initiative: Mathematics Instruction Transformed (Texas LIMIT).*  
**Kimberly Childs\***, **Deborah Pace**, **Lesla Beverly** and **Betty Alford**, Stephen F. Austin State University
- 2:00PM (1310) *Talented Teachers in Training for Texas (T4).*  
**Lesla Beverly\***, **Keith Hubbard**, **Karen Embry-Jenlink** and **Dennis Gravatt**, Stephen F. Austin State University
- 2:00PM (1311) *Paradigms in Physics: Interactive Electromagnetism Curricular Materials.*  
**Tevian Dray\***, **Corinne A. Manogue** and **Emily H. van Zee**, Oregon State University
- 2:00PM (1312) *Mathematical ACES: Algebraic Concepts for Elementary Students.*  
**Davida Fischman\***, **Shawn McMurrin**, **Joseph Jesunathadas**, California State University-San Bernardino, **Karla Wells**, Ontario Montclair Elementary School District, and **Carol Cronk**, San Bernardino Superintendent of Schools
- 2:00PM (1313) *Learning Discrete Mathematics and Computer Science via Primary Historical Sources.*  
**Jerry Lodder\*** and **David Pengelley**, New Mexico State University
- 2:00PM (1314) *Linear Algebra in New Environments (LINE).*  
**Draga Vidakovic\***, Georgia State University, **Sergio Loch**, Grand View University, **William Martin**, North Dakota State University, and **Jeff Suzuki**, Brooklyn College
- 2:00PM (1315) *Careers in Mathematics.*  
**Michael Dorff**, Brigham Young University
- 2:00PM (1316) *Math Images.*  
**Eugene Klotz\***, Math Forum, and **Camilia Smith Barnes**, Sweet Briar College
- 2:00PM (1317) *Illustrating Graph Theory Concepts in Real World Settings.*  
**Joan M. Lucas\*** and **Rebecca Smith**, The College at Brockport, State University of New York
- 2:00PM (1318) *Undergraduate Research in Mathematical Biology: Modeling cellular processes from bacteria to neurons.*  
**George Yates\***, **Jonathan Caguiat**, **Jozsi Jalics**, **Gary Walker** and **Mark Womble**, Youngstown State University
- 2:00PM (1319) *University Scholars in STEM.*  
**Leah Gold**, Cleveland State University
- 2:00PM (1320) *Improving the Learning Environment for Underrepresented Students in Mathematics through the S-STEM Program.*  
**Alexandra Kurepa**, North Carolina A&T State University
- 2:00PM (1321) *Research, Dissemination, and Faculty Development of Inquiry-Based Learning (IBL) Methods in the Teaching and Learning of Mathematics.*  
**Ralf Spatzier**, University of Michigan



*Boston, MA, Thursday, January 5 – Program of the Sessions*

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| <p>2:00PM (1322) <i>Distributome—An Interactive Web-based Resource for Probability Distributions.</i><br/><b>Kyle Siegrist*</b>, University of Alabama in Huntsville, <b>Dennis Pearl</b>, The Ohio State University, and <b>Ivo Dinov</b>, University of California Los Angeles</p> <p>2:00PM (1323) <i>Resources for Instructors Teaching “Elementary Mathematics for Teachers”.</i><br/><b>Thomas H. Parker*</b> and <b>Scott Baldrige</b>, Louisiana State University</p> <p>2:00PM (1324) <i>Undergraduates Learning to Write Mathematics: The Math Images Project.</i><br/><b>K. A. Renninger*</b>, <b>A. M. Phillips</b>, <b>A. Lipman</b> and <b>Gene Klotz</b>, Swarthmore College</p> <p>2:00PM (1325) <i>Productive Disposition: Of What Does It Consist? The Case of Preservice Mathematics Teachers and Virtual Fieldwork: The Math Forum’s Virtual Fieldwork Sequence.</i><br/><b>K. A. Renninger*</b>, <b>M. Chin</b>, <b>D. Fan</b>, Swarthmore College, and <b>Wesley Shumar</b>, Drexel University</p> <p>2:00PM (1326) <i>Discovering the Art of Mathematics.</i><br/><b>Julian F. Fleron*</b>, <b>Volker Ecke</b>, <b>Philip K. Hotchkiss</b> and <b>Christine von Renesse</b>, Westfield State University</p> <p>2:00PM (1327) <i>Introducing Statistical Techniques Through Guided Interdisciplinary Research Projects.</i><br/><b>Shonda Kuiper</b>, Grinnell College</p> <p>2:00PM (1328) <i>Math for America Boston: Teaching Scholars Program.</i><br/><b>Eileen Lee*</b>, Math for America Boston, <b>Steve Rosenberg</b>, <b>Suzanne Chapin</b> and <b>Glenn Stevens</b>, Boston University</p> <p>2:00PM (1329) <i>Focus on Mathematics: Creating Learning Cultures for High Student Achievement, A targeted Math and Science Partnership.</i><br/><b>Una MacDowell*</b>, Education Development Center, Inc, <b>Steve Rosenberg</b>, <b>Glenn Stevens</b>, Boston University, <b>Al Cuoco</b>, Education Development Center, Inc, and <b>Wayne Harvey</b>, Education Development Center, Inc.</p> <p>2:00PM (1330) <i>Resequencing Calculus.</i><br/><b>Mark Gruenwald*</b> and <b>David Dwyer</b>, University of Evansville</p> <p>2:00PM (1331) <i>Quantitative Skills in Biology through Scientific Inquiry at James Madison University.</i><br/><b>Brian Walton*</b>, <b>Anthony Tongen</b>, <b>Nusrat Jahan</b> and <b>Reid Harris</b>, James Madison University</p> <p>2:00PM (1332) <i>Project MOSAIC: Integrating Modeling, Statistics, Computation and Calculus in the Undergraduate Curriculum.</i><br/><b>Daniel Kaplan*</b>, Macalester College, <b>Randall Pruiem</b>, Calvin College, <b>Eric Marland</b>, Appalachian State University, and <b>Nicholas Horton</b>, Smith College</p> | <p>2:00PM (1333) <i>Biology and Mathematics in Population Studies (BioMaPS) II.</i><br/><b>Donald Adongo*</b>, <b>K. Renee Fister</b>, <b>Terry Derting</b>, <b>Chris Mecklin</b>, <b>Claire Fuller</b>, <b>Kate He</b>, <b>Emily Croteau</b>, <b>Maeve McCarthy</b> and <b>Howard Whiteman</b>, Murray State University</p> <p>2:00PM (1334) <i>DIYModeling (Do It Yourself Modeling).</i><br/><b>Frank Wattenberg*</b>, <b>Rod Sturdivant</b>, <b>Chris Weld</b>, United States Military Academy, <b>Jim Rolf</b>, United States Air Force Academy, <b>Bill Bauldry</b>, Appalachian State University, <b>Joe Yanik</b> and <b>Betsy Yanik</b>, Emporia State University</p> <p>2:00PM (1335) <i>WeBWork: Improving Student Success in Mathematics.</i><br/><b>Arnold Pizer*</b>, <b>Mike Gage</b>, <b>Vicki Roth</b>, University of Rochester, <b>Michael Pearson</b> and <b>John Wyatt</b>, Mathematical Association of America</p> <p>2:00PM (1336) <i>The Impact of the PREP 2011 Workshops on Bioinformatics Research and Teaching Activities at Jacksonville State University.</i><br/><b>Monica Trifas*</b>, <b>Aaron Garrett</b>, <b>Jimmy Triplett</b> and <b>Chris Murdock</b>, Jacksonville State University</p> <p>2:00PM (1337) <i>An Integrative Analysis of Human Cancer: Exploiting the Synergy of Mathematical and Molecular Biological Approaches in Studying a Complex Problem.</i><br/><b>Jeffrey Forrester*</b> and <b>Michael P. Roberts</b>, Dickinson College</p> |
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- AMS Invited Address**
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- 2:15 PM – 3:05 PM      **Ballrooms A/B, 3rd floor, Hynes**
- (1338) *Invariant manifolds and dispersive Hamiltonian evolution equations.*  
**Wilhelm Schlag**, University of Chicago (1077-35-2)
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- MAA/Young Mathematicians Network Panel Discussion**
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- 2:40 PM – 4:00 PM      **Room 309, Hynes**
- Hit the ground running! Interview like a pro and land the job.*
- Organizers: **Kristine Roinestad**, Georgetown College  
**Nick Scoville**, Ursinus College
- Panelists: **David Cox**, Amherst College  
**Paul Dupuis**, Brown University  
**Eric Grinberg**, University of Massachusetts, Boston  
**Betty Mayfield**, Hood College

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**MAA Panel Discussion**

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2:40 PM – 4:00 PM Room 306, Hynes

*Publishing with the MAA.*

Organizer: **Zaven A. Karian**, Denison University

Panelists: **Donald J. Albers**, MAA  
**Gerald J. Bryce**, Hampden-Sydney College

**MAA Subcommittee on Research by Undergraduates Panel Discussion**

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2:40 PM – 4:00 PM Room 304, Hynes

*Successful and diverse models for mentoring research by undergraduates.*

Organizers: **Sarah Spence Adams**, Franklin W. Olin College of Engineering

**Angel R. Pineda**, California State University, Fullerton

Panelists: **James Davis**, University of Richmond

**Gary P. Gordon**, Lafayette College

**Kathryn Leonard**, California State University, Channel Islands

**Herbert A. Medina**, Loyola Marymount University

**Alison A. Motsinger-Reif**, North Carolina State University

**Suzanne L. Weekes**, Worcester Polytechnic Institute

**SIGMAA on Math Circles Demonstration for JMM Participants**

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3:00 PM – 4:00 PM Back Bay Ballroom B, 2nd Floor, Sheraton

*Come see and participate in this Math Circles experience.*

Organizers: **James Tanton**, St. Mark's Institute of Mathematics

**Tatiana Shubin**, San Jose State University

**AMS Retiring Presidential Address**

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3:20 PM – 4:10 PM Ballrooms A/B, 3rd floor, Hynes

(1339) *Our challenges.*

**George E. Andrews**, Penn State University (1077-00-14)

**Joint Prize Session**

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4:25 PM – 5:25 PM Ballrooms A/B, 3rd floor, Hynes

**Joint Prize Session Reception**

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5:30 PM – 6:30 PM Ballroom C, 3rd floor, Hynes

**SIGMAA on Environmental Mathematics Business Meeting**

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5:30 PM – 7:00 PM Room 311, Hynes

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

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5:45 PM – 7:00 PM Room 302, Hynes

5:45PM Business meeting and reception.

6:15PM *Why is it plausible?*

(1340) **Barry Mazur**, Harvard University (1077-A0-44)

**SIGMAA on Statistics Education Business Meeting and Reception**

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5:45 PM – 7:15 PM Room 201, Hynes

**MAA Two-Year College Reception**

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5:45 PM – 7:00 PM Arlington, 3rd Floor, Marriott

**SIGMAA on Mathematicians in Business, Industry, and Government Guest Lecture, Reception, and Business Meeting**

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6:00 PM – 8:45 PM Room 203, Hynes

6:00PM *Rational rationing in healthcare: Observations for organ allocation.*  
(1341) **Sommer Gentry**, U. S. Naval Academy (1077-A0-26)

7:15PM Reception.

8:00PM Business meeting.

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

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6:00 PM – 7:00 PM Room 202, Hynes

**Young Mathematicians' Network Open Forum**

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7:30 PM – 8:30 PM Berkeley, 3rd Floor, Marriott

*All meeting participants, including undergraduates and graduate students, are welcome to discuss topics and issues affecting young mathematicians.*

Organizers: **Josh Laison**, Williamette University

**Thomas Wakefield**, Youngstown State University

## Friday, January 6

### Joint Meetings Registration

7:30 AM – 4:00 PM                      2nd Floor Corridor,  
opposite Hall C, Hynes

### AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates and Students in Post-Baccalaureate Programs, I

8:00 AM – 10:50 AM                      Back Bay Ballroom  
A, 2nd Floor, Sheraton

Organizers: **Bernard Brooks**, Rochester Institute of Technology  
**Jobby Jacob**, Rochester Institute of Technology  
**Jacqueline Jensen**, Sam Houston State University  
**Darren A. Narayan**, Rochester Institute of Technology

- ▶ 8:00AM (1342) *The Rainbow Domination Number of a Graph.* Preliminary report.  
**Micaela Harris**, **Ruth Haas**, **Kristina Martin\***, **Shira Polster** and **Julie Woods**, Smith College (1077-05-1886)
- ▶ 8:30AM (1343) *Discrete Models with Proportional Harvesting.*  
**James C Cameron\***, University of Texas at Austin, **Luis Diego Granera**, Yale University, **Peter Jaworski**, Central Michigan University, and **Loren Santana**, Skidmore College (1077-39-107)
- ▶ 9:00AM (1344) *On 2-fold G-designs where G has order at most 4 and edge-multiplicity 2.*  
**Sabrina Allen\***, University of Illinois, Champaign-Urbana, **Jelsi Bolt**, Kankakee High School, IL, **Ryan C. Bunge**, Illinois State University, **Scott Burton**, Virginia Tech, and **Saad I. El-Zanati**, Illinois State University (1077-05-2666)
- ▶ 9:30AM (1345) *On Rosa-type labelings of directed graphs.*  
**Catherine Kruger\***, Eastern Illinois University, **Saad El-Zanati**, Illinois State University, and **Jessica Klister**, University of Wisconsin La Crosse (1077-05-2812)
- ▶ 10:00AM (1346) *Higher Rectification and Polytope Numbers: The Simplex Case.* Preliminary report.  
**Chelsea R. Snyder\*** and **Christina C. Scurlock**, Grove City College (1077-05-40)
- ▶ 10:30AM (1347) *Restricted Symmetric Signed Permutations.*  
**Andy Hardt** and **Justin M. Troyka\***, Carleton College (1077-05-91)

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

8:00 AM – 10:50 AM                      Constitution Ballroom  
A, 2nd Floor, Sheraton

Organizers: **William Barker**, Bowdoin College  
**William McCallum**, University of Arizona  
**Bonnie Saunders**, University of Illinois at Chicago

- ▶ 8:00AM (1348) *A statewide partnership to support professional development for mathematics teachers.* Preliminary report.  
**W James Lewis**, University of Nebraska-Lincoln (1077-97-2151)
- ▶ 8:30AM (1349) *Incorporating the Common Core State Standards Integrated Secondary Curriculum in a Teacher Training Course.*  
**Amanda Cangelosi** and **Hugo Rossi\***, University of Utah (1077-97-184)
- ▶ 9:00AM (1350) *The Mathematical Education of Teachers II and Progressions for the Common Core State Standards for Mathematics.* Preliminary report.  
**Sybilla Beckmann**, University of Georgia (1077-97-1542)
- ▶ 9:30AM (1351) *A Guided Tour of the Illustrative Mathematics Project.* Preliminary report.  
**Kristin L. Umland**, University of New Mexico (1077-97-644)
- ▶ 10:00AM (1352) *Assessing Mathematical Habits of Mind for Teaching.*  
**Ryota Matsuura\***, St. Olaf College, **Sarah Sword**, **Mary Beth Piecham**, Education Development Center, Inc., **Glenn Stevens**, Boston University, and **Al Cuoco**, Education Development Center, Inc. (1077-97-2827)
- ▶ 10:30AM (1353) *Transforming geometry through transformations.*  
**Patrick Callahan**, University of California Los Angeles (1077-97-1879)

### AMS-SIAM Special Session on the Mathematics of Computation: Algebra and Number Theory, I

8:00 AM – 10:50 AM                      Room 109, Hynes

Organizers: **Jean-Marc Couveignes**, Université de Toulouse  
**Michael J. Mossinghoff**, Davidson College  
**Igor E. Shparlinski**, Macquarie University, Australia

- ▶ 8:00AM (1354) *Faster deterministic integer factorization.*  
**David Harvey**, University of New South Wales (1077-11-881)

**Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)**

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- 8:30AM (1355) *Algorithms for Approximately Counting Semismooth Integers*. Preliminary report. **Jonathan P Sorenson**, Butler University (1077-11-405)
- 9:00AM (1356) *Elliptic Pseudoprimes and Elliptic Carmichael Numbers*. Preliminary report. **Joseph H. Silverman\***, Brown University, and **Chantal David**, Concordia University (1077-11-173)
- 9:30AM (1357) *Wieferich primes, heuristics, and computations*. Preliminary report. **Pace P Nielsen**, Brigham Young University (1077-11-48)
- 10:00AM (1358) *Dense product-free sets*. **Carl Pomerance**, Dartmouth College (1077-11-406)
- 10:30AM (1359) *Congruence properties of the multiplicative partition function*. **Paul Pollack**, University of British Columbia (1077-11-285)

**AMS-AWM Special Session on Nonlinear Hyperbolic Partial Differential Equations, II**

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8:00 AM – 10:50 AM Room 300, Hynes

- Organizers: **Barbara Lee Keyfitz**, Ohio State University  
**Charis Tsikkou**, Ohio State University
- 8:00AM (1360) *Transonic flow in gas dynamics*. **Dehua Wang**, University of Pittsburgh (1077-35-296)
- 8:30AM (1361) *A system of conservation laws with no classical Riemann solution. Existence of Dafermos profiles for singular shocks*. **Barbara Lee Keyfitz** and **Charis Tsikkou\***, The Ohio State University (1077-35-2501)
- 9:00AM (1362) *Applications of Generalized Characteristics*. **Constantine M. Dafermos**, Brown University (1077-35-1049)
- 9:30AM (1363) *Singularity Formation in Nonstrictly Hyperbolic Equations*. **Katarzyna Saxton**, Loyola University, New Orleans (1077-35-2206)
- 10:00AM (1364) *On the transonic shocks of Euler-Poisson equations*. **Tao Luo**, Georgetown University (1077-35-582)
- 10:30AM (1365) *Enhanced Lifespan of Smooth Solutions of a Burgers-Hilbert Equation*. **John K Hunter\*** and **Mihaela Ifrim**, University of California at Davis (1077-35-2769)

**AMS Special Session on Advances in Mathematical Biology, I**

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8:00 AM – 10:50 AM Simmons, 3rd Floor, Marriott

Organizers: **David Chan**, Virginia Commonwealth University

- 8:00AM (1366) *Stability and bifurcations in an epidemic model with nonlinear incidence rate and varying immunity period*. Preliminary report. **Eric José Avila**, Universidad Autonoma de Yucatan (1077-34-295)
- 8:30AM (1367) *Reaction-Diffusion-Delay Model for Chondrocyte/Cytokine Interactions During Typical Injury Response in Articular Cartilage*. Preliminary report. **Jason M Graham**, University of Iowa (1077-92-719)
- 9:00AM (1368) *Dynamical behavior of a model for hormonal regulation of the menstrual cycle*. **James F Selgrade\*** and **Alison Margolskee**, North Carolina State University (1077-92-2359)
- 9:30AM (1369) *Fatal Disease and Demographic Allee Effect: Population Persistence and Extinction*. **Avner Friedman**, Mathematical Bioscience Institute/ The Ohio State University, and **Abdul-Aziz Yakubu\***, Howard University (1077-34-2150)
- 10:00AM (1370) *Attenuant and Resonant 2-Cycles in Discrete-Time 2-Species Population Models*. Preliminary report. **John E. Franke\***, North Carolina State University, and **Matthew A. Morena**, University of New Hampshire (1077-92-1624)
- 10:30AM (1371) *On a nonlinear system of difference equations*. **M Predescu**, Bentley University (1077-39-921)

**AMS Special Session on Algebraic and Geometric Aspects of Integrable Systems and Random Matrices, I**

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8:00 AM – 10:40 AM Room 107, Hynes

- Organizers: **Anton Dzhamay**, University of Northern Colorado  
**Kenichi Maruno**, University of Texas, Pan American  
**Virgil Pierce**, University of Texas, Pan American
- 8:00AM (1372) *Random matrix methods for the enumeration of 3-valent maps*. **Nicholas M. Ercolani**, University of Arizona, and **Virgil U. Pierce\***, University of Texas – Pan American (1077-60-786)
- 8:30AM (1373) *The Riemann–Hilbert approach to the gap probabilities in multi-time random point processes of Airy and Pearcey type*. **Marco Bertola\***, Concordia University, Montreal, and **Mattia Cafasso**, Universite' d'Angers, France (1077-60-1169)

*Boston, MA, Friday, January 6 – Program of the Sessions*

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- 9:00AM  $\beta$  ensemble on a Jordan curve.  
(1374) Preliminary report.  
**Seung Yeop Lee\***, Caltech, and **Nikolai Makarov**, Caltech.edu (1077-60-1213)
- 9:30AM *A matrix model for simple Hurwitz numbers and topological recursion.*  
(1375) **Gaetan Borot**, **Bertrand Eynard**, Service de Physique Theorique de Saclay, **Motohico Mulase**, University of California, Davis, and **Brad Safnuk\***, Central Michigan University (1077-14-42)
- 10:00AM *Dyson's Brownian Motions and Critical Diffusions.*  
(1376) **Mark A Adler**, Brandeis University (1077-60-2222)

**AMS Special Session on Arithmetic Geometry, II**

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8:00 AM – 10:50 AM Room 204, Hynes

Organizers: **Bo-Hae Im**, Chung-Ang University, South Korea  
**Jennifer Johnson-Leung**, University of Idaho  
**Jennifer Paulhus**, Grinnell College

- 8:00AM *Abelian surfaces with extra endomorphisms.*  
(1377) **Reinier Broker\***, Brown University, **Kristin Lauter**, Microsoft Research, and **Marco Streng**, University of Warwick (1077-14-960)
- 8:30AM *Automorphism groups of a family of maximal curves.*  
(1378) **Robert M. Guralnick**, University of Southern California, **Beth Malmskog\***, Wesleyan University, and **Rachel Pries**, Colorado State University (1077-11-2028)
- 9:00AM *Genus 2 curves with (4, 4)-split Jacobians.*  
(1379) **Nils Bruin** and **Kevin Doerksen\***, Simon Fraser University (1077-11-2125)
- 9:30AM *Decomposing Jacobian Varieties of Curves.*  
(1380) **Jennifer Paulhus**, Grinnell College (1077-11-2349)
- 10:00AM *On the arithmetic of the Legendre curve in a tower of function fields.* Preliminary report.  
(1381) **Douglas Ulmer**, Georgia Institute of Technology (1077-11-2192)
- 10:30AM *An arithmetic intersection formula for denominators of Igusa class polynomials.* Preliminary report.  
(1382) **Kristin Lauter**, Microsoft Research, and **Bianca Viray\***, Brown University (1077-11-718)

**AMS Special Session on Calculus of Functors and Its Applications, I**

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8:00 AM – 10:50 AM Exeter, 3rd Floor, Marriott

Organizers: **Brian Munson**, Wellesley College

- 8:00AM *Embedding Calculus and Topological Categories.*  
(1383) **Daniel Pryor**, University of Virginia (1077-55-2258)
- 8:30AM *Geometric representative of a (3d – 8)-dimensional cycle in knot spaces.*  
(1384) **Kristine Pelatt**, University of Oregon (1077-55-1185)
- 9:00AM *New Developments in Approximation Towers of Functors.* Preliminary report.  
(1385) **Rosona M Eldred**, University of Illinois Urbana-Champaign (1077-55-2600)
- 9:30AM *The mod 2 homology of infinite loopspaces.*  
(1386) **Jason B. McCarty**, University of Virginia (1077-55-258)
- 10:00AM *A homotopy-theoretic view of Bott-Taubes integrals and knot spaces.*  
(1387) **Robin M. J. Koytcheff**, Brown University (1077-55-2329)
- 10:30AM *A classification of Taylor towers.* Preliminary report.  
(1388) **Michael Ching**, Amherst College (1077-55-1625)

**AMS Special Session on Combinatorial Geometry of Polytopes, III**

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8:00 AM – 10:50 AM Room 101, Hynes

Organizers: **Egon Schulte**, Northeastern University  
**Asia Ivic Weiss**, York University

- 8:00AM *Symmetries of Equivelar Toroids.*  
(1389) **Asia Ivic Weiss\***, York University, **Isabel Hubard**, UNAM Mexiocc City, Mexico, **Alen Orbanic**, University of Ljubljana, Slovenia, and **Daniel Pellicer**, UNAM Morelia, Mexico (1077-52-614)
- 8:30AM *Equivelar 4-twistoids.*  
(1390) **Mark Mixer\***, York University, **Isabel Hubard**, **Daniel Pellicer**, UNAM, and **Asia Ivic Weiss**, York University (1077-52-2512)
- 9:00AM *Projective Polytopes.* Preliminary report.  
(1391) **Javier Bracho**, UNAM (1077-52-2607)
- 9:30AM *Non-Triangulatable Polyhedra.*  
(1392) **B. Carrigan**, Auburn University (1077-52-1643)
- 10:00AM *The Law of Aboav-Weaire and its analogue in three dimensions.*  
(1393) **Richard Ehrenborg\***, University of Kentucky, **Menachem Lazar**, Institute for Advanced Study, and **Jeremy Mason**, Lawrence Livermore National Laboratory (1077-52-866)
- 10:30AM *Vertex-transitive polyhedral maps and actions of discrete groups on surfaces.*  
(1394) **Roman Nedela**, Matej Bel University, Banska Bystrica, Slovak rep. (1077-05-852)

**Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)**

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**AMS Special Session on Control Theory and Inverse Problems for Partial Differential Equations, II**

**8:00 AM – 10:50 AM** **Clarendon, 3rd Floor, Marriott**

Organizers: **Shitao Liu**, University of Helsinki  
**Ting Zhou**, Massachusetts Institute of Technology

- 8:00AM (1395) *Carleman estimates for systems of partial differential equations.*  
**Matthias Eller**, Georgetown University (1077-35-2369)
- 8:30AM (1396) *The Calderon Problem with Partial Data.*  
**Gunther Uhlmann**, UC Irvine and University of Washington (1077-35-2584)
- 9:00AM (1397) *Schrödinger hats: cloaked amplifiers via transformation optics.*  
**Allan Greenleaf\***, University of Rochester, **Yaroslav Kurylev**, University College London, **Matti Lassas**, University of Helsinki, **Ulf Leonhardt**, School of Physics and Astronomy, University of St. Andrews, and **Gunther Uhlmann**, University of California-Irvine (1077-35-613)
- 9:30AM (1398) *Recovery of a source or a sound speed with one measurement and applications.*  
**Plamen Stefanov\***, Purdue University, and **Gunther Uhlmann**, University of Washington and UC Irvine (1077-35-615)
- 10:00AM (1399) *Hybrid inverse problems and internal functionals.*  
**Guillaume Bal**, Columbia University (1077-35-532)
- 10:30AM (1400) *Local Analysis of Inverse Problems: Hölder Stability and Iterative Reconstruction.*  
**Maarten de Hoop\***, **Lingyun Qiu**, Purdue University, and **Otmar Scherzer**, University of Vienna (1077-35-1651)

**AMS Special Session on Differential Algebraic Geometry and Galois Theory (in memory of Jerald Kovacic), II**

**8:00 AM – 10:50 AM** **Room 103, Hynes**

Organizers: **Phyllis Joan Cassidy**, Smith College and the City University of New York  
**Richard Churchill**, Hunter College and Graduate Center at CUNY  
**Claude Mitschi**, Université de Strasbourg, France  
**Michael Singer**, North Carolina State University

- 8:00AM (1401) *Reductive connections and Ruled surfaces.*  
**Camilo Sanabria**, CUNY Bronx Community College (1077-34-727)

- 8:30AM (1402) *Topological Methods in Klein's Resolvent Problem.*  
**Yuri Burda**, University of Toronto (1077-12-932)
- 9:00AM (1403) *The Lie groupoid of the integers.*  
**Alexandru Buium**, University of New Mexico (1077-13-419)
- 9:30AM (1404) *Real Picard-Vessiot theory.*  
**Zbigniew Hajto\***, Jagiellonian University, **Teresa Crespo**, Universitat de Barcelona, and **Elzbieta Sowa**, Jagiellonian University (1077-12-1171)
- 10:00AM (1405) *Computing the Galois Group of Linear Difference-Differential Equations.*  
**Ruyong Feng**, KLMM, Chinese Academy of Sciences (1077-34-541)
- 10:30AM (1406) *Solve Linear Differential Equations in terms of Hypergeometric Functions.*  
**Tingting Fang\*** and **Mark van Hoeij**, Florida State University (1077-34-1224)

**AMS Special Session on Fractal Geometry in Pure and Applied Mathematics (in memory of Benoit Mandelbrot), III**

**8:00 AM – 10:50 AM** **Room 200, Hynes**

Organizers: **Michael L. Lapidus**, University of California, Riverside  
**Erin Pearse**, University of Oklahoma  
**Machiël van Frankenhuysen**, Utah Valley University

- 8:00AM (1407) *Packing dimension of images of additive Lévy processes.*  
**Liang Zhang**, University of Utah (1077-60-1001)
- 8:30AM (1408) *Correlation-length bounds, and estimates for intermittent islands in parabolic SPDEs.*  
**Davar Khoshnevisan**, University of Utah (1077-60-1461)
- 9:00AM (1409) *Multifractal analysis of Lévy fields.*  
**Arnaud Durand\***, Univ. Paris-Sud, and **Stephane Jaffard**, Univ. Paris-Est (1077-60-1304)
- 9:30AM (1410) *Fractal properties of the Schramm-Loewner evolution.*  
**Gregory F Lawler**, University of Chicago (1077-60-609)
- 10:00AM (1411) *On-diagonal oscillation of the heat kernels on p.c.f. self-similar fractals.*  
**Naotaka Kajino**, University of Bielefeld (1077-60-952)
- 10:30AM (1412) *The Geometry of the Mandelbrot Set.*  
**Robert L. Devaney**, Boston University (1077-37-1601)

**AMS Special Session on Frontiers in Geomathematics, II**

8:00 AM – 10:50 AM Suffolk, 3rd Floor, Marriott

Organizers: **Willi Freeden**, University of Kaiserslautern  
**Volker Michel**, University of Siegen  
**M. Zuhair Nashed**, University of Central Florida  
**Thomas Sonar**, Technical University of Braunschweig

8:00AM *Mathematical Texture Analysis.*

(1413) **Helmut Schaeben**, Geophysics and Geoscience Informatics, TU Bergakademie Freiberg (1077-41-1819)

9:00AM *Regularization of Tomographic Inverse Problems in Geophysics.*

(1414) **Volker Michel**, Geomathematics Group, University of Siegen, Germany (1077-65-1069)

10:00AM *Sparse Approximation on the Sphere - A Matching Pursuit with a Kernel Based Dictionary.*

(1415) **Roger Telschow**, Geomathematics Group, University of Siegen (1077-41-1312)

10:30AM *The Regularized Functional Matching Pursuit and its Application to Inverse Ill-posed Problems in Geomathematics.*

► (1416) **Doreen Fischer**, Geomathematics Group, University of Siegen (1077-41-1310)

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

8:00 AM – 10:50 AM Provincetown, 4th Floor, Marriott

Organizers: **Mark Behrens**, Massachusetts Institute of Technology  
**Mark W. Johnson**, Pennsylvania State University, Altoona  
**Haynes R. Miller**, Massachusetts Institute of Technology  
**James Turner**, Calvin College  
**Donald Yau**, Ohio State University

8:00AM *On the equivariant cohomology of Stiefel manifolds.* Preliminary report.

(1417) **William C Kronholm**, Whittier College (1077-55-56)

8:30AM *Cohomology of equivariant Grassmannians and motivic characteristic classes for quadratic bundles.*

(1418) **Daniel Dugger**, University of Oregon (1077-55-1920)

9:00AM *Global equivariant homotopy theory.*

(1419) **Anna Marie Bohmann**, Northwestern University (1077-55-1866)

9:30AM *G-spectra and equivariant commutativity.* Preliminary report.

(1420) **Bertrand J Guillou\***, University of Illinois - Urbana-Champaign, **J Peter May**, University of Chicago, and **Nathaniel Stapleton**, MIT (1077-55-2623)

10:00AM *A homotopical version of p-local finite groups.* Preliminary report.

(1421) **Matthew J. K. Gelvin\***, University of Copenhagen, and **Kári Ragnarsson**, Chicago, IL (1077-55-2305)

10:30AM *The Segal conjecture in homotopical group theory.* Preliminary report.

(1422) **William G. Dwyer**, Notre Dame, and **Kári Ragnarsson\***, Google/AIM (1077-55-2246)

**AMS Special Session on Linear Algebraic Groups: Their Arithmetic, Geometry, and Representations, II**

8:00 AM – 10:50 AM Berkeley, 3rd Floor, Marriott

Organizers: **R. Skip Garibaldi**, Emory University  
**George McNinch**, Tufts University

8:00AM *Graham's Variety and Perverse Sheaves on the Nilpotent Cone.*

(1423) **Amber Russell**, Louisiana State University (1077-22-692)

8:30AM *Nilpotent Orbit Closures in the Symplectic and Orthogonal Groups.* Preliminary report.

(1424) **Ellen J Goldstein**, Northwestern University (1077-14-1788)

9:00AM *Algebraic Frobenius splitting of bundles on flag varieties.* Preliminary report.

(1425) **Chuck Hague**, University of Delaware (1077-20-1597)

9:30AM *Equivariant Birational Properties of Algebraic Tori.* Preliminary report.

(1426) **Nicole Lemire**, University of Western Ontario (1077-20-2180)

10:00AM *Reduced Null Cones.*

(1427) **Gerald W. Schwarz\***, Brandeis University, and **Hanspeter Kraft**, University of Basel (1077-20-688)

10:30AM *On a duality for nilpotent orbits.* Preliminary report.

(1428) **Eric Sommers**, University of Massachusetts at Amherst (1077-17-1214)

**AMS Special Session on Noncommutative Birational Geometry and Cluster Algebras, I**

8:00 AM – 10:50 AM Dartmouth, 3rd Floor, Marriott

Organizers: **Arkady Berenstein**, University of Oregon  
**Vladimir Retakh**, Rutgers University

**Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)**

- 8:00AM (1429) *Yangians, quantum loop algebras and trigonometric connections.*  
**Valerio Toledano Laredo**, Northeastern University, Boston, MA (1077-17-1443)
- 9:00AM (1430) *Yangians and quantum loop algebras.*  
**Sachin Gautam**, Columbia University (1077-17-2633)
- 9:30AM (1431) *A Minimal Non-Koszul  $A(\Gamma)$ .*  
**David Nacin**, Lincoln Park (1077-16-2292)
- 10:00AM (1432) *Noncommutative Quadratic Forms.* Preliminary report.  
**Padmini P Veerapen\*** and **Michaela Vancliff**, University of Texas, Arlington (1077-16-2846)
- 10:30AM (1433) *Functorial approach to differentiation algorithms for representations of partially ordered sets.*  
**Mark Kleiner\***, Syracuse University, and **Markus Reitenbach**, Colorado Mesa University (1077-16-1476)
- 8:00AM (1440) *A Generalization of the Mader-Helgason Inversion Formulas for Radon Transforms.*  
**Yuri A. Antipov** and **Boris Rubin\***, Louisiana State University (1077-44-724)
- 8:30AM (1441) *Local injectivity of weighted Radon transforms.*  
**Jan Boman**, Stockholm University (1077-44-715)
- 9:00AM (1442) *Characters of group representations and semi-classical analysis.* Preliminary report.  
**Victor Guillemin**, Massachusetts Institute of Technology (1077-22-466)
- 10:00AM (1443) *Orbital Integrals, applications and problems.*  
**Sigurdur Helgason**, MIT Cambridge MA 02139 (1077-43-916)

**AMS Special Session on Progress in Free Analysis, II**

8:00 AM – 10:50 AM Room 108, Hynes

Organizers: **J. William Helton**, University of California, San Diego  
**Paul S. Muhly**, University of Iowa

- 8:00AM (1434) *Free Inequalities.* Preliminary report.  
**Scott McCullough**, University of Florida (1077-47-1176)
- 8:30AM (1435) *Noncommutative Inequalities.*  
**J. William Helton**, UCSD La Jolla, California (1077-46-1641)
- 9:00AM (1436) *Noncommutative Real Ideals and an Algorithm for Computing Them.*  
**Christopher S Nelson**, University of California, San Diego (1077-47-2006)
- 9:30AM (1437) *Noncommutative analytic functions.*  
**Dmitry Kaliuzhnyi-Verbovetskyi**, Drexel University (1077-46-909)
- 10:00AM (1438) *Noncommutative functions: examples and key features.*  
**Victor Vinnikov**, Ben Gurion University (1077-47-2691)
- 10:30AM (1439) *Dilation theory, commutant lifting and semicrossed products.*  
**Kenneth R. Davidson**, University of Waterloo (1077-47-616)

**AMS Special Session on Radon Transforms and Geometric Analysis (in honor of Sigurdur Helgason's 85th birthday), I**

8:00 AM – 10:40 AM Room 104, Hynes

Organizers: **Jens Christensen**, University of Maryland  
**Fulton Gonzalez**, Tufts University  
**Todd Quinto**, Tufts University

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

8:00 AM – 10:50 AM Arlington, 3rd Floor, Marriott

Organizers: **Sophia R. Jang**, Texas Tech University  
**Andrew L. Nevai**, University of Central Florida  
**Lih-Ing W. Roeger**, Texas Tech University

- 8:00AM (1444) *Intracellular Viral Life-cycle Induced Rich Dynamics in Tumor Virotherapy.* Preliminary report.  
**Jianjun Paul Tian\***, College of William and Mary, **Yang Kuang**, Arizona State University, and **Hanchun Yang**, Yunnan University (1077-34-1249)
- 8:30AM (1445) *Extinction or Persistence of Disease in Stochastic Multi-Patch Epidemic Models.*  
**Glenn Lahodny Jr.\*** and **Linda J. S. Allen**, Texas Tech University (1077-92-1876)
- 9:00AM (1446) *Global Dynamics of a Cholera Model that Includes Direct and Indirect Transmission.*  
**Pauline van den Driessche**, University of Victoria, B.C., Canada (1077-92-911)
- 9:30AM (1447) *Modeling the spread of waterborne disease: Incorporating heterogeneity in multiple transmission pathways.*  
**Suzanne L. Robertson**, Mathematical Biosciences Institute (1077-92-1638)
- 10:00AM (1448) *Seasonality in Avian Influenza H5N1.*  
**Necibe Tuncer**, University of Tulsa, and **Maia Martcheva\***, University of Florida (1077-92-233)



*Boston, MA, Friday, January 6 – Program of the Sessions*

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10:30AM (1449) *Spatiotemporal Mutualistic Model of Mistletoes and Birds.*  
**Rongsong Liu**, Department of Mathematics and Department of Zoology and Physiology, University of Wyoming, **Junping Shi\***, College of William and Mary, **Carlos Martinez del Rio**, Department of Zoology and Physiology, University of Wyoming, and **Chuncheng Wang**, Department of Mathematics and Department of Zoology and Physiology, University of Wyoming (1077-92-1067)

**AMS Special Session on Recent Trends in Graph Theory, I**

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8:00 AM – 10:50 AM Room 102, Hynes

Organizer: **Raluca Gera**, Naval Postgraduate School

- 8:00AM (1450) *Closed 3-stop distance in graphs.*  
**Raluca Gera\***, Naval Postgraduate School, **Linda Eroh** and **Steven Winters**, University of Wisconsin Oshkosh (1077-05-1637)
- ▶ 8:30AM (1451) *The Independence Number for the Generalized Petersen Graphs.*  
**Joseph Fox\***, Salem State University, **Raluca Gera** and **Pantelimon Stanica**, Naval Postgraduate School (1077-05-722)
- 9:00AM (1452) *Towards Vizing's Independence Number Conjecture.*  
**Craig Eric Larson\***, Virginia Commonwealth University, **Taylor Short**, University of South Carolina, and **Bethany Turner**, N.C. State University (1077-05-2308)
- 9:30AM (1453) *A fractional analogue of Brook's theorem.*  
**Xing Peng\*** and **Linyuan Lu**, University of South Carolina (1077-05-611)
- ▶ 10:00AM (1454) *From sum optimal to max optimal graph rankings.*  
**Bonnie C. Jacob**, National Technical Institute for the Deaf at Rochester Institute of Technology, and **Jobby Jacob\***, Rochester Institute of Technology (1077-05-2127)
- ▶ 10:30AM (1455) *Modified Linear Programming Weighting for Graph Pebbling.* Preliminary report.  
**Luke Postle**, Georgia Institute of Technology, **Dan Cranston**, Virginia Commonwealth University, and **Carl Yerger\***, Davidson College (1077-05-1006)

**AMS Special Session on Uniformly and Partially Hyperbolic Dynamical Systems, I**

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8:00 AM – 10:50 AM Fairfield, 3rd Floor, Marriott

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

- 8:00AM (1456) *A KAM phenomenon for volume-preserving flows.*  
**Jianyu Chen\***, Penn State University, **Huyi Hu**, Michigan State University, and **Yakov Pesin**, Penn State University (1077-37-1460)
- 8:30AM (1457) *Holder shadowing on finite intervals.*  
**Sergey Tikhomirov**, Freie Universität Berlin (1077-37-678)
- 9:00AM (1458) *Classifying Teichmueller Disks with Completely Degenerate Kontsevich-Zorich Spectrum.*  
**David Aulicino**, University of Maryland - College Park (1077-37-803)
- 9:30AM (1459) *Entropy of Schur-Weyl measures.*  
**Sevak Mkrtchyan**, Rice University (1077-37-427)
- 10:00AM (1460) *Uniqueness of Equilibrium States: Constructive Techniques in a Non-Uniform, Non-Markov Setting.*  
**Vaughn Climenhaga**, University of Toronto, and **Daniel J Thompson\***, The Pennsylvania State University (1077-37-1329)
- 10:30AM (1461) *Unique equilibrium states using regular collections of times.*  
**Vaughn Climenhaga\***, University of Toronto, and **Daniel J Thompson**, Pennsylvania State University (1077-37-1618)

**MAA Invited Paper Session on Contemporary Unsolved Problems**

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8:00 AM – 10:45 AM Room 302, Hynes

- Organizers: **Ellen Kirkman**, Wake Forest University  
**Jeremy Rouse**, Wake Forest University
- ▶ 8:00AM (1462) *Partial Differential Equations: The Navier Stokes Equation.*  
**C Eugene Wayne**, Boston University (1077-AF-1011)
- 8:45AM (1463) *The Smooth Four Dimensional Poincare Conjecture.*  
**Joel Hass**, UC Davis (1077-AF-1795)
- ▶ 9:30AM (1464) *Beyond Computation: The P versus NP question.*  
**Michael Sipser**, MIT (1077-AF-1281)
- ▶ 10:15AM (1465) *The Birch and Swinnerton-Dyer Conjecture.*  
**William Arthur Stein**, University of Washington (1077-AF-2094)

**MAA Invited Paper Session on Knot Theory Untangled**

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8:00 AM – 10:50 AM Room 311, Hynes

- Organizer: **Rolland Trapp**, California State University, San Bernardino
- ▶ 8:00AM (1466) *Knot theory: past, present, future.*  
**Francis Bonahon**, University of Southern California (1077-AG-1741)

**Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)**

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- ▶ 8:30AM (1467) *Intrinsic properties of graphs embedded in  $\mathbb{R}^3$ .*  
**Erica Flapan**, Pomona College (1077-AG-963)
- ▶ 9:00AM (1468) *Twisted Alexander Polynomials.* Preliminary report.  
**Jim Hoste**, Pitzer College (1077-AG-1971)
- ▶ 9:30AM (1469) *The Geometry of Knots.*  
**Jason Cantarella**, University of Georgia (1077-AG-1900)
- ▶ 10:00AM (1470) *4-dimensional aspects of knot theory.*  
**Tim D Cochran**, Rice University (1077-AG-2085)
- ▶ 10:30AM (1471) *Hyperbolic knots.*  
**Colin C Adams**, Williams College (1077-AG-776)

**AMS Session on Algebraic Geometry, II**

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8:00 AM – 9:40 AM **Room 209, Hynes**

- ▶ 8:00AM (1472) *Patch Ideals and Peterson Varieties.*  
**Erik A Insko\***, University of Iowa, and **Alexander Yong**, University of Illinois at Urbana-Champaign (1077-14-1989)
- ▶ 8:15AM (1473) *An obstruction in extending Abhyankar's results for the Jacobian conjecture.*  
**James C Price**, University of Arkansas at Fort Smith (1077-14-1631)
- ▶ 8:30AM (1474) *Affine fibrations and Vénéreau-type polynomials.*  
**Drew Lewis**, Washington University in St. Louis (1077-14-1612)
- ▶ 8:45AM (1475) *Resolving Collinearity Among Four Points in the Complex Projective Plane.* Preliminary report.  
**Victor I Piercey**, University of Arizona (1077-14-1430)
- ▶ 9:00AM (1476) *Polyhedral Methods for Space Curves and Two Dimensional Surfaces Exploiting Symmetry.*  
**Danko Adrovic\*** and **Jan Verschelde**, University of Illinois at Chicago (1077-14-1944)
- ▶ 9:15AM (1477) *Connectedness of moduli spaces of line arrangements.*  
**Fei Ye**, Bar-Ilan University (1077-14-885)
- ▶ 9:30AM (1478) *Asymptotic Purity for Very General Hypersurfaces of Products of Projective Spaces.*  
**Michael A. Burr**, Fordham University (1077-14-1663)

**AMS Session on Associative and Nonassociative Algebras and Rings: Homological Algebras and Category Theory, I**

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8:00 AM – 9:40 AM **Room 308, Hynes**

- ▶ 8:00AM (1479) *Representations of rank two affine Hecke algebras at roots of unity.*  
**Matt S Davis**, Harvey Mudd College (1077-16-2659)

- ▶ 8:15AM (1480) *Stable Endomorphism Rings.*  
**Shannon Talbott**, The University of Iowa (1077-16-1984)
- ▶ 8:30AM (1481) *Deformations of an Algebra.* Preliminary report.  
**Jeanette Shakalli**, Texas A&M University (1077-16-1796)
- ▶ 8:45AM (1482) *Twisted Nilmanifolds and Dilogarithmic OPEs.*  
**Marco A Aldi\***, Brandeis University, and **Reimundo Heluani**, IMPA (1077-17-2259)
- ▶ 9:00AM (1483) *Delayed Koszul Duality.* Preliminary report.  
**Christopher L Phan**, Bucknell University (1077-16-2186)
- ▶ 9:15AM (1484) *Graded Skew Clifford Algebras that are Twists of Graded Clifford Algebras.*  
**Manizheh Nafari\*** and **Michaela Vancliff**, University of Texas at Arlington (1077-16-1382)
- ▶ 9:30AM (1485) *Some New Results on Albert-Like Semifield Planes.* Preliminary report.  
**Angela M. Brown**, University of Texas at Arlington (1077-17-2711)

**AMS Session on Combinatorics and Graph Theory, V**

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8:00 AM – 10:10 AM **Room 111, Hynes**

- ▶ 8:00AM (1486) *Transitive BLT-sets.* Preliminary report.  
**Eric M Nelson**, Colorado State University (1077-05-1981)
- ▶ 8:15AM (1487) *Graphs with  $(k \pm \epsilon)$ -edge-disjoint spanning trees.*  
**Ping Li**, West Virginia University (1077-05-1949)
- ▶ 8:30AM (1488) *Limits, Regularity and Removal for Relational Structures : A measure theoretic approach.*  
**Ashwini Aroskar\*** and **James Cummings**, Carnegie Mellon University (1077-05-1941)
- ▶ 8:45AM (1489) *Group Connectivity in Line Graphs.*  
**Senmei Yao**, West Virginia University (1077-05-1924)
- ▶ 9:00AM (1490) *Edge disjoint isomorphic subgraphs in uniform hypergraphs.*  
**Paul Horn\***, Harvard University, **Václav Koubek**, Charles University, and **Vojtěch Rödl**, Emory University (1077-05-1874)
- ▶ 9:15AM (1491) *Extremal Sizes of Subspace Partitions.*  
**Olof Heden**, KTH, Sweden, **Julianne Lehmann**, Hamburg, Germany, **Esmeralda Nastase\***, Xavier University, and **Papa Sissokho**, Illinois State University (1077-05-1839)
- ▶ 9:30AM (1492) *On 3-nets realizing a finite group in a projective plane.*  
**Nicola Pace**, Florida Atlantic University (1077-05-2026)

*Boston, MA, Friday, January 6 – Program of the Sessions*

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- 9:45AM *On the Number of Edges in Bipartite 2-factor Isomorphic Graphs.*  
▶ (1493) **Paul Wrayno**, Western Kentucky University (1077-05-1869)
- 10:00AM *On Continuous Rado Numbers.*  
▶ (1494) **Daniel Schaal\*** and **Melanie Zinter**, South Dakota State University (1077-05-2036)

**AMS Session on Commutative Rings and Algebras, II**

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8:00 AM – 9:40 AM Room 105, Hynes

- 8:00AM *A note on generalized Gorenstein complexes.*  
(1495) **Eero Hyry** and **Maryam Akhavin\***, University of Tampere (1077-13-804)
- 8:15AM *Finding generators for the vanishing ideal of a finite set of points.*  
(1496) **Eddy Campbell** and **Jianjun Chuai\***, University of New Brunswick (1077-13-583)
- 8:30AM *Cut Structures in Zero-divisor Graphs.*  
▶ (1497) **M Axtell**, University of St. Thomas, **N Baeth\***, University of Central Missouri, and **J Stickle**, Millikin University (1077-13-535)
- 8:45AM *Factoring formal power series over principal ideal domains.*  
(1498) **Jesse Elliott**, California State University, Channel Islands (1077-13-339)
- 9:00AM *Hilbert-Kunz multiplicities of products of ideals.* Preliminary report.  
(1499) **Neil Epstein\***, University of Osnabrueck, and **Javid Validashti**, University of Illinois at Urbana-Champaign (1077-13-2017)
- 9:15AM *Integration and Primary Decomposition.*  
(1500) **Brian L Miller**, Texas Tech University (1077-13-125)
- 9:30AM *Algorithms for strongly stable ideals.*  
(1501) Preliminary report.  
**Dennis Moore\*** and **Uwe Nagel**, University of Kentucky (1077-13-637)

**AMS Session on Computer Science, Information, Control Theory, and Economics, I**

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8:00 AM – 10:25 AM Room 303, Hynes

- 8:00AM *Price Discrepancy and Optimal Liquidation of Credit Derivatives.*  
▶ (1502) **Peng Liu\***, Johns Hopkins University, and **Tim Leung**, IEOR Department, Columbia University (1077-93-782)
- 8:15AM *Egalitarian Graph Orientations.*  
(1503) **Glencora Borradaile**, Oregon State University, **Jennifer Iglesias**, Harvey Mudd College, **Theresa Migler**, Oregon State University, **Antonio Ochoa\***, Cal Poly Pomona, **Gordon Wilfong** and **Lisa Zhang**, Bell Labs (1077-68-2919)

- 8:30AM *A characterization theorem for exact, unifilar hidden Markov models, and a polynomial time test for exactness.*  
(1504) **Nicholas F Travers\*** and **James P Crutchfield**, University of California, Davis (1077-68-1496)
- 8:45AM *Markov chains for sampling weighted permutations.*  
(1505) **Amanda Pascoe Streib**, Georgia Institute of Technology (1077-68-973)
- 9:00AM *Subword Languages of Infinite Partial Words.*  
▶ (1506) **Bob Chen\***, UC San Diego, **Francine Blanchet-Sadri**, UNC Greensboro, **Sinziana Munteanu**, **Jarret Schwartz** and **Slater Stich**, Princeton University (1077-68-2149)
- 9:15AM *Application of Modified Shannon Entropy.*  
(1507) **Brian P Kelly**, Bryant University (1077-93-2836)
- 9:30AM *Stability Analysis for Delayed Systems with an Application.*  
(1508) **Shanaz Tiwari**, Florida Atlantic University (1077-93-1768)
- 9:45AM *On a Geometric Packing Problem.*  
▶ (1509) Preliminary report.  
**Bradley J. Paynter\*** and **Douglas R. Shier**, Clemson University (1077-90-2502)
- 10:00AM *Exact Controllability of Nonlinear Neutral Functional Impulsive System with Infinite Delay in Banach Spaces.*  
(1510) **Dimplekumar N Chalishajar**, Virginia Military Institute (1077-93-1061)
- 10:15AM *Theoretical and Computational Issues in Control of a Thermal Fluid.*  
(1511) **Weiwei Hu**, Interdisciplinary Center for Applied Mathematics, Virginia Tech (1077-93-2360)

**AMS Session on Functional Analysis and Operator Theory, II**

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8:00 AM – 9:55 AM Room 208, Hynes

- 8:00AM *Topological  $k$ -graphs constructed from a topological dynamical systems and the associated  $C^*$ -algebras.*  
(1512) **Cynthia Farthing**, Creighton University, **Nura Patani\***, Arizona State University, and **Paulette N. Willis**, University of Houston (1077-46-1629)
- 8:15AM *Some hereditary properties of vector-valued functions.* Preliminary report.  
(1513) **Terje Hoim\***, Florida Atlantic University, and **David Robbins**, Trinity College (1077-46-1604)
- 8:30AM *Decomposing the  $C^*$ -algebras of groupoid extensions.*  
(1514) **Jonathan Henry Brown**, University of Otago (1077-46-628)

**Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)**

- 8:45AM (1515) *Completely Continuous operators.* Preliminary report.  
**Ioana Ghenciu\***, University of Wisconsin-River Falls, and **Paul W Lewis**, University of North Texas (1077-46-469)
- ▶ 9:00AM (1516) *Regularization for ill-posed parabolic evolution equations.*  
**Matthew A. Fury**, Penn State Abington (1077-46-108)
- ▶ 9:15AM (1517) *The Aluthge Sequence of a Shift Operator.*  
**Kevin Rion**, Bridgewater State University (1077-46-2207)
- 9:30AM (1518) *Aperiodicity Conditions in Topological  $k$ -Graphs.*  
**Sarah E. Wright**, College of the Holy Cross (1077-46-226)
- 9:45AM (1519) *MF-traces and a lower bound for the topological free entropy dimension in unital  $C^*$ -algebras.*  
**Weihua Li\***, Columbia College Chicago, **Don Hadwin**, University of New Hampshire, **Qihui Li**, East China University of Science and Technology, and **Junhao Shen**, University of New Hampshire (1077-46-401)

**AMS Session on Number Theory, Field Theory, and Polynomials, I**

8:00 AM – 10:10 AM Room 305, Hynes

- 8:00AM (1520) *Integer Embeddings of Heronian Tetrahedra.*  
**Susan Hammond Marshall\***, Monmouth University, and **Alexander R. Perlis**, Zander Mathematics Institute (1077-11-2610)
- 8:15AM (1521) *The Cohen-Lenstra heuristics, roots of unity, and random matrices.* Preliminary report.  
**Derek Garton**, University of Wisconsin, Madison (1077-11-2462)
- 8:30AM (1522) *A congruence modulo  $\mathbb{Z}$  for values at zero of partial zeta functions for totally real cubic fields.* Preliminary report.  
**Barry R Smith**, Lebanon Valley College, Annville, PA (1077-11-2354)
- ▶ 8:45AM (1523) *An Elliptic Curve Test for the  $L$ -Functions Ratios Conjecture.*  
**Ralph Morrison\***, UC Berkeley, and **Steven J. Miller**, Williams College (1077-11-2242)
- 9:00AM (1524) *The  $Z$ -densities of the Fibonacci sequence.*  
**Paul Cubre\*** and **Jeremy Rouse**, Wake Forest University (1077-11-2205)
- 9:15AM (1525) *On the factorization of  $f(n)$  for  $f(x)$  in  $\mathbb{Z}[x]$ .*  
**Samuel S. Gross\*** and **Andrew F. Vincent**, University of South Carolina (1077-11-2117)

- 9:30AM (1526) *Counting the number of solutions to the Erdős-Straus-Schinzel equation and related problems.*  
**Jing-Jing Huang**, The Pennsylvania State University, University Park (1077-11-1290)
- ▶ 9:45AM (1527) *Diophantine triples and quadruples.*  
**George W Grossman\*** and **Yifan Zhang**, Central Michigan University (1077-11-781)
- 10:00AM (1528) *The  $n$ -level density of zeroes of quadratic Dirichlet  $L$ -functions.*  
**Jake Levinson\***, University of Michigan - Ann Arbor, and **Steven J Miller**, Williams College (1077-11-2204)

**AMS Session on Undergraduate Research, V**

8:00 AM – 10:25 AM Room 110, Hynes

- ▶ 8:00AM (1529) *Permutations, Pattern Avoidance, and the Catalan Triangle.* Preliminary report.  
**Wesley K. Hough\***, Hanover College, **Derek F. DeSantis**, California State University Channel Islands, **Jacob W. Ziefle**, The College of New Jersey, and **Rebecca M. Meissen**, Worcester Polytechnic Institute (1077-05-2295)
- 8:15AM (1530) *Numerical Methods for Optimizing Chemistry Kinetic Parameters.*  
**Victoria Marsh\***, **Jen-Mei Chang** and **Stephen Mezyk**, California State University, Long Beach (1077-65-2777)
- ▶ 8:30AM (1531) *Image Fusion Using Gaussian Mixture Models.* Preliminary report.  
**Josh Koslosky**, University of Minnesota, **Stacey Levine** and **Glenn Sidle\***, Duquesne University (1077-68-1967)
- ▶ 8:45AM (1532) *Stability Analysis of Plate Deformation Equations Derived using the Hamiltonian Principle.*  
**Charles Yves Daly**, CSUMS/George Mason University (1077-74-2143)
- ▶ 9:00AM (1533) *Optimizing Plasmonic Effects for a More Efficient Nanoscale Biophotovoltaic Device.*  
**J. E. Pina**, George Mason University (1077-78-2252)
- ▶ 9:15AM (1534) *Spatial dispersion of interstellar civilizations: a site percolation model in three dimensions.*  
**Andrew D Hedman\*** and **Thomas W Hair**, Florida Gulf Coast University (1077-90-2299)
- ▶ 9:30AM (1535) *Searching for the Implied Market Utility Function.*  
**Aniket Anil Panjwani**, George Mason University (1077-91-1832)
- ▶ 9:45AM (1536) *Sequences for Solving Puzzles and Touring Graphs.*  
**Tselil Schramm\***, Harvey Mudd College, and **Emily Carlson**, Bard College (1077-91-2023)

- 10:00AM *Effects of Non-Independent Behavior on a Macroeconomic Model.*  
▶ (1537) **Nicholas S Chung**, George Mason University (1077-91-2426)
- 10:15AM *Modern Portfolio Theory Enhanced by Manifold Learning.* Preliminary report.  
▶ (1538) **Esther F. Jackson**, George Mason University: CSUMS Program (1077-91-1563)

**MAA Session on Modeling Across the Mathematics Curriculum, I**

8:00 AM – 10:55 AM Room 313, Hynes

Organizers: **Benjamin Galluzzo**, Shippensburg University  
**Mariah Birgen**, Wartburg College  
**Joyati Debnath**, Winona State University

- 8:00AM *The Volume and Surface Area of a Toy Train.*  
(1539) **Paul C Fonstad**, Dalton State College (1077-11-1440)
- ▶ 8:20AM *A modeling project on sensor networks.* Preliminary report.  
(1540) **Marian F Anton**, Ripon College (1077-11-2658)
- ▶ 8:40AM *The Optimal Placement of Range Lights.*  
(1541) **Michael A. Jones\***, *Mathematical Reviews*, **Rabab Abi-Hanna**, Montclair State University, and **Kenneth Krott**, Altoona Area School District (1077-11-2273)
- ▶ 9:00AM *Modeling the Gummy Bear Launcher as a Simple Computer Experiment.*  
(1542) **Dexter C. Whittinghill**, Rowan University (1077-11-1445)
- ▶ 9:20AM *Using Infectious Disease Models in Calculus and Differential Equations Courses.*  
(1543) **Alex Capaldi**, Valparaiso University (1077-11-867)
- ▶ 9:40AM *Using Mathematical Cancer Models in an Introductory Differential Equations Course.* Preliminary report.  
(1544) **Jana Gevertz\***, The College of New Jersey, **Julie Beier** and **Keith Howard**, Mercer University (1077-11-981)
- ▶ 10:00AM *Teaching 3D Mathematical Modeling.*  
(1545) **Paul R Bouthellier**, University of Pittsburgh-Titusville (1077-11-300)
- ▶ 10:20AM *Pack size vs. Prey Density in the Mexican wolf.* Preliminary report.  
(1546) **William Dean Stone**, New Mexico Tech (1077-11-2667)
- ▶ 10:40AM *Developing a Modeling Concept Inventory.*  
(1547) **Rebekah Isaak\***, University of Minnesota, **Daniel T Kaplan**, Macalester College, **Joan Garfield** and **Andrew Zieffler**, University of Minnesota (1077-11-780)

**MAA Session on Projects, Demonstrations, and Activities that Engage Liberal Arts Mathematics Students, II**

8:00 AM – 10:35 AM Back Bay Ballroom C, 2nd Floor, Sheraton

Organizer: **Sarah Mabrouk**, Framingham State University

- ▶ 8:00AM *Do it together to understand it: group activities that help liberal arts students understand mathematical concepts.*  
(1548) **Russell D Blyth**, Saint Louis University (1077-L1-1256)
- ▶ 8:20AM *"I CAN PROVE IT"– Using Proofs of the Pythagorean Theorem to Bolster Confidence for the math-anxious Liberal Arts Mathematics Students.*  
(1549) **Jackie A Hall**, Longwood University (1077-L1-1247)
- ▶ 8:40AM *Final Project in an Elementary Cryptology Course.*  
(1550) **Robert Edward Lewand**, Goucher College (1077-L1-442)
- ▶ 9:00AM *Open Questions in Number Theory for Liberal Arts Students: The Good, the Bad, and the Underwhelming.*  
(1551) **Emelie A Kenney**, Siena College (1077-L1-517)
- ▶ 9:20AM *Reading, Writing and Discussing Mathematics in a Service-level Undergraduate Course.*  
(1552) **Daniel P. Wisniewski**, DeSales University (1077-L1-282)
- ▶ 9:40AM *Teaching College Mathematics Using Text Messaging.*  
(1553) **Ricardo Sanchez**, Art Institute International Minneapolis and Globe University (1077-L1-2951)
- ▶ 10:00AM *Visualizing Hyperbolic Geometry in the Liberal Arts.*  
(1554) **Charlotte J. Chell**, Carthage College (1077-L1-2835)
- ▶ 10:20AM *Using a Jeopardy Game to Engage Students' Learning.*  
(1555) **Yun Lu**, Kutztown University of PA (1077-L1-1384)

**MAA Session on Topics and Techniques for Teaching Real Analysis, I**

8:00 AM – 10:55 AM Room 310, Hynes

Organizers: **Paul Musial**, Chicago State University  
**James Peterson**, Benedictine College  
**Erik Talvila**, University of the Fraser Valley  
**Robert Vallin**, Slippery Rock University of Pennsylvania

- ▶ 8:00AM *Cantor's set throughout real analysis.*  
(1556) **Cesar E. Silva**, Williams College (1077-N5-2680)

**Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)**

- ▶ 8:20AM (1557) *Motivating Real Analysis Students with Puzzles.*  
**Lynette J. Boos**, Providence College (1077-N5-1707)
- ▶ 8:40AM (1558) *Communication and Learning.*  
**Steven George Krantz**, Washington University in St. Louis (1077-N5-255)
- ▶ 9:00AM (1559) *Constructing Definitions in Undergraduate Real Analysis.*  
**Barbara A. Shipman**, University of Texas at Arlington (1077-N5-1088)
- ▶ 9:20AM (1560) *When absolute convergence fails to imply convergence.* Preliminary report.  
**Robert Kantrowitz\***, Hamilton College, and **Michael Schramm**, Le Moyne College (1077-N5-1078)
- ▶ 9:40AM (1561) *Some of my Suggested Topics and Techniques for the Real Analysis Course.*  
**Robert L. Brabenc**, Wheaton College (IL) (1077-N5-288)
- ▶ 10:00AM (1562) *Understanding the infinite.* Preliminary report.  
**Judit Kardos**, The College of New Jersey (1077-N5-2237)
- ▶ 10:20AM (1563) *Analysis based on the concept of level.*  
**Karel Hrbacek**, The City College of New York (1077-N5-2367)
- ▶ 10:40AM (1564) *A Proemial Proposition on Teaching Real Analysis: Instruct Via a "Strong" Modified Moore Method.*  
**Padraig M. McLoughlin**, Kutztown University of Pennsylvania (1077-N5-1205)

**MAA Session on Writing the History of the MAA, I**

8:00 AM – 10:55 AM Room 203, Hynes

- Organizers: **Victor J. Katz**, University of the District of Columbia  
**Janet Beery**, University of Redlands  
**Amy Shell-Gellasch**, Beloit College
- ▶ 8:00AM (1565) *History of National Meetings.* Preliminary report.  
**Kenneth A. Ross**, University of Oregon (1077-Q1-1710)
  - ▶ 8:20AM (1566) *A History of the Northeastern Section: A Work in Progress.*  
**J. J. Tattersall**, Providence College (1077-Q1-481)
  - ▶ 8:40AM (1567) *Highlights in the History of the Missouri Section.*  
**Leon M. Hall**, Missouri S&T (1077-Q1-334)
  - ▶ 9:00AM (1568) *Recovering and recapitulating the history of Project NExT.* Preliminary report.  
**T. Christine Stevens**, Saint Louis University (1077-Q1-2032)

- ▶ 9:20AM (1569) *The Ohio Section also celebrates its centennial.*  
**David Kullman**, Miami University, **Thomas Hern**, Bowling Green State University, and **Daniel E. Otero\***, Xavier University (1077-Q1-2371)
- ▶ 9:40AM (1570) *The Kansas Section: Were We First?*  
**Robert W. Neufeld**, McPherson College, McPherson, KS, **Elaine L. Tatham**, ETC Institute, Olathe, KS, and **Timothy W. Flood\***, Pittsburg State University, Pittsburg, KS (1077-Q1-1402)
- ▶ 10:00AM (1571) *The History of SIGMAAs (Special Interest Groups of the MAA).* Preliminary report.  
**Steve Carlson\***, Rose-Hulman Institute of Technology, and **Amy Shell-Gellasch**, Beloit College (1077-Q1-378)
- ▶ 10:20AM (1572) *Writing a History of the Iowa Section of the MAA.* Preliminary report.  
**Joel K. Haack\***, University of Northern Iowa, and **Linda L. Haack**, Cedar Falls, IA (1077-Q1-723)
- ▶ 10:40AM (1573) *The Intermountain Section: an exceptionally brief history.* Preliminary report.  
**Carolyn Connell**, Westminster College, Salt Lake City, Utah (1077-Q1-2590)

**MAA General Contributed Paper Session: Research in Applied Mathematics, I**

8:00 AM – 10:40 AM Back Bay Ballroom D, 2nd Floor, Sheraton

- Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University
- ▶ 8:00AM (1574) *Inverse Modeling by Cumulative-Power-Penalized Least Squares.*  
**Keaton P. Quinn**, Michigan State University (1077-VK-2408)
  - ▶ 8:15AM (1575) *Revisiting the Basel problem.*  
**Marianne Dubinsky**, University of Mary Washington (1077-VK-2395)
  - ▶ 8:30AM (1576) *Comparative analysis of a few fast numerical schemes for finding positive and some sign-changing solutions to time-independent Gross-Pitaevskii type equations with general potentials.*  
**Yuriy Shlapak**, University of Wisconsin - Marshfield/Wood County and University of Wisconsin Colleges Online (1077-VK-1803)
  - ▶ 8:45AM (1577) *Searching for the Best Quadratic Approximation of a Function.*  
**Yajun Yang\*** and **Sheldon P. Gordon**, Farmingdale State College of SUNY (1077-VK-2209)

*Boston, MA, Friday, January 6 – Program of the Sessions*

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| <p>9:00AM ▶ (1578) <i>TPA: A New Method for Approximate Counting.</i><br/><b>Mark Huber</b>, Claremont McKenna College, and <b>Sarah Schott*</b>, Duke University (1077-VK-802)</p> <p>9:15AM ▶ (1579) <i>Molecular mechanism for cardiac electrical instability in human heart disease: a predictive and multiscale computational model of “ankyrin-B syndrome.”</i><br/><b>Roseanne M Wolf*</b>, <b>Colleen C Mitchell</b>, University of Iowa, <b>Peter Mohler</b> and <b>Thomas Hund</b>, The Ohio State University (1077-VK-2383)</p> <p>9:30AM ▶ (1580) <i>A Markov Model for Actin Polymer Dynamics and Cell Membrane Protrusion.</i><br/><b>Csilla Szabo</b>, United States Military Academy (1077-VK-2811)</p> <p>9:45AM ▶ (1581) <i>The logistic gender-structured model with ephemeral pair bonds and isolation from reproduction (report on an REU project at Valparaiso University).</i><br/><b>Daniel Maxin*</b>, Valparaiso University, <b>Ludek Berec</b>, Department of Biosystematics and Ecology, Institute of Entomology, Biology Centre ASCR, Czech Republic, <b>Michael Covello</b>, Loyola University Chicago, <b>Jill Jessee</b>, Simpson College, and <b>Matthew Zimmer</b>, Saint John’s University (1077-VK-1216)</p> <p>10:00AM (1582) <i>Extreme multi-stability in a chemical model system.</i><br/><b>Calistus Ngeh Ngonghala</b>, National Institute for Mathematical and Biological Synthesis (NIMBioS) (1077-VK-2700)</p> <p>10:15AM ▶ (1583) <i>Method to extract names of geographical features from images of maps - A theoretical case study.</i> Preliminary report.<br/><b>Sridevi Pudipeddi*</b>, South Central College, North Mankato, MN, and <b>Ravi Chityala</b>, Minnesota Supercomputing Institute (1077-VK-799)</p> <p>10:30AM (1584) <i>Recovery of Fourier Transforms Using Edge Information.</i><br/><b>Alexander J Gutierrez</b>, Arizona State University (1077-VK-2752)</p> | <p>8:15AM ▶ (1586) <i>Encrypting into Polynomials.</i> Preliminary report.<br/><b>Lavinia Ciungu*</b> and <b>Mark Wissler</b>, University of Central Oklahoma (1077-VJ-2131)</p> <p>8:30AM (1587) <i>Explicit Plancherel Measure for <math>PGL_2</math> over a <math>p</math>-adic field.</i><br/><b>Carlos De la Mora</b>, University of Iowa (1077-VJ-2839)</p> <p>8:45AM (1588) <i><math>p</math>-adic L-functions of <math>GL_2</math> automorphic representations.</i> Preliminary report.<br/><b>Bei Zhang*</b>, Northwestern University, and <b>Matthew Emerton</b>, University of Chicago (1077-VJ-660)</p> <p>9:00AM ▶ (1589) <i>The Distribution of Generalized Ramanujan Primes.</i><br/><b>Nadine Amersi</b>, University College London, <b>Olivia Beckwith</b>, Harvey Mudd College, <b>Steven J Miller</b>, Williams College, <b>Ryan Ronan*</b>, The Cooper Union, and <b>Jonathan Sondow</b>, New York City, NY (1077-VJ-1449)</p> <p>9:15AM (1590) <i>Primes of the Form <math>x^2 + ny^2</math> and the Geometry of Convenient Numbers.</i><br/><b>Thomas R. Hagedorn</b>, The College of New Jersey (1077-VJ-2605)</p> <p>9:30AM ▶ (1591) <i>Gaps between summands in generalized Zeckendorf decompositions.</i><br/><b>Olivia Beckwith*</b>, Harvey Mudd College, and <b>Steven J Miller</b>, Williams College (1077-VJ-1164)</p> <p>9:45AM ▶ (1592) <i>Constructing Generalized Sum-Dominant Sets.</i><br/><b>Geoffrey S Iyer*</b>, University of Michigan, <b>Oleg Lazarev</b>, Princeton University, and <b>Liyang Zhang</b>, Williams College (1077-VJ-946)</p> <p>10:00AM ▶ (1593) <i>Evaluation of infinite products involving Fibonacci and Lucas numbers.</i><br/><b>Jonathan Sondow</b>, New York, NY (1077-VJ-2416)</p> <p>10:15AM ▶ (1594) <i>Sequences preserving GCD, Cyclotomic Polynomials, and Iterated Polynomials.</i><br/><b>Stephen Lovett</b>, Wheaton College (IL) (1077-VJ-369)</p> <p>10:30AM ▶ (1595) <i>Distribution of Missing Sums in Sumsets.</i><br/><b>Oleg Lazarev</b>, Princeton University (1077-VJ-1409)</p> <p>10:45AM ▶ (1596) <i>Examining the Dynamical Systems of Various Polynomials over Finite Fields Using Mathematica.</i><br/><b>Jonathan Weisbrod</b>, Rowan University (1077-VJ-479)</p> |
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**MAA General Contributed Paper Session:  
Research in Number Theory**

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8:00 AM – 10:55 AM **Back Bay Ballroom  
B, 2nd Floor, Sheraton**

Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University

- 8:00AM ▶ (1585) *A Variation of the ElGamal Encryption Method.* Preliminary report.  
**Mark Wissler\*** and **Lavinia Ciungu**, University of Central Oklahoma (1077-VJ-2130)

**MAA General Contributed Paper Session:  
Teaching Mathematics Beyond the Calculus Sequence**

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8:00 AM – 10:55 AM **Room 201, Hynes**

Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College

Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)

- Aliza Steurer**, Dominican University
- 8:00AM (1597) *Numerical Method/Analysis Students Function Concept Knowledge.*  
 ► **Emre Tokgoz**, University of Oklahoma (1077-VD-474)
- 8:15AM (1598) *Integrating factors and repeated roots of the characteristic equation.*  
**Howard I Dwyer**, Monmouth College, and **William R Green\***, Eastern Illinois University (1077-VD-547)
- 8:30AM (1599) *Bridging mathematics concepts to engineering contexts: Just-in-time review modules.* Preliminary report.  
**Alina N. Duca\***, North Carolina State University, **Dianne Raubenheimer** and **Hatice Ozturk**, NC State University, College of Engineering (1077-VD-2652)
- 8:45AM (1600) *Scaffolding for Inquiry Instruction in Mathematics.*  
 ► **Mark L. Daniels**, UTeach Program Natural Scinces/ University of Texas at Austin (1077-VD-342)
- 9:00AM (1601) *An inquiry-based, writing intensive introduction to proofs course.* Preliminary report.  
 ► **Carl Mummert**, Marshall University (1077-VD-1567)
- 9:15AM (1602) *Keep them guessing: teaching conjecturing in a discrete transition course.* Preliminary report.  
 ► **Suzanne I Doree**, Augsburg College, Minneapolis (1077-VD-2841)
- 9:30AM (1603) *Using a capstone course to learn how to teach mathematical proofs.*  
 ► **Elana Reiser**, St. Joseph's College (1077-VD-77)
- 9:45AM (1604) *Getting the Act Together.* Preliminary report.  
 ► **Melvin G. Royer**, Indiana Wesleyan University (1077-VD-2519)
- 10:00AM (1605) *Some Strategies for Teaching a Course Based on Douglas Hofstadter's Gödel, Escher, Bach.* Preliminary report.  
**Stephen Andrilli**, La Salle University, Philadelphia, PA (1077-VD-444)
- 10:15AM (1606) *Developing the capstone experience at Winthrop University.* Preliminary report.  
 ► **Trent Kull\*** and **Heakyung Lee**, Winthrop University (1077-VD-836)
- 10:30AM (1607) *Moving from Theory to Practice: A Lesson Plan Activity for a History of Mathematics Course.*  
**Kate G McGivney**, Shippensburg University (1077-VD-2624)
- 10:45AM (1608) *Reading and writing assignments in a Real Analysis course.*  
**Bogdan Doytchinov**, Elizabethtown College (1077-VD-2790)

**SIAM Minisymposium on Applied Mathematics Outreach: Bringing Relevance to Middle and High School Math Experience**

- 8:00 AM – 10:50 AM Room 206, Hynes**
- Organizer: **Peter Turner**, Clarkson University
- 8:00AM (1609) *Applied Mathematics Outreach to Middle and High Schools: Opportunities and Resources.*  
 ► **Peter R Turner**, Clarkson University (1077-97-303)
- 8:30AM (1610) *Scrapheap Showdown and Pi Night: Two Ways to Reach out the the Local Community.*  
 ► **Erica Dakin Voolich**, Somerville Mathematics Fund (1077-97-1959)
- 9:00AM (1611) *Applied Mathematical Modeling and Research Opportunities for Middle School, High School, and Pre-Freshmen Students.*  
 ► **Kathleen R Fowler**, Clarkson University (1077-97-395)
- 9:30AM (1612) *Applied Mathematics at Girls' Angle: A Math Club for Girls.*  
 ► **C. Kenneth Fan**, Girls' Angle (1077-97-1094)
- 10:00AM (1613) *Trees and Soil Microbes: Activities for Bringing Life (Science) to Mathematics.* Preliminary report.  
 ► **Kelly K. Sturner\***, National Institute for Mathematical and Biological Synthesis, and **Suzanne Lenhart**, University of Tennessee (1077-97-978)
- 10:30AM (1614) *Bringing Biological Applications to the High School Mathematics Curriculum.*  
 ► **Mike Martin**, Johnson County Community College (1077-92-353)

**PME Council Meeting**

- 8:00 AM – 11:00 AM Clarendon, 3rd Floor, Sheraton**

**Employment Center**

- 8:00 AM – 6:00 PM Exhibit Hall C, Hynes**

**AMS Special Session on Some Nonlinear Partial Differential Equations: Theory and Application, II**

- 8:30 AM – 10:50 AM Wellesley, 3rd Floor, Marriott**
- Organizers: **Jerry L. Bona**, University of Illinois, Chicago  
**Laihan Luo**, New York Institute of Technology
- 8:30AM (1615) *From Euler equation to Boussinesq system to KP equation.*  
 ► **Min Chen**, Purdue University (1077-35-2223)



*Boston, MA, Friday, January 6 – Program of the Sessions*

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- 9:00AM (1616) *Nonlocal dissipation and the Euler Equations.*  
**Peter Constantin\***, Princeton University, and **Vlad Vicol**, University of Chicago (1077-35-2321)
- 9:30AM (1617) *Initial value problem for coupled nonlinear dispersive equations.*  
**Jerry L. Bona**, University of Illinois at Chicago, and **Hongqiu Chen\***, University of Memphis (1077-35-2628)
- 10:00AM (1618) *Carrier Shocks and Coherent Structures in the Nonlinear Maxwell Equation.*  
**Michael I. Weinstein**, Columbia University (1077-35-2813)
- 10:30AM (1619) *The surface quasi-geostrophic and related equations.*  
**Jiahong Wu**, Oklahoma State University (1077-35-1765)

**AMS-MAA Grad School Fair**

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8:30 AM – 10:30 AM **Veteran's Auditorium, 2nd floor, Hynes**

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

**MAA Invited Address**

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9:00 AM – 9:50 AM **Ballrooms A/B, 3rd floor, Hynes**

(1620) *Sum of squares polynomials in optimization.*  
**Rekha R. Thomas**, University of Washington (1077-A0-6)

**ASL Invited Address**

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9:00 AM – 9:50 AM **Room 207, Hynes**

(1621) *The end of the inner model program: ultimate L or not ultimate L.*  
**W. Hugh Woodin**, University of California (1077-03-2963)

**MAA Minicourse #6: Part B**

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9:00 AM – 11:00 AM **Salon CD, 4th Floor, Marriott**

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

**MAA Minicourse #8: Part B**

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9:00 AM – 11:00 AM **Salon AB, 4th Floor, Marriott**

*Preparing to serve as an outside consultant in the mathematical sciences.*  
 Presenters: **Kyle Riley**, South Dakota School of Mines and Technology

**Nancy Baxter Hastings**, Dickinson College

**MAA Minicourse #14: Part B**

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9:00 AM – 11:00 AM **Salon HI, 4th Floor, Marriott**

*Teaching introductory statistics.*  
 Presenters: **Michael Posner**, Villanova University  
**Carolyn Cuff**, Westminster College

**MAA Session on Quantitative Literacy and Decision Making**

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9:00 AM – 10:15 AM **Room 202, Hynes**

Organizers: **Eric Gaze**, Bowdoin College  
**Cinnamon Hillyard**, University of Washington, Bothell  
**Semra Kilic-Bahi**, Colby Sawyer College

- ▶ 9:00AM (1622) *Using MS Excel to Improve Understanding of Financial Mathematics.*  
**Paul Taylor**, Shippensburg University (1077-L5-930)
- ▶ 9:20AM (1623) *Complex Systems and K-16 Curricula.*  
**R W DeGray**, Saint Joseph College, Connecticut (1077-L5-1058)
- ▶ 9:40AM (1624) *The Financing Choices of American Consumers: The Influence of Quantitative Literacy, Cognitive Disposition and Material Values.*  
**Cinnamon Hillyard\*** and **Pete Nye**, University of Washington Bothell (1077-L5-1244)
- ▶ 10:00AM (1625) *The Financial Literacy Project at Dartmouth College: Online Classroom Resources and Modules.*  
**Eric C Gaze**, Bowdoin College (1077-L5-2563)

**MAA Professional Development Committee Panel Discussion**

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9:00 AM – 10:20 AM **Room 304, Hynes**

*Getting your textbook published.*  
 Organizer: **James Hamblin**, Shippensburg University  
 Panelists: **Doug Ensley**, Shippensburg University  
**Sheldon Gordon**, Farmingdale State College  
**Thomas W. Judson**, Stephen F. Austin State University

Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)

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**MAA Panel Discussion**

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9:00 AM – 10:20 AM Room 309, Hynes

*Incorporation of the mathematics of climate change and sustainability into our undergraduate courses.*

Organizer: **Robert E. Megginson**,  
University of Michigan, Ann Arbor

Panelists: **Christopher Jones**,  
University of North Carolina,  
Chapel Hill

**Thomas J. Pfaff**, Ithaca  
College

**Martin E. Walter**, University  
of Colorado, Boulder

**Mary Lou Zeeman**, Bowdoin  
College

**MAA Committee on Assessment Panel Discussion**

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9:00 AM – 10:20 AM Room 306, Hynes

*Using data from the registrar's office to better understand, plan, and change your undergraduate mathematics program.*

Organizer: **Jack Bookman**, Duke  
University

Panelists: **Mary Callahan**,  
Massachusetts Institute of  
Technology

**Amy Cohen**, Rutgers  
University

**Bill Martin**, North Dakota  
State University

**Jack Bookman**

**Student Hospitality/Information Center**

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9:00 AM – 5:00 PM 2nd Floor Corridor by  
Veterans Auditorium, Hynes

**AMS Special Presentation**

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9:30 AM – 11:00 AM Room 312, Hynes

*Who wants to be a mathematician—National contest.*

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

**Exhibits and Book Sales**

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9:30 AM – 5:30 PM Exhibit Hall D, Hynes

**ASL Invited Address**

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10:00 AM – 10:50 AM Room 207, Hynes

(1626) *Prikry type forcings and singular combinatorics.*  
**Dima Sinapova**, University of California  
at Irvine (1077-03-159)

**AMS Invited Address**

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10:05 AM – 10:55 AM Ballrooms A/B,  
3rd floor, Hynes

(1627) *The Ribe program.*  
**Assaf Naor**, Courant Institute of  
Mathematical Sciences (1077-51-1)

**AMS-MAA Invited Address**

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11:10 AM – NOON Ballrooms A/B, 3rd floor, Hynes

(1628) *Apollonian packings, fractal geometry, and dynamics on hyperbolic manifolds.*  
**Hee Oh**, Brown University

**AMS Colloquium Lectures: Lecture III**

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1:00 PM – 1:50 PM Ballrooms A/B, 3rd floor, Hynes

(1629) *Langlands program, trace formulas, and their geometrization, III.*  
**Edward Frenkel**, University of California  
Berkeley (1077-14-12)

**MAA Lecture for Students**

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1:00 PM – 1:50 PM Room 312, Hynes

► (1630) *Turning theorems into plays.*  
**Steve Abbott**, Middlebury College  
(1077-A0-38)

**AMS Current Events Bulletin**

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1:00 PM – 4:45 PM Room 200, Hynes

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

1:00PM (1631) *Assembling surfaces from random pants: mixing, matching and correcting in the proofs of the surface-subgroup and Ehrenpreis conjectures.*  
**Jeffrey F. Brock**, Brown University  
(1077-51-2422)

2:00PM (1632) *The cobordism hypothesis: quantum field theory + homotopy invariance = higher algebra.*  
**Daniel S. Freed**, University of Texas at  
Austin (1077-57-1075)

3:00PM (1633) *Dispersive equations and their role beyond PDE.*  
► **Gigliola Staffilani**, Massachusetts  
Institute of Technology (1077-35-769)

4:00PM (1634) *How does quantum mechanics scale?*  
**Umesh Vazirani**, University of California,  
Berkeley (1077-81-1817)

**AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates and Students in Post-Baccalaureate Programs, II**

1:00 PM – 5:50 PM

**Back Bay Ballroom A, 2nd Floor, Sheraton**

Organizers: **Bernard Brooks**, Rochester Institute of Technology

**Jobby Jacob**, Rochester Institute of Technology

**Jacqueline Jensen**, Sam Houston State University

**Darren A Narayan**, Rochester Institute of Technology

- ▶ 1:00PM *Global coordinate systems on manifolds lacking continuously moving bases.* Preliminary report.  
**Eileen R Martin\***, University of Texas at Austin, **Ryan Hotovy**, Texas A&M University, and **Daniel Freeman**, University of Texas at Austin (1077-58-89)
- ▶ 1:30PM *Optimization of *P. falciparum* gametocyte sex ratios via competitive and non-competitive strategies: the evolutionary implications.*  
**Ha T Nguyen\***, **Ryan A Warriar**, **Miranda I. Teboh-Ewungkem** and **Thomas Yuster**, Lafayette College, Easton, PA (1077-91-574)
- ▶ 2:00PM *Isoperimetry in the Plane with Density  $e^r$ .*  
**Luis A. Sordo Vieira\***, Wayne State University, **Niralee K. Shah**, Williams College, **Miguel Fernandez**, Truman State University, and **Ping Ngai Chung**, MIT (1077-53-1109)
- ▶ 2:30PM *Oregon Blackberry Invasion Analyzed by Spatial Stochastic Modeling.*  
**Heather Johnston\***, Western Oregon University, **May Boggess** and **Jay Walton**, Texas A&M University (1077-92-585)
- ▶ 3:00PM *Bounds for the Minimum Semi-Definite Rank of Circulant Graphs.* Preliminary report.  
**Chennah Heroor\***, Massachusetts Institute of Technology, **Troy Klingler**, **Anthony Pochini**, Central Michigan University, and **Gretchen Schillemat**, Brigham Young University (1077-15-109)
- ▶ 3:30PM *A complete characterization of optimal vertex rankings of paths, cycles, and joins of graphs.*  
**Maxwell Bileschi\***, University of Buffalo, and **Meridangela Gutierrez Jhong**, Rochester Institute of Technology (1077-05-192)
- ▶ 4:00PM *Generating Dynamic Adjustable Weighted Social Networks.*  
**Nakisa Nassersharif\***, Syracuse University, and **Megan Sinton**, Bucknell University (1077-91-194)

- ▶ 4:30PM *Representations of Graphs modulo  $N$ .*  
**Ryan Held\***, Rochester Institute of Technology, and **Lauren Stemler**, St. Lawrence University (1077-05-193)
- ▶ 5:00PM *On Some Multicolor Ramsey Numbers Involving  $K_3 + e$  and  $K_4 - e$ .*  
**Daniel S. Shetler**, Whitworth University, and **Michael Wurtz\***, Northwestern University (1077-05-191)
- ▶ 5:30PM *Rank numbers of rook's graphs.*  
**Korinne Dobosh\***, Montclair State University, and **Samuel Kennedy**, Rochester Institute of Technology (1077-05-190)

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

1:00 PM – 5:40 PM

**Constitution Ballroom A, 2nd Floor, Sheraton**

Organizers: **William Barker**, Bowdoin College

**William McCallum**, University of Arizona

**Bonnie Saunders**, University of Illinois at Chicago

- ▶ 1:00PM *Addressing the transition to college mathematics.*  
**David M. Bressoud**, Macalester College (1077-97-1008)
- ▶ 1:30PM *Preparing twelfth-graders for college mathematics.*  
**Cathy L Seeley**, Charles A. Dana Center, The University of Texas at Austin (1077-97-1488)
- ▶ 2:00PM *Listening to Students About the Transition from High School to College.* Preliminary report.  
**William G McCallum\***, University of Arizona, and **Guadalupe Lozano-Teran**, The University of Arizona (1077-97-2939)
- ▶ 2:30PM *Factors Influencing Success in College Calculus.* Preliminary report.  
**Philip M. Sadler**, Harvard-Smithsonian Center for Astrophysics (1077-97-2944)
- ▶ 3:00PM *Placement in College Mathematics.*  
**Bernard L Madison**, University of Arkansas (1077-97-652)
- ▶ 3:30PM *Being CRAFTY in the Transition to College Mathematics.*  
**Daniel T Kaplan**, Macalester College (1077-97-2056)
- ▶ 4:00PM *The Mathematical and Theoretical Biology Institute Community Learning Model.*  
**Carlos W. Castillo-Garsow**, Kansas State University, **Carlos Castillo-Chavez\***, Arizona State University, and **Sherry Woodley**, Math, Comp and Mod Sciences Center, Arizona State University (1077-97-2875)

**Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)**

- 4:30PM *Pictures of Personal Change and View of Change Needed to Enhance Transition to College Mathematics.* Preliminary report. **Brian J. Winkel**, United States Military Academy, West Point (1077-97-753)
- 5:00PM Discussion: Panel on the *Issues of the Transition to College Mathematics* moderated by David Bressoud.

**AMS-SIAM Special Session on the Mathematics of Computation: Algebra and Number Theory, II**

1:00 PM – 5:50 PM Room 109, Hynes

Organizers: **Jean-Marc Couveignes**, Université de Toulouse  
**Michael J. Mossinghoff**, Davidson College  
**Igor E. Shparlinski**, Macquarie University, Australia

- 1:00PM *Counting decompositions of additive polynomials.* **Mark Giesbrecht\***, University of Waterloo, and **Joachim von zur Gathen**, B-IT, Universität Bonn (1077-11-939)
- 1:30PM *Finding a polynomial multiple that is sparse.* **Daniel S Roche**, United States Naval Academy (1077-68-906)
- 2:00PM *An algorithm for recovering zeroes of multivariate polynomials over a prime finite field.* **Jaime Gutierrez**, University of Cantabria, Santander, Spain (1077-11-542)
- 2:30PM *Non-abelian Cohen-Lenstra Heuristics.* **Nigel Boston**, University of Wisconsin - Madison (1077-11-188)
- 3:00PM *Families of marked elliptic curves, with some applications.* **Noam D. Elkies**, Harvard Univ. (1077-11-2569)
- 3:30PM *An irrationality measure for Mahler numbers.* **Michael Coons**, University of Waterloo and Fields Institute (1077-11-598)
- 4:00PM *Identifying supersingular elliptic curves.* **Andrew V. Sutherland**, Massachusetts Institute of Technology (1077-11-377)
- 4:30PM *Evaluating Igusa functions.* **Reinier Broker\***, Brown University, and **Kristin Lauter**, Microsoft Research (1077-11-961)
- 5:30PM *Positive-definite quadratic forms representing all odd, positive integers.* Preliminary report. **Jeremy Rouse**, Wake Forest University (1077-11-116)

**AMS-AWM Special Session on Nonlinear Hyperbolic Partial Differential Equations, III**

1:00 PM – 5:50 PM Room 300, Hynes

Organizers: **Barbara Lee Keyfitz**, Ohio State University  
**Charis Tsikkou**, Ohio State University

- 1:00PM *Self-similar solutions for the diffraction of weak shocks.* **Allen M. Tesdall\***, College of Staten Island, City University of New York, and **John K. Hunter**, University of California, Davis (1077-35-1177)
- 1:30PM *On 2D viscous Boussinesq system on a bounded domain.* **Ronghua Pan**, Georgia Institute of Technology (1077-35-2375)
- 2:00PM *A semi-hyperbolic region for the pressure gradient system.* **Kyungwoo Song\***, Yeshiva University and Kyung Hee University, and **Yuxi Zheng**, Yeshiva University (1077-35-2678)
- 2:30PM *Conservation laws with prescribed eigencurves.* **Helge Kristian Jenssen**, Penn State University, and **Irina A Kogan\***, North Carolina State University (1077-35-204)
- 3:00PM *Some exact solutions to nonlinear hyperbolic PDE.* **Robin Young**, University of Massachusetts, Amherst (1077-35-632)
- 3:30PM *Shock Wave Stability for Conservation Laws with Physical Viscosities.* **Tai-Ping Liu**, Academia Sinica and Stanford University, and **Yanni Zeng\***, University of Alabama at Birmingham (1077-35-1040)
- 4:00PM *Global dynamics of a diffuse interface model for solid tumor growth.* **John Lowengrub**, University of California-Irvine, **Edriss S. Titi**, University of California-Irvine and the Weizmann Institute of Science, and **Kun Zhao\***, University of Iowa (1077-35-228)
- 4:30PM *Vegetative Pattern Formation Model Systems: Comparison of Turing Diffusive and Differential Flow Instabilities.* **Bonni J Kealy\*** and **David J Wollkind**, Washington State University (1077-35-244)
- 5:00PM *A new result in blow-up for long-wave unstable thin film equations.* **Marina Chugunova**, **Mary C. Pugh\***, University of Toronto, and **Roman Taranets**, University of Nottingham (1077-35-2217)
- 5:30PM *Structure of solutions near sonic line for pressure gradient equation.* **T. Zhang\***, Penn State University, and **Y. Zheng**, Yeshiva University (1077-35-2520)

**AMS Special Session on Advances in Mathematical Biology, II**

1:00 PM – 5:50 PM Simmons, 3rd Floor, Marriott

Organizers: **David Chan**, Virginia Commonwealth University

**Rebecca Segal**, Virginia Commonwealth University

► 1:00PM *Biological dispersal strategies of Internet worms.*  
(1672) **David E Hiebeler**, University of Maine (1077-92-1450)

► 1:30PM *Modeling and Estimation in Gene Regulatory Networks.*  
(1673) **Kam Dahlquist** and **Ben G Fitzpatrick\***, Loyola Marymount University (1077-92-1751)

2:00PM *Mathematical Model for Two Germline Stem Cells Competing for Niche Occupancy.* Preliminary report.  
(1674) **Jianjun Paul Tian**, College of William and Mary (1077-34-1251)

2:30PM *A Low-Dimensional Model of the Innate Immune Response to Bacterial Infection.*  
(1675) **Lester Caudill**, University of Richmond (1077-92-851)

► 3:00PM *Using a Mathematical Model to Analyze the Treatment of a Wound Infection with Oxygen Therapy.* Preliminary report.  
(1676) **Richard Schugart\*** and **Tennessee Tucker Joyce**, Western Kentucky University (1077-92-2701)

3:30PM Discussion

4:00PM *Nanoparticle Deposition in the Human Nasal Passages.*  
(1677) **Rebecca Segal**, Virginia Commonwealth University (1077-92-1985)

4:30PM *Mechanisms for multiple activity modes of midbrain DA neurons.*  
(1678) **Andrew M. Oster\***, Washington and Lee University, **Philippe Faure**, Université Pierre et Marie Curie, Centre National de la Recherche Scientifique, and **Boris S. Gutkin**, Group for Neural Theory, École Normale Supérieure, Centre National de la Recherche Scientifique (1077-92-918)

5:00PM *Sensory Irritation Response in Rats: Recovery and Dose-Dependence.*  
(1679) **Karen A Yokley**, Elon University (1077-92-1535)

► 5:30PM *Development of a Quantitative Model Incorporating Key Events in a Hepatotoxic Mode of Action to Predict Tumor Incidence.*

**Nicholas S. Luke\***, North Carolina A&T State University, **Reeder Sams II**, National Center for Environmental Assessment, U.S. Environmental Protection Agency, **Michael J Devito**, National Toxicology Program, National Institute for Environmental Health Sciences, **Rory B Conolly** and **Hisham A. El-Masri**, Integrated Systems Toxicology Division, U.S. Environmental Protection Agency (1077-92-905)

**AMS Special Session on Algebraic and Geometric Aspects of Integrable Systems and Random Matrices, II**

1:00 PM – 5:50 PM Room 107, Hynes

Organizers: **Anton Dzhamay**, University of Northern Colorado

**Kenichi Maruno**, University of Texas, Pan American

**Virgil Pierce**, University of Texas, Pan American

1:00PM *Integrability of random growth models.*  
(1681) **Alexei Borodin**, MIT, Caltech (1077-60-1100)

2:00PM *Elliptic distributions on 3D Young diagrams, elliptic special functions and elliptic Painlevé.* Preliminary report.  
(1682) **Dan Dumitru Beta**, Caltech, Pasadena CA (1077-60-1255)

2:30PM *Discrete Hamiltonian structure of Schlesinger transformations.*  
(1683) **Anton Dzhamay**, University of Northern Colorado, **Hidetaka Sakai**, University of Tokyo, and **Tomoyuki Takenawa\***, Tokyo University of Marine Science and Technology (1077-39-1948)

3:00PM *Degeneration scheme of 4-dimensional Painlevé type equations.*  
(1684) **Hiroshi Kawakami**, **Akane Nakamura** and **Hidetaka Sakai\***, University of Tokyo (1077-33-1306)

4:00PM *Combinatorics of matrix refactorizations and discrete integrable systems.*  
(1685) **Anton Dzhamay**, University of Northern Colorado (1077-35-2867)

► 4:30PM *Quantum pentagon equation, Hirota's discrete KP equation, and projective geometry over division rings.*  
(1686) **Adam Doliwa**, University of Warmia and Mazury, Olsztyn, Poland (1077-37-464)

5:00PM *Discrete integrable systems of skew orthogonal polynomials.*  
(1687) **Hiroshi Miki\*** and **Satoshi Tsujimoto**, Graduate School of Informatics, Kyoto University (1077-33-969)

**Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)**

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5:30PM (1688) *Discrete integrable systems arising from motions of discrete curves in the Euclidean and Minkowski planes.*  
**Kenichi Maruno\***, The University of Texas - Pan American, **Kenji Kajiwara**, Institute of Mathematics for Industry, Kyushu University, **Jun-ichi Inoguchi**, Yamagata University, **Yasuhiro Ohta**, Department of Mathematics, Kobe University, and **Bao-Feng Feng**, The University of Texas - Pan American (1077-53-1491)

1:30PM (1695) *Do high frequencies contain information about low frequencies?*

**Laurent Demanet**, Massachusetts Institute of Technology (1077-86-2657)

2:00PM (1696) *Transient wave imaging with limited-view data.*

**Vincent Jugnon\***, Massachusetts Institute of Technology, **Habib Ammari**, Ecole Normale Supérieure, **Hyeonbae Kang**, Inha University, **Mark Asch**, University of Picardy Jules Verne, and **Lili Guadarrama Bustos**, Ecole Supérieure de Physique et Chimie Paris (1077-35-744)

2:30PM (1697) *Uniqueness for a hyperbolic inverse problem with angular control of the coefficients.*

**Rakesh Rakesh**, University of Delaware (1077-35-2410)

3:00PM (1698) *Enhanced Near-cloak by FSH Lining.*

**Hongyu Liu**, University of North Carolina (1077-35-2582)

3:30PM Discussion

4:00PM (1699) *Boundary Control Approach to Inverse Problems on Graphs.*

**Sergei Avdonin**, University of Alaska Fairbanks (1077-35-1501)

4:30PM (1700) *Microlocal analysis of an ultrasound operator with circular source and receiver trajectories.*

**Venky P Krishnan**, Tata Institute of Fundamental Research Centre for Applicable Mathematics (1077-35-1939)

5:00PM (1701) *Lipschitz stability of an inverse problem for a Schrödinger type equation.*

**Lingyun Qiu\***, Purdue University, **Elena Beretta**, Sapienza di Roma, and **Maarten de Hoop**, Purdue University (1077-35-925)

5:30PM (1702) *Boundary control of a beam equation with non-monotone boundary conditions.*

**Irena Lasiecka**, University of Virginia, **Rich Marchand**, U.S. Air Force Academy/Slippery Rock University, and **Tim McDevitt\***, Elizabethtown College (1077-93-2106)

**AMS Special Session on Calculus of Functors and Its Applications, II**

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1:00 PM – 5:50 PM Exeter, 3rd Floor, Marriott

Organizers: **Brian Munson**, Wellesley College

**Ismar Volic**, Wellesley College

1:00PM Discussion

1:30PM (1689) *Operads and modules in embedding calculus.*

**Gregory Arone\***, University of Virginia, and **Victor Turchin**, Kansas State University (1077-55-1662)

2:30PM (1690) *Splitting in the rational homology and homotopy of the spaces of higher dimensional long embeddings.*

**Victor Turchin\***, Kansas State University, and **Gregory Arone**, University of Virginia (1077-55-886)

3:00PM (1691) *Rational homotopy theory and spaces of smooth embeddings.* Preliminary report.

**Pascal Lambrechts**, Université catholique de Louvain (1077-55-1654)

4:00PM (1692) *Models for Taylor towers of functors.*

**Brenda Johnson\***, Union College, **Kristine Bauer**, University of Calgary, **Rosona Eldred** and **Randy McCarthy**, University of Illinois at Urbana-Champaign (1077-55-2097)

4:30PM Discussion

5:30PM (1693) *Morava E-theory of the Goodwillie tower.*

**Mark J Behrens**, MIT (1077-55-1647)

**AMS Special Session on Differential Algebraic Geometry and Galois Theory (in memory of Jerald Kovacic), III**

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1:00 PM – 5:50 PM

Room 103, Hynes

Organizers: **Phyllis Joan Cassidy**, Smith College and the City University of New York

**Richard Churchill**, Hunter College and Graduate Center at CUNY

**Claude Mitschi**, Université de Strasbourg, France

**Michael Singer**, North Carolina State University

**AMS Special Session on Control Theory and Inverse Problems for Partial Differential Equations, III**

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1:00 PM – 5:50 PM Clarendon, 3rd Floor, Marriott

Organizers: **Shitao Liu**, University of Helsinki

**Ting Zhou**, Massachusetts Institute of Technology

1:00PM (1694) *Recent developments in inverse scattering.* Preliminary report.

**Gang Bao**, Michigan State University and Zhejiang University (1077-35-2373)

*Boston, MA, Friday, January 6 – Program of the Sessions*

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| <p>1:00PM <i>Constructive approaches to Kovacic's reduced forms of linear differential systems.</i><br/>(1703) <b>Ainhoa Aparicio-Monforte</b>, RISC, Linz (Austria), <b>Elie Compoint</b>, Université de Lille (France), and <b>Jacques-Arthur Weil*</b>, XLIM, CNRS and Université de Limoges (France) (1077-34-831)</p> <p>1:30PM <i>Generic Differential Galois Extensions.</i><br/>(1704) <b>Lourdes Juan</b>, Texas Tech University (1077-13-2280)</p> <p>2:00PM <i>Model theory and differential algebraic geometry.</i><br/>(1705) <b>David Marker</b>, University of Illinois at Chicago (1077-03-507)</p> <p>2:30PM <i>Some new techniques in differential algebraic geometry from model theory.</i><br/>(1706) <b>Rahim N Moosa</b>, University of Waterloo (1077-03-2035)</p> <p>3:00PM <i>Prolongations and differentially closed fields.</i><br/>(1707) <b>Omar Leon Sanchez</b>, University of Waterloo, Ontario, Canada. (1077-14-792)</p> <p>3:30PM <i>Tannakian formalism over fields with operators.</i> Preliminary report.<br/>(1708) <b>Moshe Kamensky</b>, University of Notre-Dame (1077-20-1339)</p> <p>4:00PM <i>Linear Equations in Valued D-Fields.</i><br/>(1709) <b>Meghan Anderson</b>, Harvard University (1077-03-1464)</p> <p>4:30PM <i>Differential algebraic groups as superstable groups.</i><br/>(1710) <b>James Freitag</b>, University of Illinois at Chicago (1077-13-730)</p> <p>5:00PM <i>Representations of reductive differential algebraic groups.</i><br/>(1711) <b>Andrey Minchenko*</b>, University of Western Ontario, and <b>Alexey Ovchinnikov</b>, CUNY Queens College (1077-20-1473)</p> <p>5:30PM <i>Differential Modules over a Differential Ring.</i> Preliminary report.<br/>(1712) <b>Andy R Magid</b>, University of Oklahoma (1077-13-537)</p> | <p>1:30PM <i>Rational Catalan Combinatorics.</i><br/>▶ (1714) Preliminary report.<br/><b>Drew Armstrong</b>, University of Miami (1077-05-1897)</p> <p>2:00PM <i>Chromatic quasisymmetric functions and Hessenberg varieties.</i><br/>(1715) <b>John Shareshian</b>, Washington University, and <b>Michelle L Wachs*</b>, University of Miami (1077-05-2254)</p> <p>2:30PM <i>Recent progress on the Shuffle Conjecture: Macdonald Polynomials and Parking Functions.</i><br/>(1716) <b>Adriano M. Garsia</b>, University of California San Diego (1077-05-1178)</p> <p>3:00PM <i>Vanishing Integrals for Hall-Littlewood Polynomials.</i><br/>(1717) <b>Vidya Venkateswaran</b>, California Institute of Technology (1077-05-372)</p> <p>3:30PM <i>W-cells from scratch.</i> Preliminary report.<br/>(1718) <b>John R Stembridge</b>, University of Michigan (1077-05-838)</p> <p>4:00PM <i>The shape of a random affine Weyl group element, and random core partitions.</i><br/>▶ (1719) <b>Thomas Lam</b>, University of Michigan (1077-05-706)</p> <p>4:30PM <i>Torus actions, multi-partitions, and crystals.</i><br/>(1720) <b>Steven V Sam*</b> and <b>Peter Tingley</b>, MIT (1077-05-320)</p> <p>5:00PM <i>A curious relation between two Markov chains.</i><br/>(1721) <b>Tomohiro Sasamoto</b>, Chiba University, and <b>Lauren K Williams*</b>, University of California, Berkeley (1077-05-1599)</p> <p>5:30PM <i>The <math>1/k</math> - Eulerian Polynomials.</i><br/>▶ (1722) <b>Carla D. Savage*</b> and <b>Gopal Viswanathan</b>, North Carolina State University (1077-05-1956)</p> |
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***AMS Special Session on Fractional, Hybrid, and Stochastic Dynamical Systems with Applications***

***AMS Special Session on Enumerative and Algebraic Combinatorics, III***

1:00 PM – 5:50 PM Room 204, Hynes

Organizers: **Ira Gessel**, Brandeis University  
**Alexander Postnikov**, Massachusetts Institute of Technology  
**Richard Stanley**, Massachusetts Institute of Technology

- ▶ 1:00PM *Dismal Arithmetic.*  
(1713) **David Applegate**, AT&T Shannon Labs, **Marc LeBrun**, Fixpoint Inc., and **Neil J. A. Sloane\***, AT&T Shannon Labs (1077-11-104)

1:00 PM – 5:50 PM Dartmouth, 3rd Floor, Marriott

Organizers: **John Graef**, University of Tennessee at Chattanooga  
**Gangaram S. Ladde**, University of South Florida, Tampa  
**Aghala S. Vatsala**, University of Louisiana at Lafayette

- 1:00PM *Existence of solutions for fractional differential equations with anti-periodic boundary conditions.*  
(1723) **Mouffak Benchohra**, **Naima Hamidi**, Université de Sidi Bel-Abbes, and **Johnny Henderson\***, Baylor University (1077-34-54)

**Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)**

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| <p>1:30PM (1724) <i>Positive solutions for a class of higher order boundary value problems with fractional <math>q</math>-derivatives.</i><br/><b>John R. Graef*</b> and <b>Lingju Kong</b>, University of Tennessee at Chattanooga (1077-34-239)</p> <p>2:00PM (1725) <i>Fractional Inequalities Revisited.</i> Preliminary report.<br/><b>George A Anastassiou</b>, University of Memphis (1077-26-359)</p> <p>2:30PM (1726) <i>Fractional Differential Equations with Periodic Boundary Conditions. Generalized Monotone Method and Conditions for Uniqueness.</i><br/><b>J Diego Ramirez*</b> and <b>Aghalaya S Vatsala</b>, University of Louisiana at Lafayette (1077-34-578)</p> <p>3:00PM (1727) <i>Diffusions switched by Markov chains.</i> Preliminary report.<br/><b>Andrzej Korzeniowski</b>, The University of Texas at Arlington (1077-60-1064)</p> <p>3:30PM (1728) <i>Generalized Quasilinearization Method for Nonlinear Riemann-Liouville Fractional Differential Equations.</i> Preliminary report.<br/><b>Zachary Denton*</b> and <b>Aghalaya Vatsala</b>, University of Louisiana at Lafayette (1077-34-1132)</p> <p>4:00PM (1729) <i>Stability of stochastic two-scale network delayed SIR epidemic dynamic model with temporary immunity period.</i><br/><b>Divine T Wanduku*</b> and <b>Gangaram S Ladde</b>, University of South Florida (1077-60-1376)</p> <p>4:30PM (1730) <i>On Higher Order Stochastic differential equations.</i><br/><b>Jean-Claude Pedjeu*</b> and <b>G. S. Ladde</b>, University of South Florida (1077-60-1872)</p> <p>5:00PM (1731) <i>Existence of multiple solutions for a class of fractional boundary value problems.</i><br/><b>Lingju Kong</b>, University of Tennessee at Chattanooga (1077-34-1873)</p> <p>5:30PM (1732) <i>Generalized Monotone Method and Gauss Seidel Method for Caputo and Riemann Liouville Fractional Differential Systems.</i> Preliminary report.<br/><b>Aghalaya S Vatsala*</b>, University of Louisiana at Lafayette, and <b>Donna Stutson</b>, Xavier University of New Orleans (1077-34-1038)</p> | <p>1:00PM (1733) <i>Projective Representations of the Mapping Class Group coming from the Extended TQFT underlying the Kauffman Bracket.</i><br/><b>Charles Frohman*</b>, <b>Michael Fitzpatrick</b>, The University of Iowa, and <b>Joanna Kania-Bartoszyńska</b>, The National Science Foundation (1077-57-185)</p> <p>1:30PM (1734) <i>Knot concordance and homology cobordism.</i><br/><b>Tim D Cochran</b>, <b>Bridget D Franklin</b>, Rice University, <b>Matthew Hedden</b>, Michigan State University, and <b>Peter D Horn*</b>, Columbia University (1077-57-994)</p> <p>2:00PM (1735) <i>On the equivalence of Legendrian and transverse knot invariants in Heegaard Floer homology.</i><br/><b>John A. Baldwin</b>, Princeton University, <b>David Shea Vela-Vick*</b>, Columbia University, and <b>Vera Vertesi</b>, Massachusetts Institute of Technology (1077-57-622)</p> <p>2:30PM (1736) <i>Obstructing concordance of related satellite operations.</i><br/><b>Bridget D Franklin</b>, Rice University (1077-57-1245)</p> <p>3:00PM (1737) <i>Grid diagrams and the spectral sequence from Khovanov to Heegaard Floer homology.</i><br/><b>John A Baldwin</b>, Princeton University (1077-57-2413)</p> <p>3:30PM (1738) <i>Non-triviality of knots arising from iterated infection without the use of the Tristram-Levine signature.</i><br/><b>Christopher William Davis</b>, Rice University (1077-57-1089)</p> <p>4:00PM (1739) <i>Topologically slice knots with small fundamental group.</i> Preliminary report.<br/><b>Prudence Heck*</b> and <b>Tim Cochran</b>, Rice University (1077-57-2089)</p> <p>4:30PM (1740) <i>Classifying primitive/Seifert knots.</i> Preliminary report.<br/><b>John Berge</b>, Madison, WI, <b>Brandy Guntel*</b>, UT Austin, and <b>Sungmo Kang</b>, McGill University (1077-57-1421)</p> <p>5:00PM (1741) <i>Categorification of the Jones-Wenzl projectors and applications.</i><br/><b>Benjamin Cooper</b> and <b>Slava Krushkal*</b>, University of Virginia (1077-57-1627)</p> <p>5:30PM (1742) <i>Properties of the head and tail of the colored Jones polynomial.</i><br/><b>Oliver Dasbach*</b> and <b>Cody Armond</b>, Louisiana State University (1077-57-2110)</p> |
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**AMS Special Session on Knot Theory, III**

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1:00 PM – 5:50 PM

Provincetown,  
4th Floor, Marriott

Organizers: **Tim Cochran**, Rice University  
**Shelly Harvey**, Rice University

**AMS Special Session on Linear Algebraic Groups: Their Arithmetic, Geometry, and Representations, III**

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1:00 PM – 5:50 PM

Berkeley, 3rd Floor, Marriott

Organizers: **R. Skip Garibaldi**, Emory University  
**George McNinch**, Tufts University



*Boston, MA, Friday, January 6 – Program of the Sessions*

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| <p>1:00PM <i>Extended Quotients and Kazhdan-Lusztig Parameters.</i><br/>(1743) <b>Paul Frank Baum</b>, Penn State University (1077-22-653)</p> <p>1:30PM <i>Unexpected twists in positive depth L-packets.</i> Preliminary report.<br/>(1744) <b>Stephen DeBacker*</b>, University of Michigan, and <b>Loren Spice</b>, Texas Christian University (1077-22-2884)</p> <p>2:00PM <i>The Belkale-Kumar cup product.</i><br/>(1745) <b>Sam Evens</b>, University of Notre Dame (1077-17-1471)</p> <p>2:30PM <i>Representation Theory of semisimple Lie algebras in positive characteristic.</i> Preliminary report.<br/>(1746) <b>Ivan Mirkovic</b>, U. of Massachusetts, Amherst (1077-22-1738)</p> <p>3:00PM <i>Regular nilpotent Hessenberg varieties.</i><br/>(1747) <b>Julianna S Tymoczko</b>, Smith College (1077-14-2792)</p> <p>3:30PM <i>Special nilpotent orbits and modular Lie algebra representations.</i> Preliminary report.<br/>(1748) <b>James E. Humphreys</b>, U. Massachusetts, Amherst (1077-17-453)</p> <p>4:00PM <i>G-Galois algebras and a Hasse principle.</i><br/>(1749) <b>Parimala Raman*</b>, Emory University, Atlanta, GA 30322, and <b>Eva Bayer-Fluckiger</b>, EPFL, Lausanne, Switzerland (1077-20-2439)</p> <p>4:30PM <i>On the conjecture of Borel and Tits for abstract homomorphisms of algebraic groups.</i><br/>(1750) <b>Igor A. Rapinchuk</b>, Yale University (1077-20-218)</p> <p>5:00PM <i>Degree formula for the Euler characteristic.</i><br/>(1751) <b>Olivier Hauton</b>, University of Nottingham (1077-14-747)</p> <p>5:30PM <i>The J-invariant and Tits indices for groups of type <math>E_6</math>.</i><br/>(1752) <b>Caroline Junkins</b>, University of Ottawa (1077-14-1010)</p> | <p>2:00PM <i>A survey of topological free entropy dimension.</i> Preliminary report.<br/>(1755) <b>Don Hadwin*</b>, University of New Hampshire, <b>Qihui Li</b>, East China University of Science and Technology (Shanghai), <b>Weihua Li</b>, Columbia College (Chicago), and <b>Junhao Shen</b>, University of New Hampshire (1077-46-701)</p> <p>2:30PM <i>Representation formulas for Hardy space functions through the Cuntz relations and new interpolation problems.</i><br/>(1756) <b>Daniel Aron Alpay*</b>, Ben-Gurion University, <b>Palle Jorgensen</b>, University of Iowa, <b>Izchak Lewkowicz</b>, Department of electrical engineering, Ben-Gurion University, and <b>Itzik Marziano</b>, Ben-Gurion University (1077-47-1575)</p> <p>3:00PM <i>Characteristic functions of row contractions: unitary equivalence and coincidence.</i><br/>(1757) <b>Vladimir Bolotnikov*</b>, The College of William and Mary, and <b>Joseph A Ball</b>, Virginia Tech (1077-47-1968)</p> <p>3:30PM <i>Essential normality of polynomial-generated submodules.</i><br/>(1758) <b>Quanlei Fang*</b>, Bronx Community College, CUNY, and <b>Jingbo Xia</b>, SUNY-Buffalo (1077-47-486)</p> <p>4:00PM <i>Extensions of Hilbert Modules over Operator Tensor Algebras.</i><br/>(1759) <b>Andrew K Greene</b>, University of Iowa (1077-46-2437)</p> <p>4:30PM <i>Second Order Even and R-diagonal Operators.</i> Preliminary report.<br/>(1760) <b>James A Mingo*</b>, Queen's University at Kingston, and <b>Octavio Arizmendi</b>, Universität des Saarlandes (1077-46-1856)</p> <p>5:00PM <i>Realization and interpolation theory for generalized Schur classes.</i> Preliminary report.<br/>(1761) <b>Joseph A. Ball</b>, Virginia Tech (1077-47-200)</p> <p>5:30PM <i>Analytic Functions from Tensors.</i><br/>(1762) <b>Paul S. Muhly*</b>, University of Iowa, and <b>Baruch Solel</b>, Technion (1077-46-1704)</p> |
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**AMS Special Session on Progress in Free Analysis, III**

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1:00 PM – 5:50 PM Room 108, Hynes

Organizers: **J. William Helton**, University of California, San Diego

**Paul S. Muhly**, University of Iowa

- 1:00PM *Non commutative Hardy operator algebras.*  
(1753) **Paul S Muhly**, University of Iowa, and **Baruch Solel\***, Technion, Israel Institute of Technology (1077-47-883)
- 1:30PM *Cuntz-Pimsner algebras for subproduct systems.*  
(1754) **Ami Viselter**, University of Alberta (1077-46-499)

**AMS Special Session on Radon Transforms and Geometric Analysis (in honor of Sigurdur Helgason's 85th birthday), II**

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1:00 PM – 5:50 PM Room 104, Hynes

Organizers: **Jens Christensen**, University of Maryland  
**Fulton Gonzalez**, Tufts University  
**Todd Quinto**, Tufts University

- 1:00PM *Abel-Radon transform and CR functions.*  
(1763) **Mark Agranovsky**, Bar-Ilan University (1077-32-672)

**Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)**

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| <p>1:30PM (1764) <i>Mean value theorems on symmetric spaces.</i><br/><b>Francois Rouviere</b>, Universite de Nice, France (1077-22-1590)</p> <p>2:00PM (1765) <i>The <math>\cos^\lambda</math>-transform and intertwining operators for <math>SL(n, \mathbb{F})</math>.</i><br/><b>Gestur Olafsson*</b>, Louisiana State University, and <b>Angela Pasquale</b>, University of Metz (1077-43-1085)</p> <p>3:00PM (1766) <i>Twisted Poisson integrals on bounded symmetric domains.</i><br/><b>Adam Koranyi</b>, H. H. Lehman College, CUNY (1077-22-874)</p> <p>3:30PM (1767) <i>Radon transformation on reductive symmetric spaces: support theorems.</i><br/><b>Job J. Kuit</b>, University of Copenhagen (1077-44-456)</p> <p>4:00PM (1768) <i>Range of the Double Fibration Transform (joint work with Michael Eastwood).</i><br/><b>Joseph A. Wolf</b>, University of California at Berkeley (1077-22-331)</p> <p>5:00PM (1769) <i>The bounded hypergeometric functions associated with root systems.</i><br/><b>E. K. Narayanan</b>, Indian Institute of Science, Bangalore, India, <b>Angela Pasquale*</b>, Universite Paul Verlaine - Metz, France, and <b>Sanjoy Pusti</b>, University of Luxembourg (1077-33-684)</p> <p>5:30PM (1770) <i>Paley-Wiener Theorems on <math>\mathbb{R}^n</math> with respect to the spectral parameter.</i><br/><b>Susanna Dann*</b>, University of Missouri, and <b>Gestur Olafsson</b>, Louisiana State University (1077-43-2720)</p> | <p>2:30PM (1774) <i>A <math>p</math>-adic criterion for good reduction of curves over a <math>p</math>-adic field.</i><br/><b>Adrian Iovita</b>, Concordia University, Montreal and Padova University, Italy (1077-14-1616)</p> <p>3:00PM (1775) <i>The birational <math>p</math>-adic section conjecture -revisited.</i><br/><b>Florian Pop</b>, University of Pennsylvania (1077-08-2022)</p> <p>3:30PM (1776) <i>Cohen-Lenstra heuristics and Random Dieudonné Modules.</i><br/><b>David Michael Zureick-Brown*</b>, Emory University, <b>Jordan Ellenberg</b>, University of Wisconsin-Madison, and <b>Bryden Cais</b>, The University of Arizona (1077-11-2088)</p> <p>4:00PM (1777) <i>Euclidean quadratic forms and ADC forms.</i><br/><b>Pete L. Clark</b>, University of Georgia (1077-11-2451)</p> <p>▶ 4:30PM (1778) <i>Imaginary quadratic class numbers and Sha for congruent number curves.</i> Preliminary report.<br/><b>Nils Bruin</b>, Simon Fraser University (1077-11-2012)</p> <p>5:00PM (1779) <i>Diophantine Equations With Two Separated Variables.</i><br/><b>Benjamin L Weiss</b>, Technion (1077-12-128)</p> <p>5:30PM (1780) <i>Extensions of a Kim and Roush Result to Algebraic Fields.</i> Preliminary report.<br/><b>Alexandra Shlapentokh</b>, East Carolina University (1077-11-1325)</p> |
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**AMS Special Session on Rational Points on Varieties, III**

1:00 PM – 5:50 PM Arlington, 3rd Floor, Marriott

- Organizers: **Jennifer Balakrishnan**, Massachusetts Institute of Technology  
**Bjorn Poonen**, Massachusetts Institute of Technology  
**Bianca Viray**, Brown University  
**Kirsten Wickelgren**, Harvard University
- 1:00PM (1771) *Homotopy Obstructions to Rational Points - I.*  
**Tomer M. Schlank\*** and **Yonatan Harpaz**, The Hebrew University of Jerusalem (1077-14-1374)
- 1:30PM (1772) *Homotopy Obstructions to Rational Points - II.*  
**Yonatan Harpaz\*** and **Tomer M. Schlank**, The Hebrew University of Jerusalem (1077-14-1375)
- 2:00PM (1773) *Rational points and  $\mathbb{A}^1$ -homotopy theory.*  
**Aravind Asok**, University of Southern California, and **Christian Haesemeyer\***, UCLA (1077-14-1226)

**AMS Special Session on Recent Trends in Graph Theory, II**

1:00 PM – 5:50 PM Room 102, Hynes

- Organizer: **Raluca Gera**, Naval Postgraduate School
- ▶ 1:00PM (1781) *Uniquely  $K_r$ -saturated graphs.* Preliminary report.  
**Stephen G Hartke** and **Derrick Stolee\***, University of Nebraska-Lincoln (1077-05-1584)
- ▶ 1:30PM (1782) *On Locating Sets in Graphs.*  
**Bryan A Phinezy**, Western Michigan University (1077-05-767)
- 2:00PM (1783) *Counting Kempe-equivalence classes for 3-edge-colored cubic graphs.*  
**Sarah-Marie Belcastro\***, University of Massachusetts-Amherst and Smith College, and **Ruth Haas**, Smith College (1077-05-587)
- 2:30PM (1784) *On cubic non-toroidal graphs.* Preliminary report.  
**Stan Dziobiak\***, University of Mississippi, and **Guoli Ding**, Louisiana State University (1077-05-2541)
- ▶ 3:00PM (1785) *Prime Distance Graphs.*  
**Joshua D Laison\***, **Colin Starr**, Willamette University, and **Andrea Walker**, Sandia National Laboratory (1077-05-124)

*Boston, MA, Friday, January 6 – Program of the Sessions*

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- ▶ 3:30PM (1786) *Clawfreeness of powers of graphs.*  
Preliminary report.  
**Patrick Bahls\***, University of North Carolina, Asheville, and **Nicole A. Gin**, Spring Arbor University (1077-05-45)
- ▶ 4:00PM (1787) *Parity Balanced Bipartite Graphs.*  
**Guven Yuceturk\***, University of West Georgia, and **Dean G. Hoffman**, Auburn University (1077-05-2648)
- 4:30PM (1788) *Cancellation for the direct product of digraphs.*  
**Richard H Hammack**, Virginia Commonwealth University (1077-05-122)
- 5:00PM (1789) *Rainbow Matchings and the Erdos-Ko-Rado Theorem.*  
**David M Howard\*** and **Ron Aharoni**, Technion - Israel Institute of Technology (1077-05-2297)
- 5:30PM (1790) *Total Detection Numbers of Graphs.*  
**Henry Escudro\***, Juniata College, and **Futaba Fujie-Okamoto**, University of Wisconsin - La Crosse (1077-05-2084)

- 4:00PM (1796) *Inverse energy cascade and self-organization in 2-D turbulent channel flow.*  
**Wanping Li\*** and **Shuangxi Guo**, School of Civil Engineering and Mechanics, Huazhong University of Science and Technology, Wuhan, PR China (1077-76-683)
- 4:30PM (1797) *Evolution of elastic thin films with curvature regularization via minimizing movements.*  
**Paolo Piovano**, Carnegie Mellon University (1077-35-1747)
- ▶ 5:00PM (1798) *Well Known Equations and Not Well Known Behavior of Solutions.* Preliminary report.  
**Laihan Luo**, New York Institute of Technology (1077-35-463)

***AMS Special Session on Uniformly and Partially Hyperbolic Dynamical Systems, II***

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1:00 PM – 5:40 PM      **Fairfield, 3rd Floor, Marriott**

Organizers: **Todd Fisher**, Brigham Young University

**Boris Hasselblatt**, Tufts University

- 1:00PM (1799) *Partial Hyperbolicity in the Hamiltonian and geometrical context.*  
**Enrique Pujals**, IMPA (1077-37-764)
- 2:00PM (1800) *Ergodicity of the Weil Petersson geodesic flow.*  
**Keith Burns\***, Northwestern University, **Howard Masur**, University of Chicago, and **Amie Wilkinson**, Northwestern University (1077-37-2115)
- 2:30PM (1801) *Isotopy class for orbits of skewed  $\mathbb{R}$ -covered Anosov flows.*  
**Thomas Barthelmé**, IRMA, universit e de Strasbourg (1077-37-1352)
- 3:00PM (1802) *Partially hyperbolic actions on nilmanifolds.*  
**Danijela Damjanovic**, Rice University (1077-37-937)
- 3:30PM (1803) *Mixing rates for flows.*  
**Michael Field**, University of Houston (1077-37-1444)
- 4:00PM (1804) *Billiards under small twists.*  
**Hong-Kun Zhang**, University of Massachusetts Amherst (1077-37-438)
- 4:30PM (1805) *A note on dynamical Borel-Cantelli lemmas for non-uniformly hyperbolic dynamical systems.*  
**Nicolai Haydn**, University of Southern California, **Matthew Nicol\***, University of Houston, **Tomas Persson**, Lunds Tekniska Hogskola, Sweden, and **Sandro Vaienti**, CPT, Luminy, France (1077-37-1419)
- 5:00PM (1806) *Essential coexistence of completely hyperbolic and completely non-hyperbolic behavior.*  
**Yakov B. Pesin**, Penn State University (1077-37-540)

***AMS Special Session on Some Nonlinear Partial Differential Equations: Theory and Application, III***

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1:00 PM – 5:20 PM      **Wellesley, 3rd Floor, Marriott**

Organizers: **Jerry L. Bona**, University of Illinois, Chicago

**Laihan Luo**, New York Institute of Technology

- ▶ 1:00PM (1791) *Dispersive Quantization – the Talbot Effect.*  
**Peter J. Olver**, University of Minnesota (1077-35-605)
- ▶ 1:30PM (1792) *On the existence of stationary solutions for some non-Fredholm integro-differential equations.*  
**Vitali G Vougalter**, University of Cape Town (1077-35-2063)
- 2:00PM (1793) *Water Waves with Discontinuous Vorticity.*  
**Walter A. Strauss**, Brown University (1077-76-1172)
- 2:30PM (1794) *On a PDE system that governs the boundary layers system for complex fluids.*  
**Xiaojun Wang\*** and **Michael Renardy**, Virginia Tech (1077-76-1557)
- 3:00PM Discussion moderated by Diane Henderson
- 3:30PM (1795) *Some Integro-differential Equations Describing Nonlinear Evolution of Instability Waves on Shear Flows.*  
**Xuesong Wu**, Tianjin University, China & Imperial College London, UK (1077-76-2301)

Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)

**MAA Invited Paper Session on Semidefinite Optimization and Nonnegative Polynomials**

1:00 PM – 3:45 PM Room 302, Hynes

Organizers: **Rekha Thomas**, University of Washington  
**Greg Blekherman**, Georgia Tech

- ▶ 1:00PM (1807) *Nonnegative Polynomials and Sums of Squares.*  
**Grigoriy Blekherman**, Georgia Tech (1077-AH-2956)
- ▶ 1:45PM (1808) *Sum of Squares Optimization applied to Walking Robots and Robotic Birds.*  
**Russ Tedrake**, Massachusetts Institute of Technology: Computer Science and Artificial Intelligence Lab (1077-AH-2831)
- ▶ 2:30PM (1809) *Computational and Algebraic Aspects of Convexity.*  
**Amir Ali Ahmadi**, MIT (1077-AH-2925)
- ▶ 3:15PM (1810) *Graphs, Distances, and Semidefinite Programming.*  
**Steven J. Gortler**, SEAS, Harvard University (1077-AH-900)

**MAA Minicourse #3: Part B**

1:00 PM – 3:00 PM Salon AB, 4th Floor, Marriott

*Problem-based courses for teachers, future teachers, and math majors.*

Presenters: **Gail Burrill**, Michigan State University  
**Darryl Yong**, Harvey Mudd College  
**Bowen Kerins**, Education Development Center  
**James King**, University of Washington

**MAA Minicourse #7: Part B**

1:00 PM – 3:00 PM Salon CD, 4th Floor, Marriott

*Study the masters: Using primary historical sources in mathematics teaching.*

Presenters: **Daniel Otero**, Xavier University  
**David Pengelley**, New Mexico State University

**MAA Minicourse #11: Part B**

1:00 PM – 3:00 PM Salon HI, 4th Floor, Marriott

*Teaching differential equations with modeling.*

Presenters: **Michael Huber**, Muhlenberg College  
**Dan Flath**, Macalester College  
**Tom LoFaro**, Gustavus Adolphus College

**AMS Session on Combinatorics and Graph Theory, VI**

1:00 PM – 5:25 PM Room 111, Hynes

- ▶ 1:00PM (1811) *On the Distribution of Arithmetic Sequences in the  $3x + 1$  Graph.*  
Preliminary report.  
**Keenan Monks**, Harvard, **Ken G. Monks\***, University of Scranton, **Ken M. Monks**, Colorado State University, and **Maria Monks**, UC Berkeley (1077-05-1804)
- ▶ 1:15PM (1812) *Counting Binary Normal Networks.*  
**Devin R Bickner**, Iowa State University (1077-05-1719)
- ▶ 1:30PM (1813) *Improving the Computational Efficiency of the Blitzstein–Diaconis algorithm for Generating Graphs of Prescribed Degree.*  
**Elizabeth Moseman**, NIST (1077-05-1694)
- ▶ 1:45PM (1814) *Combinatorial Interpretations of Quantum Elementary Characters.*  
Preliminary report.  
**Brittany C Shelton\*** and **Mark Skandera**, Lehigh University (1077-05-1664)
- ▶ 2:00PM (1815) *Some planar Hall completable graphs.*  
Preliminary report.  
**Sibel Ozkan**, Istanbul, Turkey, and **Erik E Westlund\***, Kennesaw State University (1077-05-1594)
- ▶ 2:15PM (1816) *The  $k$ -Fixed-Endpoint Path Partition Problem.*  
**Breeanne Baker\*** and **Garth Isaak**, Lehigh University (1077-05-1568)
- ▶ 2:30PM (1817) *Mod  $(2p + 1)$ -orientations in graphs.*  
**Yanting Liang**, St. Mary's College of Maryland (1077-05-1761)
- ▶ 2:45PM (1818) *On quasi-symmetric designs with intersection difference three.*  
**V. C. Mavron**, **T. P. McDonough**, Institute of Mathematics and Physics, Aberystwyth, Ceredigion, UK, and **M. S. Shrikhande\***, Central Michigan University (1077-05-1852)
- ▶ 3:00PM Break.
- ▶ 3:15PM (1819) *Split digraphs.*  
**M Drew LaMar**, College of William and Mary (1077-05-1853)
- ▶ 3:30PM (1820) *Maximum packings of complete graphs with stars.*  
**Dan Roberts**, Auburn University (1077-05-1457)
- ▶ 3:45PM (1821) *Generalizations of Baranyai's Theorem and Embedding Factorizations.*  
**Amin Bahmianian**, Auburn University (1077-05-1369)
- ▶ 4:00PM (1822) *Conjectures and Results on Equitable  $\Delta$ -Coloring of Graphs.*  
**Bor-Liang Chen**, National Taichung Institute of Technology, Taiwan, **Ko-Wei Lih**, Academia Sinica, Taiwan, and **Chih-Hung Yen\***, National Chiayi University, Taiwan (1077-05-1316)

*Boston, MA, Friday, January 6 – Program of the Sessions*

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| <p>4:15PM <i>Partial Permutations Avoiding Pairs of Patterns.</i><br/>▶ (1823) <b>Noah Arbesfeld</b>, Massachusetts Institute of Technology (1077-05-1300)</p> <p>4:30PM <i>Quotients of subgroup lattices of finite abelian <math>p</math>-groups.</i> Preliminary report.<br/>▶ (1824) <b>Marina Dombrovskaya</b>, Washington University in St. Louis (1077-05-1252)</p> <p>4:45PM <i>A Geometric Extremal Result for Cubic Arrays.</i><br/>▶ (1825) <b>James E Gossell*</b>, University of Central Missouri, and <b>Peter Johnson</b>, Auburn University (1077-05-1639)</p> <p>5:00PM <i>A hypergraph version of a graph packing theorem by Bollobás and Eldridge.</i><br/>(1826) <b>Peter Hamburger</b>, Western Kentucky University, <b>Alexandr V. Kostochka</b>, University of Illinois at Urbana-Champaign, and <b>Christopher Stocker*</b>, Western Kentucky University (1077-05-1945)</p> <p>5:15PM <i>A bijective factorization of modified Macdonald polynomials.</i><br/>(1827) <b>Nicholas A Loehr</b>, Virginia Tech, and <b>Elizabeth M Niese*</b>, Marshall University (1077-05-1513)</p> | <p>2:30PM <i>An Innovative Approach to Limiting Availability Using Extended Semi-Markov Processes.</i><br/>(1834) <b>Liang Hong*</b>, Bradley University, <b>Jyotirmoy Sarkar</b>, Indiana University Purdue University Indianapolis, and <b>Bruno Bieth</b>, Modeling and Simulation, Novartis Pharma AG (1077-90-16)</p> <p>2:45PM Break.</p> <p>3:00PM <i>Strategic market games with random endowments.</i><br/>(1835) <b>Barbara A Bennie</b>, University of Wisconsin - La Crosse (1077-91-2382)</p> <p>3:15PM <i>(Me) vs (Them) with the Help of Mr. Lincoln.</i><br/>(1836) <b>Allan M. Cordish</b>, Bethel, Ohio (1077-91-358)</p> <p>3:30PM <i>Growth of one-dimensional cellular automata.</i><br/>▶ (1837) <b>Eric Rowland*</b>, LaCIM, Université du Québec à Montréal, and <b>Charles Brummitt</b>, University of California Davis (1077-68-130)</p> <p>3:45PM <i>Turing Machines and Quantum Computation: Building a Quantum Brain.</i><br/>(1838) <b>Julia T Upton</b>, Husson University (1077-68-127)</p> <p>4:00PM <i>Strategies to Deploy Temporary Ambulatory Medical Services in Response of a Catastrophic Event.</i> Preliminary report.<br/>(1839) <b>Ahlam E.H. Tannouri*</b>, Morgan State University, <b>Sam F. Tannouri</b>, Computer Science Department/ Morgan State University, and <b>Belinda Kauffman</b>, University of Maryland School of Medicine (1077-90-2907)</p> |
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**AMS Session on Computer Science, Information, Control Theory, and Economics, II**

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**1:00 PM – 4:55 PM Room 303, Hynes**

- 1:00PM *Numerical Experiments on New Relaxation-Type Algorithms for LPs.*  
▶ (1828) **Jesus A. De Loera**, **Amitabh Basu** and **Mark Junod\***, University of California, Davis (1077-90-1809)
- 1:15PM *Modeling Special Ordered Set Restrictions and Other Disjunctions using Base-2 Expansions.* Preliminary report.  
(1829) **Warren P Adams** and **Frank M Muldoon\***, Clemson University (1077-90-1418)
- 1:30PM *Computational Manifold Equilibrium in Dynamical Economic Models.*  
(1830) **Zhengyuan Gao**, University of Amsterdam (1077-91-297)
- 1:45PM *A Minimax Distribution Free Approach: Joint Vendor and Buyer Model.*  
▶ (1831) **Ajanta Roy**, University of South Carolina, Salk, SC 29488 (1077-91-2528)
- 2:00PM *Game theory in vaccination and its application.* Preliminary report.  
▶ (1832) **Yingyun Shen\*** and **Mike Mesterton-Gibbons**, Florida State University (1077-91-2483)
- 2:15PM *Identification of Systems with Structural Uncertainties using Binary Sensors.*  
(1833) Preliminary report.  
**Shaobai Kan**, John Jay College of Criminal Justice, CUNY (1077-93-1291)

- 4:15PM *Communication-efficient 2-round group key establishment from pairings.*  
(1840) **K N Neupane\*** and **R Steinwandt**, Florida Atlantic University, Boca Raton, Florida (1077-94-1635)
- 4:30PM *Controllability of nonlocal semilinear boundary delay control systems.*  
(1841) Preliminary report.  
**Nutan Kumar Tomar\*** and **Suman Kumar**, Indian Institute of Technology Patna, Bihar, India (1077-93-2344)
- 4:45PM *Codes from incidence matrices and line graphs of generalized Paley graphs.*  
▶ (1842) Preliminary report.  
**Pani Seneviratne**, American University of Sharjah (1077-94-543)

**AMS Session on Group Theory and Generalizations**

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**1:00 PM – 5:40 PM Room 308, Hynes**

- 1:00PM *On subgroups of the Dixmier group and Calogero-Moser spaces.* Preliminary report.  
▶ (1843) **Alimjon K Eshmatov**, University of Arizona, Tucson (1077-20-2938)

Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)

- 1:15PM *Symmetry of Endomorphism Algebras - preliminary report.* Preliminary report. (1844)  
**Adam Anthony Allan**, St. Louis University (1077-20-2820)
- ▶ 1:30PM *The probability that two elements commute in groups with small centers.* Preliminary report. (1845)  
**Thomas Langley**, Rose-Hulman Institute of Technology (1077-20-2585)
- 1:45PM *Towers of IA-automorphisms.* Preliminary report. (1846)  
**Margaret H Dean**, The City University of New York-BMCC, **Stephen Majewicz**, The City University of New York-KCC, and **Marcos Zyman\***, The City University of New York-BMCC (1077-20-2573)
- 2:00PM *Relating the structure of a group to the module-theoretic properties of the group von Neumann algebra over the complex group ring.* (1847)  
**Wade Mattox**, Virginia Tech (1077-20-2491)
- ▶ 2:15PM *Recent results on Cayley-Dickson loops.* (1848)  
**Jenya Kirshtein**, University of Denver (1077-20-2154)
- ▶ 2:30PM *Monoids Defined by Second Order Recurrence Relations.* Preliminary report. (1849)  
**Trey Brock\*** and **Nicholas R Baeth**, University of Central Missouri (1077-20-2054)
- 2:45PM *Schur  $\sigma$ -groups of small prime power order.* (1850)  
**Michael R Bush**, Smith College (1077-20-1783)
- 3:00PM *Hyperbolic hydra.* (1851)  
**Noel Brady**, University of Oklahoma, **Will Dison**, Bank of England, and **Tim Riley\***, Cornell (1077-20-1684)
- 3:15PM Break.
- 3:30PM *Abelian groups with partial decomposition bases.* Preliminary report. (1852)  
**Carol Jacoby**, Jacoby Consulting, **Katrin Leistner**, University of Duisburg-Esen, Germany, **Peter Loth\***, Sacred Heart University, and **Lutz Struengmann**, University of Duisburg-Essen, Germany (1077-20-1108)
- 3:45PM *Bounds and Asymptotics for Various Properties of Numerical Semigroups.* (1853)  
**Lynelle L Ye**, Stanford University (1077-20-1054)
- ▶ 4:00PM *Zero-divisor graphs with seven vertices.* Preliminary report. (1854)  
**Xinyun Zhu**, University of Texas of the Permian Basin (1077-20-638)
- 4:15PM *Dirichlet-Ford Domains and Arithmetic Reflection Groups.* Preliminary report. (1855)  
**Grant S Lakeland**, University of Texas at Austin (1077-20-446)
- 4:30PM *The nonabelian tensor square of nilpotent product of cyclic groups.* Preliminary report. (1856)  
**Arturo Magidin**, University of Louisiana at Lafayette (1077-20-344)
- 4:45PM *Using the  $p$ -Group Generation Algorithm to Generate Extensions of  $D_4$  by  $C_2 \times C_2 \times C_{2n-5}$ .* Preliminary report. (1857)  
**Aliza A. Steurer**, Dominican University (1077-20-1605)
- 5:00PM *On Conditions Relating to Nonsolvability.* (1858)  
**Michael J. J. Barry**, Allegheny College (1077-20-1613)
- 5:15PM *Finite Groups with all Subgroups not Contained in the Frattini Subgroup Permutable.* (1859)  
**Joseph Kirtland**, Marist College (1077-20-266)
- ▶ 5:30PM *A new distinguished form for 3-braids and its applications to the  $\sigma$ -order on  $B_3$ .* Preliminary report. (1860)  
**Emille Davie Lawrence**, University of San Francisco (1077-20-259)

**AMS Session on Mathematical Biology and Related Fields, III**

1:00 PM – 5:10 PM Room 105, Hynes

- 1:00PM *Reaction-diffusion replicator equation: Stability and asymptotic behavior.* (1861)  
**Artem S. Novozhilov\***, **Vladimir P. Posvyanskii** and **Alexander S. Bratus**, Moscow State University (1077-92-829)
- ▶ 1:15PM *Mathematical Modeling of Competitive Binding on a Microarray.* (1862)  
**Frank H Lynch\*** and **Thomas Jemielita**, Occidental College (1077-92-629)
- 1:30PM *A Novel Bayesian Change-Point (BCP) Model for Better ChIP-seq Data Analyses.* Preliminary report. (1863)  
**Yifan Mo\***, Stony Brook University, **Will Liao**, **Haipeng Xing**, Applied Math and Statistics Department, Stony Brook University, and **Michael Zhang**, Cold Spring Harbor Laboratory (1077-92-581)
- 1:45PM *The Number of Multistate Nested Canalizing Functions.* (1864)  
**David Murrugarra**, Virginia Tech (1077-92-361)
- ▶ 2:00PM *A discrete model of iron metabolism in lung epithelial cells with fungal challenge.* Preliminary report. (1865)  
**John Nardini\***, North Carolina State University, **Kahmya McAlpin**, Oakwood University, **Leslie Myint**, Johns Hopkins University, and **Shernita Lee**, Virginia Bioinformatics Institute (1077-92-322)
- 2:15PM *Estimating population growth rates for mammalian species.* (1866)  
**Yanthe E Pearson\***, **William Fagan**, **Elise Larsen**, University of Maryland College Park, **Emma Goldberg**, University Illinois Chicago, **Heather Lynch**, SUNY Stony Brook, **Hillary Staver**, University of Maryland College Park, and **Jessica Turner**, Select (1077-92-251)

- 2:30PM (1867) ▶ *Modeling the Differences in the Development of a New Antibiotic Class versus the Development of a Next Generation Antibiotic to Combat Antimicrobial Resistance in a Hospital Setting.*  
**Michele L. Joyner**, East Tennessee State University (1077-92-895)
- 2:45PM (1868) ▶ *Modeling thermal propagation along vein walls in endovenous laser treatment.*  
**William R Fuller**, Ohio Northern University (1077-92-2799)
- 3:00PM (1869) ▶ *Tumor growth in complex, evolving geometries: A diffuse domain approach.*  
**Ying Chen\***, University of California, Irvine, and **John S. Lowengrub**, University of California, Irvine (1077-92-2464)
- 3:15PM Break.
- 3:30PM (1870) ▶ *Modeling Cell Movement using the Level Set Method.* Preliminary report.  
**Matthew K Fox\***, **Benjamin Dellaria** and **Magdalena Stolarska**, University of Saint Thomas (1077-92-2431)
- 3:45PM (1871) ▶ *Association testing in sequencing studies: Accommodating risk and protective variants.*  
**Abra Brisbin\*** and **Brooke L. Fridley**, Mayo Clinic (1077-92-245)
- 4:00PM (1872) ▶ *Multi-scale Model of CRISPR-induced Coevolutionary Dynamics: Diversification at the Interface of Lamarck and Darwin.* Preliminary report.  
**Lauren M Childs\***, Georgia Institute of Technology, **Nicole Held**, University of Illinois at Urbana-Champaign, **Mark J Young**, Montana State University, **Rachel J Whitaker**, University of Illinois at Urbana-Champaign, and **Joshua S Weitz**, Georgia Institute of Technology (1077-92-241)
- 4:15PM (1873) ▶ *A Cellular Automata Model for Biofilm Growth with Surface Flow.*  
**Baldvin Einarsson\***, Center for Complex and Nonlinear Science, University of California, Santa Barbara, **David Rodriguez** and **Ana Carpio**, Universidad Complutense de Madrid (1077-92-2514)
- 4:30PM (1874) ▶ *Using Optimal Control to minimize Rift Valley Fever Cases.* Preliminary report.  
**Donald Adongo\***, **Renee Fister**, Murray State University, and **Holly Gaff**, Old Dominion University (1077-92-2218)
- 4:45PM (1875) ▶ *Modeling the Spread of a Ug99-Type Wheat Pathogen in the United States of America.*  
**Patrick Thomas Davis\***, Central Michigan University, and **Andrew M. Ross**, Eastern Michigan University (1077-92-189)
- 5:00PM (1876) ▶ *Simple Undergraduate Mathematics to Understand Complex HIV-1 Latent Infection Dynamics.*  
**Naveen K. Vaidya**, The University of Western Ontario (1077-92-1553)

**AMS Session on Number Theory, Field Theory, and Polynomials, II**

1:00 PM – 5:25 PM Room 305, Hynes

- 1:00PM (1877) ▶ *Rational Density.* Preliminary report.  
**Adam C. McDougall\*** and **Nathan Bishop**, St. Olaf College (1077-11-1778)
- 1:15PM (1878) ▶ *Solutions to  $xyz = 1$  and  $x + y + z = k$  in Integers in Cubic Number Fields.* Preliminary report.  
**Helen G. Grundman\***, Bryn Mawr College, and **Laura L. Hall-Seelig**, Merrimack College (1077-11-1587)
- 1:30PM (1879) ▶ *Integer Solutions to  $xyz = 1$  and  $x + y + z = k$  in Number Fields of Degree at Most Four.* Preliminary report.  
**Helen G. Grundman**, Bryn Mawr College, and **Laura L. Hall-Seelig\***, Merrimack College (1077-11-1588)
- 1:45PM (1880) ▶ *Robin's theorem, primes, and a new elementary reformulation of the Riemann Hypothesis.*  
**Geoffrey Caveney**, Chicago, IL, **Jean-Louis Nicolas**, Université de Lyon; CNRS, Institut Camille Jordan, and **Jonathan Sondow\***, New York, NY (1077-11-1573)
- 2:00PM (1881) ▶ *On the Dimension of Algebro-Geometric Trace Codes.*  
**Phong Le**, Niagara University (1077-11-1104)
- 2:15PM (1882) ▶ *On positive integers  $n$  dividing the  $n$ th term of an elliptic divisibility sequence.*  
**Avram M. Gottschlich**, Dartmouth College (1077-11-1705)
- 2:30PM (1883) ▶ *Computing Intersections of Abelian Varieties Associated to Modular Forms.*  
**Randy J Heaton**, Florida State University (1077-11-1414)
- 2:45PM (1884) ▶ *The Inverse Galois Problem and Minimal Ramification over Function Fields.*  
**Meghan M De Witt**, University of Central Oklahoma (1077-11-1192)
- 3:00PM Break.
- 3:15PM (1885) ▶ *Exponential Hensel Lifting.*  
**A Johnston**, Johns Hopkins University (EP) (1077-11-1082)
- 3:30PM (1886) ▶  *$\ell$ -adic Properties of Partition Functions.*  
**Eva Kinoshita Belmont**, Harvard University, **Sarah Trebat-Leder\***, Princeton University, **Alexandra Musat**, California Institute of Technology, and **Holden Lee**, Massachusetts Institute of Technology (1077-11-1068)
- 3:45PM (1887) ▶ *Divisibility of Eigenforms, and computing a function of the  $j$ -invariant.*  
**Jeffrey Beyerl\***, **Kevin James** and **Hui Xue**, Clemson University (1077-11-899)
- 4:00PM (1888) ▶ *Connections between discriminants and the root distribution of polynomials with rational generating functions.*  
**Khang D. Tran**, University of Illinois at Urbana-Champaign (1077-11-687)

**Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)**

- 4:15PM *Symmetric parameterizations for quintic Eisenstein series.*  
(1889) **Tim Huber\***, **Richard Charles** and **Andoni Mendoza**, University of Texas - Pan American (1077-11-1772)
- 4:30PM *Polynomial Cunningham Chains.*  
▶ (1890) **Lenny Jones**, Shippensburg University (1077-11-1833)
- 4:45PM *New Ramanujan Congruence Properties of the Restricted Partition Function  $p(n, m)$  Modulo Prime Powers.*  
▶ (1891) **Brandt Kronholm**, Whittier College (1077-11-659)
- 5:00PM *The quadratic Waring-Goldbach problem and related topics.* Preliminary report.  
▶ (1892) **Taiyu Li**, Shandong University (1077-11-2966)
- 5:15PM *Congruence and Noncongruence Subgroups of  $\Gamma(2)$  via Graphs on Surfaces.*  
(1893) **erica j. Whitaker**, The Ohio State University (1077-11-626)
- 2:45PM *A Non-linear Least Squares Estimator of Bühlmann Credibility.* Preliminary report.  
(1901) **Jinfeng Wei**, Maryville University of St. Louis (1077-65-2692)
- 3:00PM Break.
- 3:15PM *Perturbation theory for the approximation of stability spectra by QR methods for products of linear operators on a Hilbert space.*  
(1902) **M. Badawy\*** and **Erik S. Van Vleck**, University of Kansas (1077-65-2444)
- 3:30PM *Proper Orthogonal Decomposition Nonlinear Closure Models of Engineering Flows.*  
▶ (1903) **Zhu Wang\*** and **Traian Iliescu**, Virginia Tech (1077-65-1732)
- 3:45PM *Immerse Finite Element Methods for Solving Parabolic Type Moving Interface Problems.*  
(1904) **Xu Zhang\*** and **Tao Lin**, Virginia Tech (1077-65-1492)
- 4:00PM *The Statistical Estimation of Uncertain Parameters in Elliptic PDEs.*  
(1905) **Hans-Werner van Wyk**, Virginia Polytechnic and State University (1077-65-1465)
- 4:15PM *High Order Compact Reconstruction Scheme with Weighted Essentially Non-Oscillatory Limiting.*  
▶ (1906) **Debojyoti Ghosh\***, University of Maryland, and **James D. Baeder**, Department of Aerospace Engineering, University of Maryland (1077-65-1385)

**AMS Session on Numerical Analysis, I**

1:00 PM – 4:55 PM Room 209, Hynes

- 1:00PM *Iteratively Re-weighted Least Squares Methods for Inverse Problems with Sparsity Constraints.*  
(1894) **Ingrid Daubechies**, Duke University, and **Sergey Voronin\***, Princeton University (1077-65-1626)
- 1:15PM *A fast numerical solver for the unsteady Oseen problems in rotation form.*  
(1895) **Jia Liu**, University of West Florida (1077-65-2949)
- 1:30PM *An Adaptive Compact Scheme for the Quenching Solution of Reaction-Diffusion Equations.*  
(1896) **Matthew A. Beauregard\*** and **Qin Sheng**, Baylor University (1077-65-2497)
- 1:45PM *Spectral Variational Integrators.*  
(1897) Preliminary report.  
**James Brian Hall**, University of California, San Diego (1077-65-665)
- 2:00PM *On the construction of optimal piece-wise constant coarse spaces in algebraic multigrid method.*  
(1898) **James J Brannick**, **Yao Chen\*** and **Ludmil T Zikatanov**, Penn State University (1077-65-2705)
- 2:15PM *Explicit Extended Stability Time Stepping Methods.*  
(1899) **Katharine F Gurski**, Howard University (1077-65-2804)
- 2:30PM *Variational Multiscale and SUPG Stabilization of Proper Orthogonal Decomposition Approximation for a Generalized Oseen Problem.*  
(1900) **John P Roop\***, North Carolina A & T State University, **Traian Iliescu** and **Zhu Wang**, Virginia Tech (1077-65-2713)

- 4:30PM *Implementing the localized method of approximate particular solutions using a Schultz-Jones-Mayer algorithm.*  
(1907) **Guangming Yao\***, Rowan University, and **Joseph Kolibal**, University of Southern Mississippi (1077-65-2230)
- 4:45PM *Galerkin Finite Element Approximations of an Optimal Control Problem for Elliptic PDEs with Random Input Data.*  
(1908) **Jangwoon Lee\***, University of Mary Washington, and **Hyung-Chun Lee**, Ajou University (1077-65-1372)

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

1:00 PM – 4:25 PM Room 110, Hynes

- 1:00PM *On theory and numerical method for computing eigen-solutions of nonlinear elliptic equation with Neumann boundary condition.* Preliminary report.  
(1909) **Changchun Wang**, Texas A&M University (1077-35-2433)
- 1:15PM *Optimization Problem for Klein-Gordon Equation.*  
(1910) **Qinghua Luo**, University of Oklahoma (1077-35-2039)
- 1:30PM *New Results for the Leah Cosine Function.*  
(1911) **Joshua Mann\***, Morehouse College, and **Ronald E. Mickens**, Clark Atlanta University (1077-35-2144)



*Boston, MA, Friday, January 6 – Program of the Sessions*

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| <p>1:45PM (1912) <i>Fundamental differential form and boundary value problems for PDEs.</i><br/>▶ <b>Maxim Zyskin</b>, UTB (1077-35-2694)</p> <p>2:00PM (1913) <i>A Multi-Moment CIP Method for Hyperbolic Equations.</i><br/>▶ <b>Sarah King</b>, North Carolina State University (NCSU) (1077-35-2535)</p> <p>2:15PM (1914) <i>Nonlinear Neutral Inclusions: Assemblages of Disks and Ellipsoids.</i> Preliminary report.<br/><b>Silvia Jiménez*</b> and <b>Bogdan Vernescu</b>, Worcester Polytechnic Institute (1077-35-2723)</p> <p>2:30PM Break.</p> <p>2:45PM (1915) <i>Analysis of a 2n-th Order Differential Equation with Lidstone Boundary Conditions - The Existence of Positive Solutions.</i><br/>▶ <b>Tuwaner Hudson Lamar</b>, Morehouse College (1077-35-2291)</p> <p>3:00PM (1916) <i>On the Laplacian, and fractional Laplacian, in an Exterior Domain.</i><br/>▶ <b>Leonardo Kosloff*</b> and <b>Tomas Schonbek</b>, Florida Atlantic University (1077-35-1893)</p> <p>3:15PM (1917) <i>Blow-up of Solutions to Systems of Nonlinear Wave Equations with Interior and Boundary Sources and Damping.</i><br/>▶ <b>Yanqiu Guo*</b> and <b>Mohammad A. Rammaha</b>, University of Nebraska-Lincoln (1077-35-2275)</p> <p>3:30PM (1918) <i>Analysis of a Ginzburg-Landau Type Energy Model for Smectic C* Liquid Crystals with Defects.</i> Preliminary report.<br/>▶ <b>Sean A. Colbert-Kelly*</b> and <b>Daniel Phillips</b>, Purdue University (1077-35-2379)</p> <p>3:45PM (1919) <i>On a Variational Approach for Water Waves.</i><br/>▶ <b>Danut Arama</b>, Loyola University Chicago (1077-35-1646)</p> <p>4:00PM (1920) <i>Global Well Posedness for a System of KDV-TYPE Equations with Quadratic Nonlinearities.</i> Preliminary report.<br/>▶ <b>Gang Wang*</b>, DePaul University, <b>Jerry L Bona</b>, University of Illinois at Chicago, and <b>Jonathan Cohen</b>, DePaul University (1077-35-1279)</p> <p>4:15PM (1921) <i>A sixth-order compact finite difference method for Navier-Stokes in cylindrical coordinates.</i> Preliminary report.<br/>▶ <b>Shelly M McGee</b>, University of Findlay (1077-35-2655)</p> | <p>1:00PM (1922) <i>Modularized Math Remediation: Implementation and data.</i><br/>▶ <b>Aaron Wong</b>, Nevada State College (1077-C5-641)</p> <p>1:20PM (1923) <i>Designing Developmental Mathematics for Student Success.</i><br/><b>Alvina J. Atkinson*</b>, <b>Barry D. Biddlecomb</b> and <b>D. Natasha Brewley</b>, Georgia Gwinnett College (1077-C5-202)</p> <p>1:40PM (1924) <i>Streamlining Basic Algebra Instruction.</i><br/>▶ <b>James R. Henderson</b>, University of Pittsburgh at Titusville (1077-C5-163)</p> <p>2:00PM (1925) <i>Factors Related to Using Algebraic Variables to Represent Quantitative Relationships.</i><br/><b>Susan S Gray</b>, University of New England, <b>Barbara J Loud</b>, Regis College, and <b>Carole P Sokolowski*</b>, Merrimack College (1077-C5-121)</p> <p>2:20PM (1926) <i>Meeting the Needs of Under-Prepared Students.</i> Preliminary report.<br/>▶ <b>Sarah Hutcheson Jahn*</b> and <b>Robert J. Krueger</b>, Concordia University, St. Paul (1077-C5-1367)</p> <p>2:40PM (1927) <i>What Csn We Do For Amanda?</i> Preliminary report.<br/>▶ <b>Jesse W Byrne*</b> and <b>Charlotte K Simmons</b>, University of Central Oklahoma (1077-C5-1411)</p> <p>3:00PM (1928) <i>Developmental Mathematics: Try, Try, and Try Again.</i> Preliminary report.<br/>▶ <b>Sarah V. Cook</b>, Washburn University (1077-C5-2583)</p> <p>3:20PM (1929) <i>Energize: Strategies to Keep Students Going and Going.</i><br/>▶ <b>Carla Rudder</b>, Zayed University Abu Dhabi United Arab Emirates (1077-C5-1527)</p> <p>3:40PM (1930) <i>An Integrated Media Approach to Developmental Mathematics Instruction.</i><br/>▶ <b>Jan O. Case*</b> and <b>Jessica Bentley</b>, Jacksonville State University (1077-C5-1909)</p> <p>4:00PM (1931) <i>An evaluation of the success of students who transition from a developmental Math Workshop into College Algebra, Trigonometry and Calculus I.</i> Preliminary report.<br/>▶ <b>Jessica Deshler*</b>, <b>Edgar Fuller</b>, <b>Betsy Kuhn</b>, <b>Doug Squire</b> and <b>Vicki Sealey</b>, West Virginia University (1077-C5-2673)</p> <p>4:20PM (1932) <i>Digital Learning Materials: Analysis of student early preparation in College Algebra.</i><br/>▶ <b>Karoline Auby*</b>, <b>James Sobota</b> and <b>Maighread McHugh</b>, University of Wisconsin-La Crosse (1077-C5-1958)</p> <p>4:40PM (1933) <i>Creating Pathways to Math Success at a Liberal Arts College.</i> Preliminary report.<br/>▶ <b>Maria Belk*</b> and <b>Lauren Rose</b>, Bard College (1077-C5-2834)</p> |
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**MAA Session on Developmental Mathematics Education: Helping Under-Prepared Students Transition to College-Level Mathematics**

1:00 PM – 6:15 PM Room 310, Hynes

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

**Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)**

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- ▶ 5:00PM *Trying to Bridge the Gap: Outcomes and Implications of a Remedial Mathematics Intervention Program.* Preliminary report. **Karen G Santoro**, Central Connecticut State University (1077-C5-2068)
- ▶ 5:20PM *The use of Pop Culture and Competition to Enhance Learning Mathematics (Survivor Math).* **Robert E. Burks**, Department of Operations Research, Naval Postgraduate School (1077-C5-50)
- ▶ 5:40PM *Can Peer Coaches Improve Student Success in Developmental Mathematics Courses?* **Leonid Khazanov\*** and **Fred Peskoff**, Borough of Manhattan Community College/CUNY (1077-C5-630)
- ▶ 6:00PM *Experiences in Designing and Teaching Statway.* Preliminary report. **Mary R Parker**, Austin Community College (1077-C5-2570)

- ▶ 2:40PM *Using an Online Homework System in an Introductory Statistics Course: Instructor and Student Perspectives.* Preliminary report. **Lisa Carnell**, High Point University (1077-E5-1849)
- ▶ 3:00PM *Descent into 'The Abyss' of Least-Squares Linear Regression.* Preliminary report. **Charles Bergeron\*** and **David Clarke**, Albany College of Pharmacy and Health Sciences (1077-E5-2782)
- ▶ 3:20PM *Playing Games with a Purpose.* **Shonda Kuiper**, Grinnell College (1077-E5-1653)
- ▶ 3:40PM *Playing Games with a Purpose: Initial Lessons from the Classroom.* Preliminary report. **Kevin F. Cummiskey\*** and **William H. Kaczynski**, United States Military Academy (1077-E5-1824)
- ▶ 4:00PM *Using R in an Undergraduate Statistics Course.* **Judith E Canner\*** and **Jon Detka**, California State University, Monterey Bay (1077-E5-741)
- ▶ 4:20PM *Probability Density Functions from Real-World Applications.* **Annela R Kelly**, Bridgewater State University (1077-E5-2770)
- ▶ 4:40PM *Cutting Through the Theory: Emphasizing Statistical Thinking in Mathematical Statistics.* **Jennifer L. Green\*** and **Erin E. Blankenship**, University of Nebraska-Lincoln (1077-E5-2100)
- ▶ 5:00PM *Value and Relevance of an Engineering Statistics Course.* **Kumer Das**, Lamar University, Beaumont, TX (1077-E5-2547)

**MAA Session on Innovations in Teaching Statistics in the New Decade, I**

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1:00 PM – 5:15 PM **Back Bay Ballroom B, 2nd Floor, Sheraton**

Organizers: **Andrew Zieffler**, University of Minnesota  
**Brian Gill**, Seattle Pacific University  
**Nancy Boynton**, SUNY Fredonia

- ▶ 1:00PM *Introductory Statistics with a Central Theme: "Statistical Reasoning" Courses That Interest Students.* **David G Taylor\*** and **Adam F Childers**, Roanoke College (1077-E5-907)
- ▶ 1:20PM *How the Analysis of Current Economic Growth, Income and Employment Can Be Used in Teaching an Introductory Statistics Course that Speaks to Students.* Preliminary report. **Alexander G. Atwood**, SUNY Suffolk County Community College (1077-E5-2901)
- ▶ 1:40PM *Mathematics and the Law: How Big Should a Jury Be, and How Should It Render Its Decision?* **Jeff A Suzuki**, Brooklyn College (1077-E5-72)
- ▶ 2:00PM *Read and Reflect: Making Statistics Real.* **Heather Hulett\*** and **Barbara Bennie**, Univ. of Wisconsin-La Crosse (1077-E5-2631)
- ▶ 2:20PM *Statistics Scrapbooks in Elementary Statistics.* **Julie Beier**, Mercer University (1077-E5-1660)

**MAA Session on Modeling Across the Mathematics Curriculum, II**

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1:00 PM – 3:15 PM **Room 306, Hynes**

Organizers: **Benjamin Galluzzo**, Shippensburg University  
**Mariah Birgen**, Wartburg College  
**Joyati Debnath**, Winona State University

- ▶ 1:00PM *Why Mathematics?* **Nagaraj S Rao\*** and **Sanju Vaidya**, Mercy College (1077-I1-1650)
- ▶ 1:20PM *Integrating modeling into an introductory programming course.* **Sheldon Lee**, Viterbo University (1077-I1-2612)
- ▶ 1:40PM *Learning Mathematics in the Context of Environmental Issues.* **Therese L Bennett**, **Ray Mugno\*** and **James Tait**, Southern CT State University (1077-I1-2500)

- 2:00PM (1954) *Social justice modeling contexts for teaching calculus and higher level math courses.*  
**Anand L Pardhanani**, Earlham College (1077-11-2195)
- 2:20PM (1955) *The Center for Applied Mathematics and Science at Salisbury University.* Preliminary report.  
**Veera Holdai, Brian Hill, Steven Hetzler** and **Kathleen Shannon\***, Salisbury University (1077-11-1537)
- 2:40PM (1956) *Research Experiences for All Learners.*  
**Carla D Martin\*** and **Anthony Tongen**, James Madison University (1077-11-1649)
- 3:00PM (1957) *Mathematical Thinking as a gateway to Undergraduate Research.*  
**Joyati Debnath**, Winona State University (1077-11-2853)

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

1:00 PM – 2:55 PM Room 202, Hynes

Organizers: **Sean Larsen**, Portland State University  
**Stacy Brown**, Pitzer College  
**Karen Marrongelle**, Portland State University

- 1:00PM (1958) *Learning mathematics from peers with different reasoning styles.* Preliminary report.  
**Kyeong Hah Roh**, Arizona State University, **Owen Davis\***, Arizona State University, and **Aviva Halani**, Arizona State University (1077-M1-2800)
- 1:20PM (1959) *The Role of Collective Work in Undergraduate Teaching of Mathematical Knowledge for Teaching to Future Elementary Teachers.* Preliminary report.  
**Wendy Aaron\***, **Yvonne Lai** and **Hyman Bass**, University of Michigan (1077-M1-2829)
- 1:40PM (1960) *Examination and Analysis of Undergraduate Students' Level of Statistics Anxiety with Respect to Gender and College-year.* Preliminary report.  
**Soofia Malik\*** and **Karen Traxler**, University of Northern Colorado, Greeley, CO (1077-M1-1692)
- 2:00PM (1961) *Developing a research-based calculus for elementary teachers.*  
**Karen Keene Allen**, North Carolina State University
- 2:20PM (1962) *Faculty Perspectives on the Transition to Graduate School in Mathematics.*  
**Sarah L. Marsh**, Oklahoma Baptist University (1077-M1-1407)
- 2:40PM (1963) *Mathematics for Nonmath Majors and Mathematics Anxiety.* Preliminary report.  
**Moira K Devlin\*** and **Agnes Rash**, Saint Joseph's University (1077-M1-2507)

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

1:00 PM – 3:55 PM Room 309, Hynes

Organizers: **Paul Musial**, Chicago State University  
**James Peterson**, Benedictine College  
**Erik Talvila**, University of the Fraser Valley  
**Robert Vallin**, Slippery Rock University of Pennsylvania

- 1:00PM (1964) *Calculus: A Missed Opportunity.*  
**Peter A. Loeb**, University of Illinois Champaign-Urbana (1077-N5-407)
- 1:20PM (1965) *The Lebesgue Integral : Motivations, advantages and Limitations.* Preliminary report.  
**Eddy A Kwessi**, Trinity University (1077-N5-498)
- 1:40PM (1966) *Teaching the Lebesgue Integral with a Calculus II Prerequisite.*  
**William Johnston**, Butler University (1077-N5-991)
- 2:00PM (1967) *A simple derivation of the trapezoidal rule for numerical integration.*  
**Erik Talvila\***, University of the Fraser Valley, and **Matthew Wiersma**, University of Waterloo (1077-N5-662)
- 2:20PM (1968) *Undergraduate research in a Real Analysis course.* Preliminary report.  
**Manmohan Kaur**, Benedictine University (1077-N5-2211)
- 2:40PM (1969) *Use of a "Connections Journal" in an undergraduate Real Analysis course.*  
**Antonia E. Cardwell**, Millersville University of Pennsylvania (1077-N5-827)
- 3:00PM (1970) *Using the Banach-Mazur Game in an Undergraduate Real Analysis Class to Investigate Different Types of Infinite Sets.*  
**Don L Hancock**, Pepperdine University (1077-N5-187)
- 3:20PM (1971) *Flows on metric spaces: ODEs, PDEs, SDEs and DDEs.*  
**Craig J. Calcatera**, Metropolitan State University (1077-N5-1468)
- 3:40PM (1972) *Using Illustrations to Motivate Definitions and Proofs in Real Analysis.*  
**Paul M. Musial**, Chicago State University (1077-N5-2456)

**MAA Session on Wavelets in Undergraduate Education**

1:00 PM – 4:15 PM Back Bay Ballroom C, 2nd Floor, Sheraton

Organizers: **Caroline Haddad**, SUNY Geneseo  
**Catherine Beneteau**, University of South Florida  
**David Ruch**, Metropolitan State College of Denver

**Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)**

- Patrick Van Fleet**, University of St. Thomas
- 1:00PM *Undergraduate Research Projects on Wavelet-Based Time Series Forecasting.* (1973)  
**Bruce Atwood**, Beloit College, **Helmut Knaust**, The University of Texas at El Paso, **Caroline Haddad\***, SUNY Geneseo, and **John Merkel**, Oglethorpe University (1077-P5-2886)
- ▶ 1:20PM *Applications of Discrete Wavelets to Stock Price Prediction.* (1974)  
**John C. Merkel**, Oglethorpe University (1077-P5-2868)
- 1:40PM *Applications of Wavelets: a sophomore-level seminar course.* (1975)  
**Rachel J Weir**, Allegheny College (1077-P5-329)
- ▶ 2:00PM *Discrete signal processing with fractal wavelets.* Preliminary report. (1976)  
**J. D'Andrea\*** and **T. Sibbett**, Westminster College of Salt Lake City (1077-P5-2808)
- ▶ 2:20PM *What Are You Hiding? Steganography Using Wavelets.* (1977)  
**Jeff Zeitler**, SUNY Geneseo (1077-P5-1875)
- ▶ 2:40PM *Smartphone Sensors and Wavelets.* (1978)  
**Edward F Aboufadel\***, **Nathan Marculis**, Grand Valley State University, and **SaraJane Parsons**, Indiana University of Pennsylvania (1077-P5-901)
- ▶ 3:00PM *Facial Detection and Recognition Using the Haar Transform in Static Images.* (1979)  
**Joseph Michael Gonzalez**, University of South Florida (1077-P5-772)
- ▶ 3:20PM *Some Ideas for Undergraduate Projects Involving Periodic Wavelets.* (1980)  
**Kenneth R. Hoover\***, California State University, Stanislaus, and **Brody Dylan Johnson**, Saint Louis University (1077-P5-2611)
- ▶ 3:40PM *Investigation of Second Generation Wavelets.* (1981)  
**Karleigh Cameron**, **Michael Gustin\***, **John Holden** and **Stacy Siereveld**, Central Michigan University (1077-P5-101)
- ▶ 4:00PM *Smoke Detection in Stationary Video Using Wavelets.* Preliminary report. (1982)  
**Helmut Knaust**, The University of Texas at El Paso (1077-P5-2893)

**MAA Session on the Mathematics of Sustainability**

1:00 PM – 2:55 PM **Room 203, Hynes**

- Organizers: **Elton Graves**, Rose-Hulman Institute of Technology  
**Peter Otto**, Willamette University
- ▶ 1:00PM *A Mathematics Course for Majors in Sustainable Living at the Level of Intermediate Algebra.* (1983)  
**M. Anne Dow**, Maharishi University of Management (1077-H5-2830)

- ▶ 1:20PM *Embodied Energy, Energy Return on Investment, and Sustainability.* (1984)  
**Ben Fusaro**, Florida State University (1077-H5-2896)
- ▶ 1:40PM *Nineteen Years Teaching Environmental Numeracy and Logic: Mathematics for the Environment.* Preliminary report. (1985)  
**Martin E. Walter**, University of Colorado, Boulder (1077-H5-696)
- 2:00PM *Sustainability Project for Calculus I.* (1986)  
**Peter T Otto**, Willamette University (1077-H5-2138)
- 2:20PM *Preventing the tragedy of the commons through punishment of over-consumers and encouragement of under-consumers.* (1987)  
**Irina Kareva**, **Benjamin Morin**, Arizona State University, and **Georgy Karev\***, NCBI, NIH (1077-H5-2000)
- ▶ 2:40PM *What's for Dinner: Linear Analysis of Nutritional Data and an Application to Community Health.* (1988)  
**Michael Ian Friedrich** and **Halcyon Annette Garrett\***, University of North Carolina Asheville (1077-H5-2455)

**MAA Session on the Philosophy of Mathematics and Mathematical Practice**

1:00 PM – 4:55 PM **Room 311, Hynes**

- Organizers: **Dan Sloughter**, Furman University  
**Bonnie Gold**, Monmouth University
- ▶ 1:00PM *The Consequences of Drawing Necessary Conclusions.* Preliminary report. (1989)  
**Daniel C. Sloughter**, Furman University (1077-K1-1196)
- ▶ 1:30PM *Thought in Mathematical Practice.* (1990)  
**Thomas Drucker**, University of Wisconsin-Whitewater (1077-K1-383)
- ▶ 2:00PM *Beyond Practicality: George Berkeley and the Need for Philosophical Integration in Mathematics.* (1991)  
**Joshua B. Wilkerson**, Texas A&M University (1077-K1-85)
- ▶ 2:30PM *Philosophy (but not philosophers) of mathematics does influence mathematical practice.* Preliminary report. (1992)  
**Bonnie Gold**, Monmouth University (1077-K1-2002)
- 3:00PM *Epistemological Culture and Mathematics.* Preliminary report. (1993)  
**Sarah-Marie Belcastro**, University of Massachusetts-Amherst / Smith College (1077-K1-1287)
- ▶ 3:30PM *How Do I (We) Know Mathematics.* (1994)  
**Ruggero Ferro**, Università di Verona, Italia (1077-K1-904)

*Boston, MA, Friday, January 6 – Program of the Sessions*

- ▶ 4:00PM (1995) *Formal mathematical proof and mathematical practice: a new skeptical problem.* Preliminary report.  
**Jeff Buechner**, Rutgers University-Newark and Saul Kripke Center, CUNY Graduate Center (1077-K1-800)
- ▶ 4:30PM (1996) *CDEG: Computerized Diagrammatic Euclidean Geometry.*  
**Nathaniel G. Miller**, University of Northern Colorado (1077-K1-1744)

- ▶ 2:45PM (2004) *Methods for Reducing and Transforming Agent-Based Models into Polynomial Dynamical Systems.*  
**Franziska Hinkelmann**, **Matt Oremland**, Virginia Bioinformatics Institute, **Hussein Al-Asadi**, University of Michigan, **Atsya Kumano**, Colorado College, **Laurel Ohm\***, St. Olaf College, **Alice Toms**, North Carolina State University, and **Reinhard Laubenbacher**, Virginia Bioinformatics Institute (1077-VG-473)

- ▶ 3:00PM (2005) *A three-dimensional mathematical and computational model of necrotizing enterocolitis.* Preliminary report.  
**Jared Barber\***, **Mark Tronzo**, University of Pittsburgh, **Gilles Clermont**, Center for Inflamm. and Reg. Modeling, McGowan Institute and Dept for Crit. Care Medicine, University of Pittsburgh, **Yoram Vodovotz**, Department of Surgery, University of Pittsburgh and Center for Inflamm. and Reg. Modeling, McGowan Institute, and **Ivan Yotov**, University of Pittsburgh (1077-VG-1722)

- ▶ 3:15PM (2006) *Stochastic Modeling of Ribosomal Frameshifting.*  
**Brenae L. Bailey**, University of Arizona (1077-VG-1039)

- ▶ 3:30PM (2007) *A mathematical model of drug resistance with infection by health care workers.*  
**Avner Friedman**, Mathematical Biosciences Institute/ The Ohio State University, **Najat Ziyadi\***, Morgan State University, and **Khalid Boushaba**, Johns Hopkins University (1077-VG-1455)

- ▶ 3:45PM (2008) *An improved mathematical model for dose-response of anticancer drug combinations at fixed schedule.*  
**Ardith El-Kareh**, University of Arizona, **Leslie Jones\***, University of Tampa, and **Timothy Secomb**, University of Arizona (1077-VG-2082)

- ▶ 4:00PM (2009) *Cannibals and Mosquitos: Using a predator-prey epidemic model to search for a Dengue fever reservoir.* Preliminary report.  
**Lee R Gibson\***, Indiana University - Southeast, and **Mary E Bradley**, University of Louisville (1077-VG-2661)

- ▶ 4:15PM (2010) *Inferring gang affiliation for violent events with incomplete data.*  
**Rachel Anne Hegemann\***, **Erik Lewis** and **Andrea L. Bertozzi**, University of California, Los Angeles (1077-VG-2162)

- ▶ 4:30PM (2011) *A Mathematical Investigation of the Financial Performance of Movie Sequels.*  
**Ron Buckmire\***, **Jacob Ortega-Gingrich**, Occidental College, and **David Edwards**, University of Delaware (1077-VG-1799)

- ▶ 4:45PM (2012) *Exploration of Stable Distributions.*  
**Catherine Rose O'Doherty**, University of Mary Washington (1077-VG-1988)

- ▶ 5:00PM (2013) *Learning in three multi-player auctions.*  
**DeLong Meng**, Massachusetts Institute of Technology (1077-VG-806)

**MAA General Contributed Paper Session: Modeling and Applications of Mathematics, II**

1:00 PM – 5:40 PM                      Room 201, Hynes

Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University

- ▶ 1:00PM (1997) *Modeling Wrist Oscillations Using Perturbation Methods.* Preliminary report.  
**Joe Latulippe\***, Norwich University, and **Randy Sierra**, Cal Poly Pomona (1077-VG-1951)

- ▶ 1:15PM (1998) *Development of an Ozone Inhalation Model.* Preliminary report.  
**Andrew Kirby\***, University of Wisconsin-Madison, **Analise Rodenberg**, Lewis & Clark College, **Andrew Bernstein**, University of Maryland College Park, and **Adrian McLean**, Fayetteville State University (1077-VG-1195)

- ▶ 1:30PM (1999) *Modeling Articular Cartilage Regeneration: A Phenomenological Approach.* Preliminary report.  
**Janine M. Haugh**, University of North Carolina at Asheville (1077-VG-2815)

- ▶ 1:45PM (2000) *Estimating the stiffness of healthy arteries via multi-dimensional secant method.*  
**Kun Gou**, Texas A&M University (1077-VG-1208)

- ▶ 2:00PM (2001) *The Mechanical Stability of Growing Arteries.*  
**Rebecca M Vandiver**, St. Olaf College (1077-VG-2241)

- ▶ 2:15PM (2002) *Non-Newtonian Effects on the Blood Pressure Drop in Atherosclerotic Right Coronary Arteries.*  
**Biyue Liu**, Monmouth University (1077-VG-689)

- ▶ 2:30PM (2003) *The effect of thrombin activatable fibrinolysis inhibitor (TAFI) in a multiscale mathematical model of fibrinolysis.*  
**Brittany E. Bannish\***, **James P. Keener** and **Aaron L. Fogelson**, University of Utah (1077-VG-1131)

**Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)**

- 5:15PM *Markov and Itô Representations of Option Price Models*. Preliminary report.  
 ▶ (2014) **Kevin Coltin**, Arizona State University (1077-VG-947)
- 5:30PM *Point process models for order arrival rates in order book dynamics*. Preliminary report.  
 (2015) **He Huang**, Florida State University (1077-VG-1558)

**MAA General Contributed Paper Session: Research in Applied Mathematics, II**

1:00 PM – 2:40 PM **Back Bay Ballroom D, 2nd Floor, Sheraton**

Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University

- 1:00PM *Intermittency and chaos near Hopf bifurcation with broken  $O(2) \times O(2)$  symmetry*.  
 (2016) **Yang Zou\***, **Gerhard Dangelmayr** and **Iuliana Oprea**, Colorado State University (1077-VK-1683)
- ▶ 1:15PM *Modeling wave velocity and frequency spectra in low-temperature, compressed LJ lattices: HPC simulations, mathematical theory and applications to acoustic metrics*. Preliminary report.  
 (2017) **Stephen H. Harnish**, Bluffton University (1077-VK-2924)
- 1:30PM *Effective Acceleration of Gravity due to the Expanding Universe*.  
 (2018) **Christopher Robert Frye\*** and **Costas Efthimiou**, University of Central Florida (1077-VK-2637)
- ▶ 1:45PM *Memory Effects for the Heat Conductivity of Random Suspensions of Spheres*.  
 (2019) **Abhinandan Chowdhury**, Delaware State University (1077-VK-2095)
- 2:00PM *The  $(1 + N)$ -vortex problem: a study of inviscid and weakly viscous vortex relative equilibria*.  
 (2020) **Anna M. Barry\***, **Glen R. Hall** and **C. Eugene Wayne**, Boston University (1077-VK-1366)
- 2:15PM *The Dynamic Programming Equation for a Deterministic Optimal Control Problem*.  
 (2021) **Jesus A. Pascal\*** and **Betsi J. Tirado**, American University of Afghanistan (1077-VK-2290)
- 2:30PM *Trajectory Controllability of Nonlinear Integro-differential System*.  
 (2022) **Dimplekumar N. Chalishajar\*** and **Heena D. Chalishajar**, Virginia Military Institute (1077-VK-1060)

**SIAM Minisymposium on Applied, Computational, and Discrete Mathematics at National Laboratories and Federal Research Agencies**

1:00 PM – 6:25 PM **Room 206, Hynes**

Organizers: **Zuhair Nasheed**  
**Luminita Vese**, University of California Los Angeles

- ▶ 1:00PM *Non Standard Parabolic Equations and Image Reconstruction*. Preliminary report.  
 (2023) **Alfred S. Carasso**, NIST (1077-35-1644)
- 1:30PM *Splitting algorithms for nonconvex, matrix optimization*.  
 (2024) **Rick Chartrand**, Los Alamos National Laboratory (1077-49-2113)
- 2:00PM *Scalable Stochastic Programming for Optimization Under Uncertainty of Energy Systems*.  
 (2025) **Mihai Anitescu\***, **Cosmin Petra**, Argonne National Laboratory, **Miles Lubin**, University of Chicago, and **Victor Zavala**, Argonne National Laboratory (1077-90-1204)
- 2:30PM *Simulation-Based Optimization and Uncertainty Quantification Methods and Software at Sandia National Labs*.  
 (2026) **Patricia D. Hough**, Sandia National Laboratories (1077-68-1657)
- ▶ 3:00PM *Nonlinear Solvers in Large-Scale Computational Science: Challenges and Opportunities*.  
 (2027) **Lois Curfman McInnes**, Argonne National Laboratory (1077-35-2309)
- 3:30PM *Discrete Event Execution and Reversibility: Challenges in the Path to Asynchrony for Massively Parallel Computing*. Preliminary report.  
 (2028) **Kalyan S Perumalla**, Oak Ridge National Laboratory (1077-94-2457)
- ▶ 4:00PM *Constructing Interactive 3D Visualizations for the NIST Digital Library of Mathematical Functions*.  
 (2029) **Bonita V. Saunders**, National Institute of Standards and Technology (1077-33-1721)
- ▶ 4:30PM *Optimization-based Approaches to Singular Value and Eigenvalue Problems*.  
 (2030) **Christopher G. Baker**, Oak Ridge National Laboratory (1077-65-2066)
- 5:00PM *Scalable Methods for Characterizing and Generating Large Graphs*.  
 (2031) **Ali Pinar\***, **Seshadri Comandur** and **Tammy Kolda**, Sandia National Laboratories (1077-68-1611)
- 5:30PM *Allele specific compatibility of interactions underlying yeast DNA repair phenotypes*. Preliminary report.  
 (2032) **Yang Huang\*** and **Teresa M Przytycka**, National Center for Biotechnology Information, NLM/NIH (1077-92-2515)

**Boston, MA, Friday, January 6 – Program of the Sessions**

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6:00PM *Spreadsheets, Big Tables, and the Algebra of Associative Arrays.*  
(2033) **Jeremy Kepner**, MIT Lincoln Laboratory (1077-05-1447)

**Jane Muhich**, Carnegie Foundation

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

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1:00 PM – 4:20 PM **Room 101, Hynes**

- 1:00PM *On the Arithmetic and Geometry of Quaternion Algebras: a new spectral correspondence for Maass waveforms.*  
(2034) **Terrence R Blackman**, Medgar Evers College, CUNY (1077-11-880)
- ▶ 1:30PM *Character sums and hyperelliptic curves associated with subsets of finite fields with square order.*  
(2035) **Lois Simon**, Howard University (1077-11-1516)
- 2:00PM *Elements of Tensor Products of Ultrafilters on  $\mathbb{N}$ . Preliminary report.*  
(2036) **Vitaly Bergelson**, Ohio State University, **Neil Hindman**, Howard University, and **Kendall Williams\***, United States Military Academy (1077-22-1974)
- ▶ 2:30PM *Deriving Optimal Composite Scores: Relating Observational/Longitudinal Data with a Primary Endpoint.*  
(2037) **Rhonda D Ellis\***, Norfolk State University, and **Chris Gennings**, Virginia Commonwealth University (1077-62-2037)
- 3:00PM *Bicircular Matroids with Circuits of at Most Two Sizes.*  
(2038) **Torina Deachune Lewis\***, Bethune-Cookman University, **Talmage James Reid** and **Laura Sheppardson**, The University of Mississippi, Oxford (1077-05-2060)
- 3:30PM *Computationally Tractable Stochastic Integer Programming Models for Air Traffic Flow Management.*  
(2039) **Charles N Glover\*** and **Michael O Ball**, University of Maryland (1077-90-2182)
- 4:00PM *Mathematics You Won't Sleep on.*  
(2040) **Dennis A. Dean II**, Boston (1077-92-2576)

**MAA Committee on Two-Year Colleges Panel Discussion**

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1:00 PM – 2:20 PM **Room 304, Hynes**

*A new look at math for the non-STEM students.*  
Organizer: **Joanne Peeples**, El Paso Community College  
Moderator: **Bruce Yoshiwara**, Los Angeles Pierce College  
Panelists: **Kris Bishop**, University of Texas, Austin  
**Karon Klipple**, Carnegie Foundation

**AMS Special Session on Climate Modeling and Geophysical Fluid Dynamics, III**

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1:30 PM – 4:20 PM **Suffolk, 3rd Floor, Marriott**

- Organizers: **Qingshan Chen**, Florida State University  
**Nathan Glatt-Holtz**, Indiana University  
**Mickael Chekroun**, University of California, Los Angeles
- 1:30PM *Energy Balance Climate Models with Bio-Feedback.*  
(2041) **Georg Hetzer**, Auburn University (1077-35-734)
  - 2:00PM *Well-posedness results for a nonlinear Stokes problem arising in Glaciology.*  
(2042) **Qingshan Chen**, **Max Gunzburger** and **Mauro Perego\***, Florida State University (1077-35-2855)
  - 2:30PM *On the Global Well-posedness of a Simplified Reduced Rayleigh-Bénard Convection Model.*  
(2043) **Chongsheng Cao**, Florida international University, **Aseel Farhat\***, University of California, Irvine, and **Edriss S. Titi**, University of California, Irvine & The Weizmann Institute of Science, Israel (1077-76-1250)
  - ▶ 3:00PM *Lie group analysis - a microscope of physical and engineering sciences.*  
(2044) **Ranis N Ibragimov**, University of Texas at Brownsville (1077-35-712)
  - ▶ 3:30PM *A Generalization of Contour Advection with Surgery for Three Dimensional Flows. Preliminary report.*  
(2045) **Zachary M Harrison\*** and **Peter Derek Bradshaw**, Arizona State University (1077-VG-2061)
  - ▶ 4:00PM *A new staggering approach towards shallow water simulations. Preliminary report.*  
(2046) **Qingshan Chen\***, Los Alamos National Laboratory, **Max Gunzburger**, Florida State University, and **Todd Ringler**, Los Alamos National Laboratory (1077-65-2219)

**ASL Invited Address**

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2:15 PM – 3:05 PM **Room 207, Hynes**

(2047) *Structures associated with real closed fields and real closed exponential fields.*  
**Julia F. Knight**, University of Notre Dame (1077-03-155)

**Rocky Mountain Mathematics Consortium Board of Directors Meeting**

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2:15 PM – 4:00 PM **Exeter, 3rd Floor, Sheraton**

## Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)

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### MAA Presentations by Teaching Award Winners

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2:30 PM – 3:50 PM Room 312, Hynes

Organizers: **Barbara Faires**, Westminster College  
**Paul Zorn**, Saint Olaf College

- 2:30PM *Unexpected Adventures and Undergraduate Research.*  
► (2048) **Cindy Wyels**, CSU Channel Islands (1077-A0-2744)
- 3:00PM *Teaching, Mentoring, and Advising Undergraduate Research: Lessons Learned On the Streets.*  
► (2049) **Susan Loepf**, Williams College (1077-A0-1847)
- 3:30PM *Learning to teach and teaching to learn.*  
► (2050) Preliminary report.  
**Matthew E DeLong**, Taylor University (1077-A0-2872)

### AMS Committee on Science Policy Panel Discussion

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2:30 PM – 4:00 PM Room 208, Hynes

*The changing landscape of research funding.*

Speakers: **Subra Suresh**, National Science Foundation

### MAA/Park City Mathematics Institute Panel Discussion

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2:40 PM – 4:00 PM Room 304, Hynes

*Engaging secondary teachers in doing mathematics.*

Organizer: **Gail Burrill**, Michigan State University

Panelists: **Brian Hopkins**, St. Peters College  
**James King**, University of Washington  
**Brynja Kohler**, Utah State University  
**Roger Knobel**, University of Texas Pan American  
**Glenn Stevens**, Boston University

### ASL Invited Address

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3:15 PM – 4:05 PM Room 207, Hynes

- (2051) *Randomness and ergodic theory.*  
**Johanna N.Y. Franklin**, University of Connecticut (1077-03-153)

### MAA Session on the History of Mathematics and Its Uses in the Classroom, I

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3:20 PM – 5:35 PM Room 202, Hynes

Organizer: **Amy Shell-Gellasch**, Beloit College

- 3:20PM *Newton Estimates the Natural Logarithm of 2: A History Lesson for Calculus II.*  
► (2052) Preliminary report.  
**Martin E. Flashman**, Humboldt State University (1077-E1-707)
- 3:40PM *Torricelli and Robinson play Gabriel's Trumpet.*  
► (2053) Preliminary report.  
**Maureen T. Carroll\***, **Steven Dougherty**, University of Scranton, and **David Perkins**, Luzerne County Community College (1077-E1-2390)
- 4:00PM *Bringing Sixteenth Century Mathematics into the Twenty-First Century Calculus Classroom.*  
► (2054) Preliminary report.  
**Duane K Farnsworth**, Clarion University of Pennsylvania (1077-E1-2668)
- 4:20PM *Google Books and the Long Tail of Mathematics.*  
► (2055) **Scott B. Guthery**, Docent Press (1077-E1-1174)
- 4:40PM *Astronomical Instruments Between Theory and Practice.*  
► (2056) **Toke L Knudsen**, SUNY Oneonta (1077-E1-592)
- 5:00PM *Euler's "Letters to a German Princess": Translation and Betrayal.*  
► (2057) **Dominic W Klyve**, Central Washington University (1077-E1-2271)
- 5:20PM *James Hamblin Smith's Euclid.*  
► (2058) **Charles F. Rocca**, Western Connecticut State University (1077-E1-2935)

### MAA Minicourse #5: Part B

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3:30 PM – 5:30 PM Salon AB, 4th Floor, Marriott

*Dance and mathematics.*

Presenters: **Leon Harkleroad**, Bowdoin College  
**Karl Schaffer**, De Anza College

### MAA Minicourse #12: Part B

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3:30 PM – 5:30 PM Salon HI, 4th Floor, Marriott

*Using randomization methods to build conceptual understanding of statistical inference.*

Presenters: **Robin Lock**, St. Lawrence University  
**Patti Frazer Lock**, St. Lawrence University  
**Kari F. Lock**, Harvard University/Duke University  
**Eric F. Lock**, University of North Carolina  
**Dennis F. Lock**, Iowa State University



*Boston, MA, Friday, January 6 – Program of the Sessions*

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**MAA Undergraduate Poster Session**

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3:30 PM – 5:30 PM                      **Veteran's Auditorium,  
2nd floor, Hynes**

Organizer: **Joyati Debnath**, Winona  
State University

**ASL Contributed Paper Session, I**

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4:15 PM – 6:15 PM                      **Room 207, Hynes**

4:15PM *Martin's Maximum and Tower Forcing.*  
(2059) **Sean Cox**, Universität Münster

4:40PM *Approximable functions and strong  
reducibilities.*

**Jennifer Chubb Reimann\***, University of  
San Francisco/Pennsylvania State  
University, and **Russell Miller**, Queens  
College and the Graduate Center, City  
University of New York

5:05PM *Reverse mathematics and dichotomy.*  
(2061) **Jeffrey Hirst\***, François Dorais and **Paul  
Shafer**, Appalachian State University

5:30PM *Complexity in the degrees of unsolvability  
of mass problems.*

**Paul Shafer**, Appalachian State University

5:55PM *The distance function on a computable  
graph.*

**Wesley Calvert\***, Southern Illinois  
University, **Jennifer Chubb**, Penn State  
University, and **Russell Miller**, Queens  
College and the Graduate Center, City  
University of New York

**AMS-MAA-SIAM Special Event**

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4:30 PM – 6:00 PM                      **Room 208, Hynes**

*Forum for community input on the  
proposed NSF Division of Mathematical  
Sciences name change.*

**AMS Congressional Fellowship Session**

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4:30 PM – 6:30 PM                      **Republic Ballroom  
A, 2nd Floor, Sheraton**

Organizer: **Samuel M. Rankin III**,  
American Mathematical  
Society

**SIGMAA on Mathematics Instruction Using  
the Web Business Meeting, Reception, and  
Guest Lecture**

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5:00 PM – 6:15 PM                      **Room 304, Hynes**

5:30PM *Examples of how mobile/Web  
technologies can impact how, when,  
where, what, and why students learn.*

**Frank Wattenberg**, U. S. Military  
Academy (1077-A0-49)

**SIGMAA on Quantitative Literacy Business  
Meeting**

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5:00 PM – 6:00 PM                      **Room 309, Hynes**

**MAA Actuarial Science Panel Discussion**

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5:00 PM – 7:00 PM                      **Room 306, Hynes**

*Actuarial Science: Career milestones and  
choices.*

Organizers: **Patrick Brewer**, Lebanon  
Valley College

**Robert Buck**, Slippery Rock  
University

**Bettye Anne Case**, Florida  
State University

**Kevin Charlwood**,  
Washburn University

**Steve Paris**, Florida State  
University

Moderators: **Bettye Anne Case**  
**Robert Buck**

**MAA Special Presentation: Poetry Reading**

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5:00 PM – 7:00 PM                      **Room 302, Hynes**

*All mathematical poets and those  
interested in mathematical poetry are  
invited.*

Organizers: **JoAnne Growney**, Silver  
Spring, Maryland

**Mark Huber**, Claremont  
McKenna College

**Gizem Karaali**, Pomona  
College

**Reception in Honor of Retiring MAA  
Executive Director Tina Straley**

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5:00 PM – 6:30 PM                      **Room 313, Hynes**

**SIGMAA on Mathematical and Computational  
Biology Business Meeting and Guest Lecture**

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6:00 PM – 7:45 PM                      **Room 202, Hynes**

6:00PM Reception and business meeting.

7:00PM *Epidemiology of influenza strains:  
(2065) Competition, prediction, and associated  
mortality.*

**Edward Goldstein**, Harvard School of  
Public Health (1077-A0-46)

**MAA Dramatic Presentation**

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6:00 PM – 7:00 PM                      **Room 312, Hynes**

*Mathematically Bent Theater.*

Presenter: **Colin Adams**,  
Möbiusbandaid Theater  
Company

**AMS Mathematical Reviews Reception**

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6:00 PM – 7:00 PM                      **Liberty Ballroom  
BC, 2nd Floor, Sheraton**

## Program of the Sessions – Boston, MA, Friday, January 6 (cont'd.)

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### NAM Cox-Talbot Address

7:30 PM – 8:15 PM                      **Constitution Ballroom  
B, 2nd Floor, Sheraton**

- (2066) *Creating Mathematical Scientists Among the Underrepresented.*  
**Sylvia T Bozeman**, Spelman College  
(1077-00-434)

### MAA-Project NExT Reception

8:30 PM – 10:00 PM                      **Back Bay Ballroom  
D, 2nd Floor, Sheraton**

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

Organizers: **Judith Covington**, Louisiana State University, Shreveport

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

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

**P. Gavin LaRose**, University  
of Michigan

8:30AM (2068) *A Survey of the Feasibility of Similarity Measures for use in Rigid Registration.*  
**John A.W.B. Costanzo\*** and **Nathan D. Cahill**, Rochester Institute of Technology  
(1077-65-2775)

9:00AM (2069) ► *Identification of Certain Parameters in Fourth Order Boundary Value Problems.*  
**Andrew N Zemke\*** and **Akhtar Khan**, Rochester Institute of Technology  
(1077-65-1405)

9:30AM (2070) ► *Differences of multiple Fibonacci numbers.*  
**Hannah Alpert**, MIT (1077-11-1733)

10:00AM (2071) ► *A Tropical Proof of the Brill-Noether Theorem.*  
**Filip Cools**, Katholieke Universiteit Leuven, **Jan Draisma**, Technische Universiteit Eindhoven, **Sam Payne**, Yale University, and **Elina Robeva\***, Harvard University (1077-05-2803)

10:30AM (2072) ► *Gromov's knot distortion.*  
**John V Pardon**, Stanford University  
(1077-53-2900)

## Saturday, January 7

### MAA Minority Chairs Breakfast

7:00 AM – 10:00 AM                      **Regis, 3rd Floor, Marriott**

### Joint Meetings Registration

7:30 AM – 2:00 PM                      **2nd Floor Corridor,  
opposite Hall C, Hynes**

### AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates and Students in Post-Baccalaureate Programs, III

8:00 AM – 10:50 AM                      **Back Bay Ballroom  
A, 2nd Floor, Sheraton**

Organizers: **Bernard Brooks**, Rochester Institute of Technology

**Jobby Jacob**, Rochester Institute of Technology

**Jacqueline Jensen**, Sam Houston State University

**Darren A Narayan**, Rochester Institute of Technology

- 8:00AM (2067) ► *Geometry of Surfaces with Density.*  
**Miguel A. Fernandez\***, Truman State University, **Ping Ngai Chung**, MIT, **Niralee K. Shah**, Williams College, and **Luis A. Sordo Vieira**, Wayne State University (1077-51-1580)

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

8:00 AM – 10:50 AM                      **Constitution Ballroom  
A, 2nd Floor, Sheraton**

Organizers: **William Barker**, Bowdoin College

**William McCallum**,  
University of Arizona

**Bonnie Saunders**, University  
of Illinois at Chicago

8:00AM (2073) ► *Math Anxiety: From Teacher to Student.*  
**Sian L. Beilock**, Chicago, IL  
(1077-97-762)

8:30AM (2074) ► *Gender Differences in Mathematics: Facts from Recent Data.*  
**Janet E. Mertz\***, University of Wisconsin – Madison, and **Jonathan M. Kane**, University of Wisconsin – Whitewater  
(1077-97-1282)

9:00AM (2075) ► *Girls' Angle: A Math Club for Girls.*  
**C. Kenneth Fan**, Girls' Angle  
(1077-97-1095)

9:30AM (2076) ► *Progress and Persistent Barriers for Women in Advanced Mathematics.*  
**Patricia Hale**, Cal Poly Pomona  
(1077-97-1688)

10:00AM (2077) ► *Is STEM Still Just a Man's World? Awards and Prizes for Research in Disciplinary Societies Go Mainly to Men, Despite Growth in Women's Participation.*  
**Alice B. Popejoy\*** and **Phoebe S. Leboy**, Association for Women in Science (AWIS)  
(1077-00-1439)

*Boston, MA, Saturday, January 7 – Program of the Sessions*

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- 10:30AM Discussion: *Participation of Girls and Women in Mathematics*. Preliminary report.  
 ► (2078) **Cathy Kessel\***, Berkeley, CA, **Bonnie Saunders**, University of Illinois at Chicago, **Maura Mast**, University of Massachusetts Boston, and **Tanya Leise**, Amherst College (1077-97-2493)

**AMS-SIAM Special Session on the Mathematics of Computation: Algebra and Number Theory, III**

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8:00 AM – 10:50 AM Room 109, Hynes

Organizers: **Jean-Marc Couveignes**, Université de Toulouse  
**Michael J. Mosinghoff**, Davidson College  
**Igor E. Shparlinski**, Macquarie University, Australia

- 8:00AM *Interesting families of algebraic curves*.  
 (2079) **T. Shaska\***, Oakland University, **L. Beshaj** and **V. Hoxha**, Research Institute of Science and Technology (1077-14-175)
- 8:30AM *An Application of Quasi-Inverse Rings*.  
 ► (2080) **Harlan Kadish**, Texas A&M University (1077-13-409)
- 9:00AM *Lattice Cryptography and Pseudorandomness*.  
 (2081) **Daniele Micciancio**, UCSD (1077-68-2091)
- 9:30AM *The Entropic Discriminant*.  
 (2082) **Raman Sanyal**, Freie Universität Berlin, **Bernd Sturmfels\***, UC Berkeley, and **Cynthia Vinzant**, University of Michigan (1077-14-35)
- 10:00AM *On the computation of Galois Belyi maps*.  
 (2083) **John Voight**, University of Vermont (1077-11-177)
- 10:30AM *Number Fields Unramified Away From 2*.  
 (2084) **John W Jones**, Arizona State University (1077-11-182)

**AMS Special Session on Algebraic and Geometric Aspects of Integrable Systems and Random Matrices, III**

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8:00 AM – 10:40 AM Constitution Ballroom B, 2nd Floor, Sheraton

Organizers: **Anton Dzhamay**, University of Northern Colorado  
**Kenichi Maruno**, University of Texas, Pan American  
**Virgil Pierce**, University of Texas, Pan American

- 8:00AM *Integrable  $n$ -field model on a triangular domain*.  
 (2085) **Maxim Zyskin**, University of Texas, Brownsville (1077-35-2599)

- 8:30AM *Bilinearization of the Degasperis-Procesi equation*.  
 (2086)

**Baofeng Feng\***, **Kenichi Maruno**, The University of Texas-Pan American, and **Yasuhiro Ohta**, Kobe University (1077-35-2568)

- 9:00AM *Coupled Maxwell-Bloch equations with inhomogeneous broadening for a 3-level system*. Preliminary report.  
 (2087)

**Mark J. Ablowitz**, CU Boulder, **Sarbarish Chakravarty**, Univ of Colorado at Colorado Springs, and **Barbara Prinari\***, Univ of Colorado at Colorado Springs and Dept of Physics - Univ of Salento (Italy) (1077-35-1110)

- 9:30AM *On the Q4-elliptic Painleve equation and rational elliptic surfaces*.  
 (2088)

**Adrian Stefan Carstea**, Institute of Physics and Nuclear Engineering, P.O.Box, MG-6, Magurele, Bucharest, Romania (1077-39-1070)

- 10:00AM *Calogero-Moser curves and the geometry of the moduli space of curves*.  
 (2089)

**Samuel Grushevsky**, Stony Brook University (1077-14-654)

**AMS Special Session on Arithmetic Geometry, III**

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8:00 AM – 10:50 AM Room 204, Hynes

Organizers: **Bo-Hae Im**, Chung-Ang University, South Korea  
**Jennifer Johnson-Leung**, University of Idaho  
**Jennifer Paulhus**, Grinnell College

- 8:00AM *Simple Cubic Function Fields*.  
 (2090) **Pieter Rozenhart**, University of Calgary, and **Jonathan Webster\***, Bates College (1077-11-1566)

- 8:30AM *Conjugacy classes in  $GSp_4$  and an application to the enumeration of abelian surfaces*. Preliminary report.  
 (2091) **Cassie L Williams**, Colorado State University (1077-11-216)

- 9:00AM *Cyclic  $p$ -Extensions of  $\mathbb{Z}_p$ -Fields*.  
 (2092) **Jordan Schettler**, University of Arizona (1077-11-1059)

- 9:30AM *Arithmetic Torelli maps for cubic surfaces and threefolds*. Preliminary report.  
 (2093) **Jeffrey D Achter**, Colorado State University (1077-14-1246)

- 10:00AM *Rigid cohomology for algebraic stacks*.  
 (2094) **David Zureick-Brown**, Emory University (1077-11-1861)

- 10:30AM *Far beyond Newton polygons*.  
 (2095) **Joseph Rabinoff**, Harvard University (1077-14-1858)

Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)

**AMS Special Session on Control of Biological and Physical Systems, I**

8:00 AM – 10:50 AM Simmons, 3rd Floor, Marriott

Organizers: **Wandi Ding**, Middle Tennessee State University  
**Volodymyr Hryniv**, University of Houston-Downtown  
**Suzanne Lenhart**, University of Tennessee, Knoxville, and NIMBioS

- 8:00AM **▶** (2096) *Reducing HIV Epidemic by Education and Treating it Using Optimal Control.* Preliminary report.  
**Hem Raj Joshi**, Xavier University, Cincinnati, OH (1077-49-2824)
- 8:30AM (2097) *Bang-bang Optimal Control of Continuous Time Species Augmentation.*  
**Erin N Bodine\***, Rhodes College, and **Suzanne Lenhart**, University of Tennessee, Knoxville (1077-92-1716)
- 9:00AM (2098) *Long time behavior of Flow-Structure interactions arising in modeling of subsonic and supersonic flows of gas.* Preliminary report.  
**Irena M. Lasiecka\*** and **Justin Webster**, University of Virginia (1077-35-664)
- 9:30AM (2099) *Linear and non-linear boundary stabilization in  $L_2 \times H^{-1}$  of the system of dynamic elasticity with Dirichlet Boundary dissipation: a direct approach.* Preliminary report.  
**Jing Zhang\*** and **Roberto Triggiani**, University of Virginia (1077-35-697)
- 10:00AM **▶** (2100) *A Local Approach for an Inverse Problem on a Semi-Axis.*  
**John V Matthews\*** and **Boris Belinskiy**, University of Tennessee at Chattanooga (1077-35-826)
- 10:30AM (2101) *Determining Physical Parameters for a Neuronal Cable Model Defined on a Tree Graph.*  
**Sergei Avdonin\***, University of Alaska Fairbanks, and **Jonathan Bell**, UMBC (1077-35-1808)

**AMS Special Session on Fractal Geometry in Pure and Applied Mathematics (in memory of Benoit Mandelbrot), IV**

8:00 AM – 10:50 AM Room 200, Hynes

Organizers: **Michael L. Lapidus**, University of California, Riverside  
**Erin Pearse**, University of Oklahoma  
**Machiel van Frankenhuijsen**, Utah Valley University

- 8:00AM (2102) *Intersection property of fractals via Schmidt games.*  
**Ryan Broderick**, **Lior Fishman**, **Dmitry Kleinbock\***, **Asaf Reich**, Brandeis University, and **Barak Weiss**, Ben Gurion University (1077-11-1050)
- 8:30AM (2103) *Hitting Probabilities and Packing Dimensions of the Random Covering Sets.* Preliminary report.  
**Bing Li**, South China University of Technology, **Narn-Rueih Shieh**, National Taiwan University, and **Yimin Xiao\***, Michigan State University (1077-60-1556)
- 9:00AM **▶** (2104) *Lipschitz Equivalence of Cantor Sets.*  
**Yang Wang**, Michigan State University (1077-26-2606)
- 9:30AM (2105) *Exponential spectra in  $L^2(\mu)$ .* Preliminary report.  
**Xing-Gang He**, Central China Normal University, **Chun-Kit Lai** and **Ka-Sing Lau\***, The Chinese University of Hong Kong (1077-46-1750)
- 10:00AM **▶** (2106) *Fractals and hyperbolicity.* Preliminary report.  
**Vadim Kaimanovich**, University of Ottawa (1077-37-2630)
- 10:30AM (2107) *Self-similar fractals as boundaries of networks.*  
**Erin P.J. Pearse**, University of Oklahoma (1077-60-2960)

**AMS Special Session on Frontiers in Geomathematics, III**

8:00 AM – 10:50 AM Suffolk, 3rd Floor, Marriott

Organizers: **Willi Freeden**, University of Kaiserslautern  
**Volker Michel**, University of Siegen  
**M. Zuhair Nashed**, University of Central Florida  
**Thomas Sonar**, Technical University of Braunschweig

- 8:00AM (2108) *Multiscale simulations for Richards' equation in high-contrast media and applications.*  
**Yalchin Efendiev**, **Juan Galvis**, **Seul ki Kang\*** and **Raytcho Lazarov**, Texas A&M University (1077-65-1770)
- 8:30AM (2109) *Stress field simulations in geothermal reservoirs.* Preliminary report.  
**Matthias Augustin**, University of Kaiserslautern (1077-74-1305)
- 9:00AM (2110) *Recent trends in Multi-parameter Regularization.*  
**Sergei Pereverzev**, Johann Radon Institute, Austrian Academy of Sciences (1077-65-1506)
- 10:00AM (2111) *Methods for the treatment of indirect noisy data.*  
**Bernd Hofmann**, Chemnitz University of Technology, Germany (1077-65-1314)

*Boston, MA, Saturday, January 7 – Program of the Sessions*

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10:30AM (2112) *Maximum likelihood regularization of some inverse problems.* Preliminary report.  
**Paul P. B. Eggermont**, Food and Resource Economics, University of Delaware (1077-86-2173)

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

8:00 AM – 10:50 AM **Provincetown,  
4th Floor, Marriott**

Organizers: **Mark Behrens**, Massachusetts Institute of Technology  
**Mark W. Johnson**, Pennsylvania State University, Altoona  
**Haynes R. Miller**, Massachusetts Institute of Technology  
**James Turner**, Calvin College  
**Donald Yau**, Ohio State University

8:00AM (2113) *Model structures for higher categories.*  
**Ricardo Andrade**, Stanford University (1077-55-1745)

8:30AM (2114) *Dendroidal sets and symmetric monoidal infinity categories.* Preliminary report.  
**Samuel Baruch Isaacson**, The University of Texas at Austin (1077-55-2269)

9:00AM (2115) *Categories of Modules and their Deformations.*  
**Romie Banerjee**, Tata Institute of Fundamental Research (1077-18-1908)

9:30AM (2116) *Weak  $n$ -categories are sheaves on  $d \leq n$ -manifolds.* Preliminary report.  
**David Hector Ayala**, Harvard University (1077-55-1274)

10:00AM (2117) *Manifolds, Higher Categories and Topological Field Theories.*  
**Nick Rozenblyum**, Northwestern University (1077-55-1490)

10:30AM (2118) *On the uniqueness of the homotopy theory of higher categories.*  
**Christopher J. Schommer-Pries**, Massachusetts Institute of Technology (1077-55-1982)

**AMS Special Session on Mathematical Theory of Control of Quantum Systems, I**

8:00 AM – 10:50 AM **Clarendon,  
3rd Floor, Marriott**

Organizers: **Francesca Albertini**, University of Padua  
**Domenico D'Alessandro**, Iowa State University  
**Raffaele Romano**, University of Trieste  
**Francesco Ticozzi**, University of Padua

▶ 8:00AM (2119) *Quantum Circuits at Nash Equilibrium.*  
**Faisal Shah Khan\*** and **Simon J. D. Phoenix**, Khalifa University (1077-81-745)

8:30AM (2120) *Engineering Pointer States in Open Quantum Systems.*  
**Lorenza Viola**, Dartmouth College (1077-93-1544)

9:00AM (2121) *Encoded weak quantum Zeno effect for quantum computation and control.*  
**Gerardo A. Paz-Silva**, University of Southern California, **Ali T. Rezakhani**, Sharif University of Technology, Tehran, **Jason M. Dominy\*** and **Daniel A. Lidar**, University of Southern California (1077-93-2078)

9:30AM (2122) *Stabilization of stochastic quantum dynamics via open and closed loop control.*  
**Francesco Ticozzi**, University of Padova and Dartmouth College (1077-93-619)

10:00AM (2123) *Real-time feedback control of a mesoscopic superposition.*  
**Kurt Jacobs\***, **Justin Finn** and **Sai Vinjanampathy**, University of Massachusetts at Boston (1077-00-270)

10:30AM (2124) *Convergence of quantum random walks with decoherence.*  
**Sheng Xiong\***, Edward Waters College, **Shimao Fan**, Temple University, **Zhiyong Feng**, Philadelphia, PA, and **Wei-Shih Yang**, Temple University (1077-81-1273)

**AMS Special Session on Matrices and Graphs, I**

8:00 AM – 10:50 AM **Berkeley, 3rd Floor, Marriott**

Organizers: **Leslie Hogben**, Iowa State University and American Institute of Mathematics  
**Bryan L. Shader**, University of Wyoming

8:00AM (2125) *Zero Forcing Number and Maximum Nullity of Subdivided Graphs.*  
**Michael Young\***, **Leslie Hogben**, Iowa State University, **My Huynh**, Arizona State University, **Kirill Lazebnik**, State University of New York at Geneseo, **Anna Cepek**, Bethany Lutheran College, **Travis Peters**, Iowa State University, and **Minerva Catral**, Xavier University (1077-05-1837)

▶ 8:30AM (2126) *The Inverse Inertia Problem for Graphs.*  
**Wayne Barrett**, Provo (1077-15-2757)

▶ 9:00AM (2127) *Computing inertia sets of graphs using variations of zero forcing.* Preliminary report.  
**Jason Grout\***, Drake University, **Steve Butler**, Iowa State University, and **Tracy Hall**, Provo, UT (1077-05-2621)

9:30AM (2128) *Refined Inertia of Sign Pattern Matrices.* Preliminary report.  
**Pauline van den Driessche**, University of Victoria, B.C., Canada (1077-15-908)

**Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)**

- 10:00AM *The minimum semidefinite rank of the Heawood graph is 10.*  
(2129) **Louis Deaett**, Quinnipiac University (1077-15-2809)
- 10:30AM *Unordered multiplicity lists of a class of binary trees.*  
(2130) **In-Jae Kim\***, Minnesota State University, Mankato, and **Bryan L Shader**, University of Wyoming (1077-15-496)

- 10:00AM *Quantum Caldero-Chapoton Type Cluster Characters.*  
(2139) **Dylan Charles Rupel**, University of Oregon (1077-81-2525)
- 10:30AM *Proof of a positivity conjecture by M. Kontsevich.*  
(2140) **Kyungyong Lee\***, Wayne State University, and **Ralf Schiffler**, University of Connecticut (1077-05-1477)

**AMS Special Session on My Favorite Graph Theory Conjectures, I**

8:00 AM – 10:50 AM Room 102, Hynes

Organizers: **Raluca Gera**, Naval Postgraduate School  
**Craig Larson**, Virginia Commonwealth University

- 8:00AM *On the nature of mathematical conjecture.*  
▶ (2131) **Neil Robertson**, Ohio State University, Columbus, and King Abdulaziz University, Jeddah, Saudi Arabia (1077-05-2361)
- 8:30AM *Powers of Strong Digraphs.*  
▶ (2132) **Ping Zhang**, Western Michigan University (1077-05-1217)
- 9:00AM *My Favorite Graph Coloring and Domination Conjectures.*  
(2133) **Stephen T. Hedetniemi**, Clemson University (1077-05-1740)
- 9:30AM *The  $\Delta^2$  Conjecture for Graph Labellings with Separation Conditions.*  
▶ (2134) **Jerrold R. Griggs**, University of South Carolina (1077-05-1128)
- 10:00AM *Two Conjectures Involving Diameter and Total Domination in Graphs.*  
(2135) **Teresa W. Haynes**, East Tennessee State University (1077-05-2226)
- 10:30AM *Some History on the Reconstruction Conjecture.* Preliminary report.  
▶ (2136) **Allen J. Schwenk**, Western Michigan University (1077-05-2021)

**AMS Special Session on Noncommutative Birational Geometry and Cluster Algebras, II**

8:00 AM – 10:50 AM Dartmouth, 3rd Floor, Marriott

Organizers: **Arkady Berenstein**, University of Oregon  
**Vladimir Retakh**, Rutgers University

- 8:00AM *Triangular bases in acyclic quantum cluster algebras.* Preliminary report.  
(2137) **Andrei Zelevinsky**, Northeastern University (1077-13-1577)
- 9:00AM *Cluster structures on quantum coordinate ring.* Preliminary report.  
(2138) **Christof Geiss\***, Universidad Nacional Autonoma de Mexico, **Bernard Leclerc**, Universite de Caen, and **Jan Schroeer**, University of Bonn (1077-16-2239)

**AMS Special Session on Operator Theory on Analytic Function Spaces, I**

8:00 AM – 10:50 AM Room 108, Hynes

Organizers: **Robert F. Allen**, University of Wisconsin, La Crosse  
**Katherine C. Heller**, North Central College  
**Matthew A. Pons**, North Central College

- 8:00AM *Compact differences of composition operators in several variables.*  
(2141) **Katherine Heller**, North Central College, **Barbara D. MacCluer\***, University of Virginia, and **Rachel J. Weir**, Allegheny College (1077-47-1359)
- 8:30AM *Commutators of composition operators with adjoints of composition operators on weighted Bergman spaces.*  
(2142) **Sivaram K. Narayan**, Central Michigan University (1077-47-380)
- 9:00AM *Closed-Range Composition Operators on Dirichlet type spaces.* Preliminary report.  
(2143) **Maria Tjani**, University of Arkansas (1077-47-2314)
- 9:30AM *Boundedness and compactness of composition operators on Segal-Bargmann spaces.* Preliminary report.  
(2144) **Trieu L. Le**, University of Toledo (1077-47-2190)
- 10:00AM *Weighted reproducing kernels and the Bergman space.*  
(2145) **Brent J Carswell** and **Rachel J Weir\***, Allegheny College (1077-30-328)
- 10:30AM *Norm of the multiplication operators from  $H^\infty$  to the Bloch Space of a bounded symmetric domain.*  
(2146) **Flavia Colonna\***, George Mason University, **Glenn R. Easley**, System Planning Corporation, Arlington, Virginia, and **David Singman**, George Mason University (1077-47-1313)

**AMS Special Session on Radon Transforms and Geometric Analysis (in honor of Sigurdur Helgason's 85th birthday), III**

8:00 AM – 10:40 AM Room 104, Hynes

Organizers: **Jens Christensen**, University of Maryland  
**Fulton Gonzalez**, Tufts University

- Todd Quinto**, Tufts University
- 8:00AM (2147) *Splines for Radon transform on compact Lie groups with application to  $SO(3)$ .*  
**Swanhild Bernstein, Svend Ebert**, TU Bergakademie Freiberg, Institute of Applied Analysis, and **Isaac Z. Pesenson\***, Temple University (1077-58-1102)
- 8:30AM (2148) *Schrodinger equation on certain compact symmetric spaces.*  
**Tomoyuki Kakehi**, Okayama University (1077-58-1528)
- 9:00AM (2149) *Counting lattice points on homogeneous spaces.*  
**Henrik Schlichtkrull**, University of Copenhagen (1077-22-1929)
- 10:00AM (2150) *Special geometries arising from some special symmetric spaces.* Preliminary report.  
**Robert J. Stanton\***, Ohio State Univ., and **Marcus J. Slupinski**, Univ. Strasbourg (1077-22-2459)

**AMS Special Session on Reaction Diffusion Equations and Applications, II**

8:00 AM – 10:50 AM Wellesley, 3rd Floor, Marriott

- Organizers: **Jerome Goddard II**, Auburn University Montgomery  
**Junping Shi**, College of William and Mary  
**Ratnasingham Shivaji**, University of North Carolina Greensboro
- 8:00AM (2151) *Existence of Positive Solutions For a Class of Semipositone Systems with Exponential Growth in  $R^2$ .*  
**Maya Chhetri\***, UNC Greensboro, and **Petr Girg**, University of West Bohemia, Czech Republic (1077-35-2243)
- 8:30AM (2152) *Pattern Formation For Reaction Diffusion Systems On Arbitrary Surfaces.*  
**Necibe Tuncer**, University of Tulsa (1077-35-1927)
- 9:00AM (2153) *Two-Species Competition Model with Nonlocal Dispersal.*  
**Georg Hetzer\***, Auburn University, **Tung Nguyen**, University of Illinois Springfield, and **Wenxian Shen**, Auburn University (1077-35-733)
- 9:30AM (2154) *Eigenvalue-curves and nonlinear boundary conditions for nonlinear elliptic equations.*  
**N. Mavinga**, Swarthmore College, and **M. N. Nkashama\***, University of Alabama at Birmingham (1077-35-2255)
- 10:00AM (2155) *On the Variational Characterization of the Fucik Spectrum.* Preliminary report.  
**Stephen Robinson\***, Wake Forest University, and **Pavel Drabek**, University of West Bohemia, Plzen, Czech. Rep. (1077-35-940)

- 10:30AM (2156) *Population models with diffusion, strong Allee effect, and nonlinear boundary conditions.*  
**Jerome Goddard II\***, Auburn University Montgomery, **E. Lee**, Pusan National University, and **R. Shivaji**, University of North Carolina Greensboro (1077-35-420)

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

8:00 AM – 10:50 AM Arlington, 3rd Floor, Marriott

- Organizers: **Sophia R. Jang**, Texas Tech University  
**Andrew L. Nevai**, University of Central Florida  
**Lih-Ing W. Roeger**, Texas Tech University
- 8:00AM (2157) *A Refuge-mediated Apparent Competition Model.*  
**Lih-Ing Wu Roeger\***, Texas Tech University, and **Sze-Bi Hsu**, National Tsing Hua University, Taiwan (1077-92-1257)
- 8:30AM (2158) *Qualitative Assessment of the Roles of an Imperfect Vaccine and Pap Cytology Screening on the Transmission Dynamics of Human Papillomavirus.*  
**M. T. Malik\***, Departments of Mathematics and Community Health Sciences, University of Manitoba, **J. Reimer**, Mathematical Institute, University of Oxford, Oxford, UK, **A. B. Gumel**, University of Manitoba, **E H Elbasha**, Merck Research Laboratories, North Wales, PA, USA, and **S. M. Mahmud**, Winnipeg Regional Health Authority, Winnipeg, Manitoba (1077-92-332)
- 9:00AM (2159) *Dispersal in heterogeneous landscape.*  
**Yuan Lou**, Ohio State University (1077-92-497)
- 9:30AM (2160) *Species abundance distributions in a stochastic niche model.*  
**Rosalyn C Rael\***, Pacific Ecoinformatics and Computational Ecology Lab, **Annette Ostling**, University of Michigan, **Trevor Bedford**, University of Edinburgh, and **Rafael D'Andrea**, University of Michigan (1077-92-2845)
- 10:00AM (2161) *Climate-driven dynamics of seasonal influenza in the tropical regions.* Preliminary report.  
**Maria C.A. Leite\***, University of Toledo, **Xiangming Xiao**, Department of Botany and Microbiology, University of Oklahoma, and **Meijun Zhu**, University of Oklahoma (1077-34-603)

**Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)**

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10:30AM (2162) *Persistence and Competitive Exclusion for a Nonautonomous Multi-Strain SIR Epidemic Model with Nonlinear Host Mortality.* Preliminary report.  
**Azmy S. Ackleh\*** and **Paul Salceanu**, University of Louisiana at Lafayette (1077-92-1269)

**AMS Special Session on Tensor Categories and Representation Theory, I**

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8:00 AM – 10:50 AM Room 103, Hynes

Organizers: **Deepak Naidu**, Northern Illinois University  
**Dmitri Nikshych**, University of New Hampshire

▶ 8:00AM (2163) *On the algebra of a class of finite-dimensional objects which accounts for some invariants of 1-1 tangles, knots, and links.* Preliminary report.  
**David E. Radford**, University of Illinois at Chicago (1077-16-1188)

8:30AM (2164) *3-Dimensional Topology and Finite Tensor Categories.*  
**Noah Snyder\***, Columbia University, **Christopher Douglas**, Oxford University, and **Christopher Schommer-Pries**, MIT (1077-17-390)

9:00AM (2165) *On an equivalence of categories of relative Yetter-Drinfeld modules.*  
**Istvan Heckenberger**, Philipps University Marburg (1077-81-984)

9:30AM (2166) *Ideals in Deligne's  $\text{Rep}(GL_\delta)$ .*  
**Jonny Comes**, Lewis and Clark College (1077-18-1607)

10:00AM (2167) *Forms of tensor categories over arbitrary fields.*  
**Pavel Etingof\***, MIT, and **Shlomo Gelaki**, Technion (1077-18-447)

10:30AM (2168) *On Symmetric Tensor Categories.*  
**Shlomo Gelaki**, Technion - I.I.T, Haifa, Israel (1077-16-1326)

**AMS Special Session on Theory and Applications of Stochastic Differential and Partial Differential Equations, II**

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8:00 AM – 9:50 AM Room 107, Hynes

Organizers: **Edward Allen**, Texas Tech University  
**Mahmoud Anabtawi**, American University of Sharjah  
**Armando Arciniega**, University of Texas at San Antonio  
**Gangaram S. Ladde**, University of South Florida  
**Sivapragasam Sathanathan**, Tennessee State University

8:00AM (2169) *Static and Dynamic Features of Liquid Crystal Films.*  
**Lei Z. Cheng**, Purdue University (1077-35-938)

8:30AM (2170) *Derivation of system of SDEs for simple phylogenetic tree.*  
**Ummugul Bulut\*** and **Edward Allen**, Texas Tech University (1077-92-2189)

9:00AM (2171) *Existence of solutions for financial models with transaction costs and stochastic volatility.*  
**Indranil SenGupta**, University of Texas-El Paso (1077-35-170)

9:30AM (2172) *Shooting Methods for Numerical Solution of Linear and Nonlinear Stochastic Boundary Value Problems.*  
**Armando Arciniega\***, The University of Texas at San Antonio, and **Edward Allen**, Texas Tech University (1077-60-1842)

**AMS Special Session on Uniformly and Partially Hyperbolic Dynamical Systems, III**

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8:00 AM – 10:40 AM Fairfield, 3rd Floor, Marriott

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

8:00AM (2173) *Invariant Sets of Hyperbolic Toral Automorphisms.*  
**Skylar C Simmons**, Brigham Young University (1077-37-1330)

8:30AM (2174) *Anosov diffeomorphisms constructed from  $\pi_k(\text{Diff}(\mathbb{S}^n))$ .*  
**Tom Farrell** and **Andrey Gogolev\***, SUNY Binghamton (1077-37-944)

9:00AM (2175) *Local rigidity for Anosov automorphisms.*  
**Andrey Gogolev**, Binghamton University, **Boris Kalinin\*** and **Victoria Sadovskaya**, University of South Alabama (1077-37-1189)

9:30AM (2176) *Cohomology of  $GL(2, \mathbb{R})$ -valued cocycles over hyperbolic systems.*  
**Victoria Sadovskaya**, University of South Alabama (1077-37-1258)

10:00AM (2177) *Actions of higher rank abelian groups: from measure rigidity to arithmeticity to topology.*  
**Anatole Katok**, Pennsylvania State University (1077-37-2555)

**AMS Session on Associative and Nonassociative Algebras and Rings: Homological Algebras and Category Theory, II**

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8:00 AM – 10:10 AM Room 308, Hynes

8:00AM (2178) *Cartan Type Lie Superalgebra  $\tilde{S}(n)$  over a Field of Positive Characteristic.*  
**Qiang Mu**, Harbin Normal University, China (1077-17-1576)



- 8:15AM (2179) *Equivalent Condition of Primitivity for Semifields.*  
**linlin Chen\*** and **Minerva Cordero**, University of Texas at Arlington (1077-17-1432)
- 8:30AM (2180) *Equivalence Classes of Subquotients of Pseudodifferential Operator Modules on the Line.* Preliminary report.  
**Jeannette Mun Larsen**, University of North Texas (1077-17-1762)
- 8:45AM (2181) *Maximal weights and multiplicities of certain  $\hat{sl}(n)$ -modules.*  
**Rebecca L. Jayne\***, Washington College, and **Kailash C. Misra**, North Carolina State University (1077-17-63)
- 9:00AM (2182) *Ring maps, derived categories, and the Bousfield Lattice.*  
**Luke Wolcott**, University of Washington (1077-18-893)
- ▶ 9:15AM (2183) *Coherence of canonically-defined natural transformations in the derived category of  $\ell$ -adic sheaves.*  
**Ryan Cohen Reich**, UCLA (1077-18-2289)
- 9:30AM (2184) *The stable derived category of a polynomial ring in two variables modulo the quadratic forms.* Preliminary report.  
**Daniel A. Bravo Vivallo**, University of Southern Maine (1077-18-1623)
- 9:45AM (2185) *The projective stable derived category of a ring.* Preliminary report.  
**James Gillespie**, Ramapo College (1077-18-1656)
- 10:00AM (2186) *Finite generation of the cohomology of quotients of a PBW algebra.*  
**Piyush Ravindra Shroff**, Texas A&M University (1077-18-1052)

**AMS Session on Combinatorics and Graph Theory, VII**

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8:00 AM – 10:25 AM Room 111, Hynes

- ▶ 8:00AM (2187) *Log-concavity of the Partition Function.* Preliminary report.  
**Janine E. Janoski\***, **Neil J. Calkin**, **Brian Bowers**, Clemson University, **Kerry Gannon**, Nazareth College, **Katie Jones**, University of Kentucky, and **Anna Kirkpatrick**, University of South Carolina (1077-05-914)
- ▶ 8:15AM (2188) *Minimum Clique Number, Chromatic Number, and Ramsey Numbers.*  
**Gaku Liu**, Princeton University (1077-05-1042)
- ▶ 8:30AM (2189) *3-shuffles of permutations.* Preliminary report.  
**Camillia Smith Barnes**, Sweet Briar College (1077-05-1126)
- 8:45AM (2190) *Codes of compositions.*  
**John T. Hird\***, **Naihuan Jing** and **Ernest Stitzinger**, North Carolina State University (1077-05-989)

- ▶ 9:00AM (2191) *Parallel Double Rule Application in Signed Graphs.*  
**Margaret Meyerhofer**, Carnegie Mellon University (1077-05-967)
- 9:15AM (2192) *Combination of ordered trees associated with nonnegative integer sequences.*  
**Hana Kim\***, **Gi-Sang Cheon**, Sungkyunkwan University, and **L. W. Shapiro**, Howard University (1077-05-1811)
- ▶ 9:30AM (2193)  *$h$ -vectors of small matroid complexes.*  
**Jesus A DeLoera**, **Yvonne Kemper** and **Steven Klee\***, UC Davis (1077-05-997)
- ▶ 9:45AM (2194) *Subtraction-Division Games, Patterns, and Self-similarity.*  
**Elizabeth J. Kupin**, Rutgers University (1077-05-913)
- 10:00AM (2195) *Part Products of Random  $S$ -Restricted Compositions.*  
**Caroline Shapcott**, Drexel University (1077-05-754)
- 10:15AM (2196) *Restricted rooted non-separable planar maps.* Preliminary report.  
**Sergey Kitaev**, University of Strathclyde, Department of Computer and Information Sciences, **Pavel Salimov**, Sobolev Institute of Mathematics SB RAS, **Christopher Clark Severs**, Arizona State University, and **Henning Arnor Ulfarsson\***, Reykjavik University, School of Computer Science (1077-05-1823)

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

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8:00 AM – 9:40 AM Room 105, Hynes

- ▶ 8:00AM (2197) *Ford Circles and Spheres.* Preliminary report.  
**Sam Northshield**, SUNY-Plattsburgh (1077-51-2722)
- 8:15AM (2198) *The Kähler-Ricci flow, the Mabuchi metric, and the existence of Kähler-Einstein metrics.*  
**Donovan C. McFeron**, Ramapo College of New Jersey (1077-53-149)
- ▶ 8:30AM (2199) *Curve Matching via Discrete Invariants.* Preliminary report.  
**Susan B Crook**, North Carolina State University (1077-53-2155)
- 8:45AM (2200) *Metric Fibrations from Simply Connected Rank - One Projective Spaces.* Preliminary report.  
**Richard H. Escobales, Jr.**, Canisius College (1077-53-1365)
- ▶ 9:00AM (2201) *Rectifying Viviani curves.* Preliminary report.  
**Scott J Simmons**, Drury University (1077-53-1756)
- 9:15AM (2202) *A Model Category Structure on Smooth Spaces.*  
**Dan Christensen** and **Enxin Wu\***, the University of Western Ontario (1077-53-2470)

**Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)**

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9:30AM (2203) *An example of a wild geometric structure.* Preliminary report.  
**Stanislav Dubrovskiy\***, MSRI, and  
**Mikhail Shubin**, Northeastern University  
 (1077-53-2596)

**AMS Session on Mathematical Logic, and Ordered and General Algebraic Structures**

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8:00 AM – 9:40 AM **Room 209, Hynes**

- ▶ 8:00AM (2204) *A logical analysis of the Monty Hall problem.*  
**Allen L. Mann**, Colgate University  
 (1077-03-1980)
- ▶ 8:15AM (2205) *Beatty Sequences and Exponential Complexity Issues.* Preliminary report.  
**Iraj Kalantari** and **Mojtaba Moniri\***,  
 Western Illinois University  
 (1077-03-2911)
- 8:30AM (2206) *Nilpotence in Groups with Bounded Chains of Centralizers.*  
**Paul Baginski\***, Smith College, and  
**Tuna Altinel**, Universite Lyon 1  
 (1077-03-2750)
- ▶ 8:45AM (2207) *Finding Factors of Factor Rings over the Eisenstein Integers.* Preliminary report.  
**Valmir Bucaj**, Texas Lutheran University  
 (1077-08-382)
- 9:00AM (2208) *The Order Dimension and Coloring of Planar Point Sets.*  
**Jonathan E Beagley**, George Mason University  
 (1077-06-1035)
- ▶ 9:15AM (2209) *A new description of the Bruhat-Chevalley order on Gauss-Jordan elements in the Renner monoid.* Preliminary report.  
**Ryan K Therkelsen**, Bellarmine University  
 (1077-06-1800)
- 9:30AM (2210) *The Algebraic Lattice of Algebraic Closure Operators.*  
**Martha Lee Hollist Kilpack**, Binghamton University  
 (1077-06-1934)

**AMS Session on Number Theory, Field Theory, and Polynomials, III**

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8:00 AM – 9:40 AM **Room 305, Hynes**

- 8:00AM (2211) *Dihedral  $p$ -adic fields.*  
**Chad Awtrey**, Elon University  
 (1077-11-1766)
- 8:15AM (2212) *Selectivity in Quaternion Algebras.*  
**Benjamin Linowitz**, Dartmouth College  
 (1077-11-533)
- 8:30AM (2213) *Symbolic evaluation of log-sine integrals in polylogarithmic terms.*  
**Jonathan M. Borwein**, University of Newcastle, NSW Australia, and **Armin Straub\***, Tulane University  
 (1077-11-487)
- 8:45AM (2214) *Almost Universal Inhomogeneous Quadratic Forms.*  
**Anna R Haensch**, Wesleyan University  
 (1077-11-132)

9:00AM (2215) *A Set of Quadratic Equations For Factoring or Primality Determination of odd  $6^n + or -1$  Type Odd Integers.*  
**L J Balasundaram**, Cambridge, Massachusetts  
 (1077-11-96)

9:15AM (2216) *Asymptotics for polynomials from integer partitions.*  
**Robert P Boyer**, Drexel University  
 (1077-11-1970)

9:30AM (2217) *Making imprimitive characters behave primitively.*  
**Ryan C Daileda\***, Trinity University, and  
**Nathan C Jones**, University of Mississippi  
 (1077-11-2476)

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

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8:00 AM – 9:55 AM **Room 110, Hynes**

- 8:00AM (2218) *Slow Drift and Fast Asynchronous Oscillatory Instabilities of Spike Patterns in a One-Dimensional Singularly Perturbed Brusselator Model.*  
**Justin C Tzou\***, Northwestern University,  
**Yana Nec** and **Michael J Ward**, University of British Columbia  
 (1077-35-1151)
- 8:15AM (2219) *Mixed Boundary Value Problem for Quasilinear Elliptic Equations.* Preliminary report.  
**Chunquan Tang\*** and **Gary M. Lieberman**, Iowa State University  
 (1077-35-1081)
- 8:30AM (2220) *Schur Complements and Block Preconditioners for Coupled Diffusion Systems.* Preliminary report.  
**Geoffrey Robert Wienefeld Dillon**, Texas Tech University  
 (1077-35-2421)
- 8:45AM (2221) *The 2D Boussinesq equations with partial viscous dissipation.*  
**Dhanapati Adhikari\***, Marywood University, and **Jiahong Wu**, Oklahoma State University  
 (1077-35-2232)
- 9:00AM (2222) *The Nonlinear Klein-Gordon Equation and Average Variational Principle.*  
**Lokenath Debnath**, The University of Texas - Pan American  
 (1077-35-927)
- ▶ 9:15AM (2223) *Extended fifth-order KdV type equations.*  
**Netra P Khanal**, The University of Tampa  
 (1077-35-882)
- 9:30AM (2224) *Nonlinear multi-integrable couplings with Hamiltonian structures.*  
**Wen-Xiu Ma**, University of South Florida  
 (1077-35-604)
- 9:45AM (2225) *Hölder continuity of a bounded weak solution of generalized parabolic  $p$ -Laplacian type equations.* Preliminary report.  
**Sukjung Hwang\*** and **Gary Lieberman**, Iowa State University  
 (1077-35-106)

*Boston, MA, Saturday, January 7 – Program of the Sessions*

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**MAA Session on Trends in Teaching Mathematics Online, I**

**8:00 AM – 10:55 AM Room 311, Hynes**

Organizer: **Michael B. Scott**, California State University, Monterey Bay

- ▶ 8:00AM (2226) *Implications for learning transition level mathematics using a distance delivery model.* Preliminary report.  
**Ronald L Merritt**, Athens State University (1077-05-94)
- ▶ 8:20AM (2227) *An Analysis of 4 College Algebra Classes With or Without Computer Software Support.*  
**Bonnie L. Oppenheimer**, Mississippi University for Women (1077-05-195)
- ▶ 8:40AM (2228) *On Synchronous Distance Teaching in a Mathematics MS Program.* Preliminary report.  
**Kuiyuan Li\***, **Raid Amin** and **Josphat Uvah**, University of West Florida (1077-05-231)
- ▶ 9:00AM (2229) *Students' Attitude Toward Assessment of on-Line Learning of College Algebra and Intermediate Algebra.*  
**A. S. Elkhader**, Northern State University (1077-05-350)
- ▶ 9:20AM (2230) *Exploring the Effect of Using Technology on the online Learning of Algebra.*  
**Bashar Zogheib**, American University of Kuwait (1077-05-1167)
- ▶ 9:40AM (2231) *Expanding Redesign Success.* Preliminary report.  
**Elizabeth A Eagle**, University of North Carolina at Charlotte, NC (UNCC) (1077-05-2122)
- ▶ 10:00AM (2232) *Teaching a General Education Math Course Online with Discussion boards and a Screencast system.*  
**James Baglama**, University of Rhode Island (1077-05-2044)
- ▶ 10:20AM (2233) *On WeBWork: how to Design a Model Course that is Concise and Complete?* Preliminary report.  
**Shumei C Richman**, Columbia, SC (1077-05-1914)
- ▶ 10:40AM (2234) *Online PREP Workshops: The experience of teaching online professional development courses in mathematics.*  
**Mike May**, Saint Louis University (1077-05-1221)

**MAA Session on the History of Mathematics and Its Uses in the Classroom, II**

**8:00 AM – 10:55 AM Room 312, Hynes**

Organizer: **Amy Shell-Gellasch**, Beloit College

- ▶ 8:00AM (2235) *The History of Irrational and Transcendental Numbers; Classroom Benefits.*  
**Charlie L Smith**, Park University (1077-E1-2677)

- ▶ 8:20AM (2236) *A President, A. Partridge, and Practical Mathematics.* Preliminary report.  
**Dick Jardine**, Keene State College (1077-E1-2008)
- ▶ 8:40AM (2237) *Exploring Prime Numbers in Classes with Preservice and Inservice Teachers.*  
**Jim Fulmer\*** and **Tom McMillan**, University of Arkansas at Little Rock (1077-E1-1053)
- ▶ 9:00AM (2238) *Mayan Geometry in the Classroom.* Preliminary report.  
**Cynthia J. Woodburn**, Pittsburg State University (1077-E1-441)
- ▶ 9:20AM (2239) *When a Number System Loses Uniqueness: The Case of the Maya.* Preliminary report.  
**Amy Shell-Gellasch\***, Beloit College, Beloit WI, and **Pedro Freitas**, FCUL Universidade de Lisboa (1077-E1-562)
- ▶ 9:40AM (2240) *Could they have known it generalized? could they? Giving credit where credit probably due.* Preliminary report.  
**Steven R Benson**, Lesley University (1077-E1-2233)
- ▶ 10:00AM (2241) *Putting Mathematics Education Controversies in Historical Context.*  
**H. Smith Risser**, Montana Tech (1077-E1-2108)
- ▶ 10:20AM (2242) *Number theory à la Sophie Germain: a course of guided discovery from her research manuscripts on Fermat's Last Theorem.*  
**David J. Pengelley**, New Mexico State University (1077-E1-627)
- ▶ 10:40AM (2243) *A Partial Examination of the Evolution of Structural Design.*  
**Patricia Williams\*** and **Elizabeth C. Rogers**, Piedmont College (1077-E1-2857)

**MAA Session on the Mathematical Preparation of Teachers: The Impact of the Common Core State Standards Initiative, I**

**8:00 AM – 10:55 AM Room 310, Hynes**

- Organizers: **Kenneth C. Millett**, University of California, Santa Barbara  
**Elizabeth Burroughs**, Montana State University  
**Holly Peters Hirst**, Appalachian State University  
**William McCallum**, The University of Arizona

**Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)**

- 8:00AM ▶ (2244) *Aligning the Self-Efficacy to Teach Statistics (SETS) Instrument to the Common Core State Standards for Mathematics.*  
**Leigh M. Harrell Williams\***, Virginia Tech, **Teri J. Murphy**, Northern Kentucky University, **M. Alejandra Sorto**, Texas State University - San Marcos, **Rebecca L. Pierce**, Ball State University, and **Lawrence M. Lesser**, The University of Texas at El Paso (1077-F5-979)
- 8:00AM ▶ (2253) *Investigations of the Riemann Hypothesis - Three Independent Confirmations.*  
**Donald Leigh Hitzl\***, Lockheed-Martin Advanced Technology Center, and **Frank Zele**, Lockheed-Martin Solar and Astrophysics Laboratory (1077-VL-22)
- 8:20AM (2245) *Uncovering and Discovering: CCSS Mathematical Process Standards in a Mathematics Course for Middle School Teachers.*  
**Teresa D Magnus\***, Rivier College, Nashua NH, and **Ann Gaffney**, River College and Londonderry Middle School (1077-F5-222)
- 8:15AM (2254) *Exposed and strongly exposed points in symmetric spaces of measurable operators.*  
**Malgorzata M Czerwinska**, University of Mississippi (1077-VL-2545)
- 8:40AM ▶ (2246) *Using Video Excerpts from Authentic Mathematics Classrooms to Demonstrate the Mathematical Practices at Various Grade Levels.* Preliminary report.  
**Taliesin Sutton\*** and **Nicole Kersting**, University of Arizona (1077-F5-2914)
- 8:30AM (2255) *Apriori bounds and maximum principles for some higher order nonlinear pdes.*  
**Anita Mareno**, Penn State Harrisburg (1077-VL-392)
- 9:00AM ▶ (2247) *Using Experience from the Past to Move Forward to the Common Core State Standards.*  
**Elizabeth C. Rogers**, Piedmont College (1077-F5-2908)
- 8:45AM ▶ (2256) *"Resistance" is Futile: Understanding the Effect of Resistance in Physical Systems.*  
**Perry Y.C. Lee**, Kutztown University of Pennsylvania (1077-VL-1892)
- 9:20AM ▶ (2248) *Advanced Teacher Capacity in Mathematics and the Common Core.*  
**Gregory D Foley**, Ohio University (1077-F5-2643)
- 9:00AM ▶ (2257) *What Does the Normality Test Indicate About the Coverage Probability of the One Sample t-based Confidence Interval?* Preliminary report.  
**Daniel J. Ghezzi**, King's College, Wilkes-Barre, Pa. (1077-VL-1997)
- 9:40AM ▶ (2249) *Enhancing the content knowledge of pre-service secondary mathematics teachers: Understanding connections.*  
**Yating Liu**, The Ohio State University (1077-F5-2087)
- 9:15AM ▶ (2258) *Modeling Examination scores with the Wakeby Distribution.*  
**Bernard Beecher**, Bmcc/CUNY-The City University of New York (1077-VL-1947)
- 10:00AM (2250) *Inquiry-Based Courses at UAB for Prospective Elementary and Middle School Teachers Modeling the Standards for Mathematical Practice.*  
**Tommy Smith\***, **John C Mayer** and **Donna Ware**, University of Alabama at Birmingham (1077-F5-2050)
- 9:30AM ▶ (2259) *Jensen's Inequality Versus Algebra in Finding the Exact Maximum.*  
**Mohammad K Azarian**, University of Evansville (1077-VL-610)
- 10:20AM (2251) *Developing Teachers' Flexibility in Geometry: Addressing the CCSS Mathematics Objectives.*  
**Tanya Berezovski**, St. Joseph's University, Philadelphia, PA (1077-F5-859)
- 9:45AM (2260) *Asymptotic Behavior of some Strodt Polynomials.*  
**Timothy B. Flowers**, Indiana University of Pennsylvania (1077-VL-2411)
- 10:40AM (2252) *Updating the CBMS report on the mathematical education of teachers and the Common Core.*  
**William McCallum**, The University of Arizona (1077-F5-2955)
- 10:00AM ▶ (2261) *Wilf's conjecture.*  
**Tewodros Amdeberhan**, Tulane University, **Valerio De Angelis\***, Xavier University of Louisiana, and **Victor Moll**, Tulane University (1077-VL-2526)
- 10:15AM ▶ (2262) *The Algebraic Thinking Project and the Encyclopedia of Algebraic Thinking.* Preliminary report.  
**Steve Rhine** and **Colin Starr\***, Willamette University (1077-VL-2001)
- 10:30AM ▶ (2263) *Using Screen Capture Video to Aid Instruction.*  
**Pat Kiihne**, Illinois College (1077-VL-942)
- 10:45AM ▶ (2264) *Communication: The Success to Online Courses.* Preliminary report.  
**Edward D. Smith**, Pima Community College (1077-VL-2921)
- MAA General Contributed Paper Session: Assorted Topics, I**
- 8:00 AM – 10:55 AM **Room 201, Hynes**  
 Organizers: **Jennifer Beineke**, Western New England College

**MAA General Contributed Paper Session:  
Assorted Topics, II**

8:00 AM – 10:55 AM Room 202, Hynes

Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University

- 8:00AM (2265) *Into the deep end of the mathematical pool: some preliminary experiences teaching with IBL.*  
**Kayla Bradley Dwelle\***, Ouachita Baptist University, and **Ruth A. Enoch**, Arkansas Tech University (1077-VL-1930)
- 8:15AM (2266) *Contradictions in the Common Core State Standards: Problems and a possible solution.*  
**Patricia Baggett\***, New Mexico State University, and **Andrzej Ehrenfeucht**, University of Colorado at Boulder (1077-VL-347)
- 8:30AM (2267) *Mathematics Teacher Preparation in Shanghai for Grades 1-9.*  
**Hong Yuan\***, The City University of New York, and **Xinsheng Lu**, Shanghai Normal University (1077-VL-2389)
- 8:45AM (2268) *Hua Loo-keng's Movement of Popularizing Mathematics and Quantitative Literacy (1958 to 1985).*  
**Jean W. Richard\*** and **Hong Yuan**, BMCC CUNY The City University of New York (1077-VL-2557)
- 9:00AM (2269) *Status, Interaction, and Undergraduate Mathematics in Nigeria: A VLP Experience.*  
**Martha Byrne**, University of New Mexico (1077-VL-346)
- 9:15AM (2270) *Perceptions of Turkish High School Mathematics Teachers Regarding the 2005 Curricular Changes and Their Effects on Mathematical Proficiency and University Entrance Exam Preparation.* Preliminary report.  
**S Nihan Er**, Ohio University (1077-VL-2859)
- 9:30AM (2271) *Native American-based Mathematics Materials for Undergraduate Courses.* Preliminary report.  
**Charles Peter Funkhouser\***, **Scott A. Annin**, California State University Fullerton, and **Miles Pfahl**, Turtle Mountain Community College, Belcourt, ND (1077-VL-2826)
- 9:45AM (2272) *Project SOAR: Providing Low-Income, First-Generation, Underrepresented STEM Students Comprehensive Support for Success.*  
**Heather A Bullen**, **Kristi L Haik** and **Gail Mackin\***, Northern Kentucky University (1077-VL-492)

- 10:00AM (2273) *Recruitment and Retention of First Generation Mathematics Majors.*  
**Elizabeth K. Mauch**, Bloomsburg University of Pennsylvania (1077-VL-500)
- 10:15AM (2274) *"Leading Disadvantaged Students to Success in Mathematics" — A midterm report of our S-STEM funded project.* Preliminary report.  
**Zhanbo Yang\***, **F G Wukovits**, **A. Daniel** and **J. Beltrami**, University of the Incarnate Word (1077-VL-639)
- 10:30AM (2275) *Mentoring and Networking Mathematics and Science Majors in Applying Mathematics.* Preliminary report.  
**Frederick A. Adkins\*** and **Yu-Ju Kuo**, Indiana University of Pennsylvania (1077-VL-2895)
- 10:45AM (2276) *Mentoring Junior Faculty: A Formula for Success.*  
**Jenna P. Carpenter**, Louisiana Tech University (1077-VL-982)

**MAA General Contributed Paper Session:  
Research in Algebra and Topology**

8:00 AM – 10:55 AM Back Bay Ballroom D, 2nd Floor, Sheraton

Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University

- 8:00AM (2277) *Finite Type Knot Invariants.* Preliminary report.  
**Lena Folwaczny**, University of Illinois, Chicago (1077-VJ-2832)
- 8:15AM (2278) *The Coefficient Space of Polynomial Knots.*  
**Lee Stemkoski**, Adelphi University (1077-VJ-2199)
- 8:30AM (2279) *Adding Complexity to Playing Tic-Tac-Toe.* Preliminary report.  
**Mary J Riegel**, University of Montana (1077-VJ-2664)
- 8:45AM (2280) *On global invariants of fibrations of smooth complete intersections.*  
**James A Fullwood**, Florida State University (1077-VJ-2579)
- 9:00AM (2281) *Regular Graded Skew Clifford Algebras of Low Global Dimension.*  
**Manizheh Nafari**, University of Texas at Arlington (1077-VJ-2505)
- 9:15AM (2282) *Global Weyl modules for twisted loop algebras.*  
**Nathanael J Manning\***, University of California, Riverside, **Ghislain Fourier**, Mathematisches Institut, Universität zu Köln, Germany, and **Prasad Senesi**, The Catholic University of America (1077-VJ-2133)

**Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)**

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- 9:30AM (2283) *BGG reciprocity for the current algebra of  $sl_2$ .*  
**Matthew L. Bennett\***, Nathanael J. Manning and Vyjayanthi Chari, University of California, Riverside (1077-VJ-2118)
- 9:45AM (2284) *On Fourier-Mukai type functors.* Preliminary report.  
**Alice Rizzardo**, Columbia University (1077-VJ-2247)
- 10:00AM (2285) *Improving the Consistency Strength of Reflection at  $\aleph_{\omega+1}$ .*  
**Zachary Paul Faubion**, University of California, Irvine (1077-VJ-2838)
- ▶ 10:15AM (2286) *Compactness properties of the second uncountable cardinal.*  
**Sean D. Cox**, University of Münster (1077-VJ-2762)
- ▶ 10:30AM (2287) *Creating Separation in Topological Spaces.*  
**Jay R. Stine**, Misericordia University (1077-VJ-552)
- 10:45AM (2288) *Lusternik-Schnirelmann Category and the connectivity of  $X$ .*  
**Nicholas A Scoville**, Ursinus College (1077-VJ-2933)
- 9:00AM (2293) ▶ *Virus Dynamics in Star Graphs.*  
**Alexander Greaves-Tunnell\***, Williams College, **Thealexa Becker**, Smith College, **Aryeh Kontorovich**, Ben Gurion University, **Steven Miller**, Williams College, **Pradeep Ravikumar**, University of Texas, Austin, and **Karen Shen**, Stanford University (1077-VJ-2175)
- ▶ 9:15AM (2294) *The Firefighter Problem for Directed Grids.*  
**Daniel P. Biebighauser**, Concordia College, Moorhead, MN (1077-VJ-1695)
- ▶ 9:30AM (2295) *Total Efficient Domination in Cayley Graphs.* Preliminary report.  
**Keegan C. Gary\***, **Mari Castle** and **Joe DeMaio**, Kennesaw State University (1077-VJ-924)
- 9:45AM (2296) *The Characteristic Polynomial for Bi-Rooted Trees.*  
**Steven J. Tedford**, Misericordia University, Dallas PA. (1077-VJ-553)
- ▶ 10:00AM (2297) *Combinatorial Interpretations of Congruences for the spt-function.*  
**George E Andrews**, Pennsylvania State University, **Frank G Garvan**, University of Florida, and **Jie L. Liang\***, University of Central Florida (1077-VJ-2404)
- ▶ 10:15AM (2298) *Counting the Number of Invalid Reductions of Fractions - How "Weird" are "Weird" Fractions?*  
**Ryan Stuffelbeam**, Transylvania University (1077-VJ-2384)
- ▶ 10:30AM (2299) *How Many Unique 4 by 4 Natural Magic Squares are There?* Preliminary report.  
**Peter Staab\*** and **Jared Weed**, Fitchburg State University (1077-VJ-2337)
- 10:45AM (2300) *Thompson's Group and the Four Color Theorem.*  
**Garry S. Bowlin**, SUNY Oneonta (1077-VJ-2096)

**MAA General Contributed Paper Session: Research in Graph Theory and Combinatorics**

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8:00 AM – 10:55 AM **Back Bay Ballroom C, 2nd Floor, Sheraton**

- Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University
- 8:00AM (2289) *On the Limiting Distribution of Eigenvalues of Large Random  $d$ -Regular Graphs with Weighted Edges.*  
**Michael Cap Khoury\***, University of Michigan – Ann Arbor, and **Steven J Miller**, Williams College (1077-VJ-636)
- 8:15AM (2290) *Necessary Spectral Conditions for 2-coloring Regular 3-uniform Hypergraphs.*  
**Franklin H.J. Kenter**, University of California, San Diego (1077-VJ-2586)
- 8:30AM (2291) *Cops and Robber on the hypercube.* Preliminary report.  
**David Offner**, Westminster College (1077-VJ-2398)
- 8:45AM (2292) *Randomly Altering Graphs via Vertex Switching.*  
**Jacob Hughes**, University of California - San Diego (1077-VJ-2236)

**SIAM Minisymposium on Recent Advances in Fluid Dynamics and Turbulence Models**

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8:00 AM – 10:55 AM **Room 206, Hynes**

- Organizer: **Edriss Titi**, University of California Irvine
- 8:00AM (2301) *On the wellposedness of the Navier-Stokes-Maxwell system.*  
**Slim Ibrahim\***, University of Victoria, BC, Canada, and **Nader Masmoudi**, Courant Institute, New York University (1077-35-1835)
- 8:30AM (2302) *Global solutions for the Euler-Maxwell equation.*  
**Pierre M Germain**, Courant Institute, New York University. (1077-35-1529)
- 9:00AM (2303) *Nonlinear Maximum Principle for Dissipative Nonlocal Operators and Applications: SQG.*  
**Peter Constantin\***, Princeton University, and **Vlad Vicol**, The University of Chicago (1077-35-2324)

*Boston, MA, Saturday, January 7 – Program of the Sessions*

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- 9:30AM *Global wellposedness of 2D anisotropic Boussinesq equations.*  
(2304) **Chongsheng Cao\***, Florida International University, and **Jiahong Wu**, Oklahoma State University (1077-35-1904)
- 10:00AM *Ensemble Dynamics and Bred Vectors.*  
(2305) **Anna L Mazzucato**, Pennsylvania State University (1077-37-1552)
- 10:30AM *Pressure Beneath a Stokes Wave.*  
▶ (2306) **Walter A Strauss**, Brown University (1077-76-1170)

**MAA General Contributed Paper Session:  
Assorted Topics, III**

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8:15 AM – 10:55 AM Room 304, Hynes

Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University

- 8:15AM *A Student Inspired Capstone Experience.*  
▶ (2307) Preliminary report.  
**Elyn Rykken**, Muhlenberg College (1077-VL-2695)
- 8:30AM *Creating a Meaningful Mock Classroom Experience for Pre-Service Secondary Teachers.* Preliminary report.  
▶ (2308) **Becky E Hall**, Western Connecticut State University (1077-VL-2278)
- 8:45AM *How I Taught A Course About The History Of Mathematics For The First Time.*  
▶ (2309) **Ricardo Enrique Rojas**, Northern State University, Aberdeen, South Dakota. (1077-VL-1668)
- 9:00AM *An Overview of Numeral Systems.*  
▶ (2310) Preliminary report.  
**Walter S. Sizer**, Minnesota State University Moorhead (1077-VL-340)
- 9:15AM *Red, White, and Blue: Pythagorean Triples in Undergraduate Mathematics Teaching.* Preliminary report.  
▶ (2311) **Homer W. Austin\***, Salisbury University, and **Jathan W. Austin**, University of Delaware (1077-VL-1377)
- 9:30AM *Deciphering a Message Using the Vigenère Square.* Preliminary report.  
▶ (2312) **Bill Linderman**, King College (1077-VL-1724)
- 9:45AM *Benjamin Franklin’s Magic.* Preliminary report.  
▶ (2313) **Rebecca Garcia**, Sam Houston State University (1077-VL-2879)
- 10:00AM *Combinatorial Proofs of Fibonacci Identities by Means of the Path Graph.*  
▶ (2314) Preliminary report.  
**John T. Jacobson**, Kennesaw State University (1077-VL-842)
- 10:15AM *Domination and Independence on the Triangular Honeycomb Chessboard.*  
▶ (2315) Preliminary report.  
**Hong Lien T. Tran**, Kennesaw State University (1077-VL-846)

- 10:30AM *Tiling Deficient Chessboards with n-Polyominoes.*  
▶ (2316) **Kristina J Woodside**, Washington and Jefferson College (1077-VL-2396)
- 10:45AM *Counting Liars and Truth-tellers: Binomial Identities through Logic Puzzles.*  
▶ (2317) **Oscar Levin**, University of Northern Colorado (1077-VL-2402)

**AWM Workshop**

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8:25 AM – 4:30 PM Room 306, Hynes

*This session has several parts that will be listed separately by time in this program. All presentations are open to all JMM participants.*

**AMS Special Session on Geometric Invariants of Groups and Related Topics, I**

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8:30 AM – 10:50 AM Exeter, 3rd Floor, Marriott

Organizers: **Nic Koban**, University of Maine, Farmington  
**Peter N. Wong**, Bates College

- 8:30AM  *$\mathbb{Z}G$ -modules over  $CAT(0)$  spaces.*  
(2318) Preliminary report.  
**Ross Geoghegan**, Binghamton University (SUNY) (1077-20-1173)
- 9:00AM  *$\Sigma^1$  for Semi-Direct Products Acting on Locally Finite Trees.*  
(2319) **Keith M Jones**, Trinity College, Hartford CT (1077-20-995)
- 9:30AM *Novikov homology of right-angled Artin groups.*  
(2320) **Dirk Schuetz**, Durham University (1077-20-1907)
- 10:00AM *Boundary of a  $CAT(0)$  2-Complex.*  
(2321) Preliminary report.  
**Yulan Qing**, Tufts University (1077-54-617)
- 10:30AM *Geometric and homological finiteness in free abelian covers.*  
(2322) **Alexander I. Suci**, Northeastern University (1077-20-1180)

**AMS Special Session on Nonlinear Analysis of Partial Differential Equation Models in Biology and Chemical Physics, I**

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8:30 AM – 10:50 AM Room 300, Hynes

Organizers: **Zhonghai Ding**, University of Nevada, Las Vegas  
**Zhaosheng Feng**, University of Texas-Pan American

- 8:30AM *A Simple Model for Arterial Blood Flow.*  
(2323) Preliminary report.  
**Jerry L. Bona**, University of Illinois at Chicago (1077-92-2128)

**Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)**

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- 9:00AM (2324) *Initial-boundary value problem for coupled nonlinear dispersive equations.* Preliminary report.  
**Jerry L. Bona**, University of Illinois at Chicago, and **Hongqiu Chen\***, University of Memphis (1077-35-2619)
- 9:30AM (2325) *Modeling spatial spread of infectious diseases with a fixed latent period in a spatially continuous domain.*  
**Jing Li\***, Pennsylvania State University, and **Xingfu Zou**, University of Western Ontario (1077-35-2848)
- 10:00AM (2326) *Financial models used in biology.*  
**Indranil SenGupta\*** and **Maria C. Mariani**, University of Texas- El Paso (1077-35-171)
- ▶ 10:30AM (2327) *Existence and stability of steady states of the microtubule formation in three states.* Preliminary report.  
**Shantia Yarahmadian**, Mississippi State University (1077-35-2120)

**MAA Invited Paper Session on Applications of Dynamical Systems**

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8:30 AM – 10:50 AM Room 302, Hynes

- Organizer: **Gene Wayne**, Boston University
- 8:30AM (2328) *Chaos, Complex Dynamics, and Undergraduate Research Projects.*  
**Robert L. Devaney**, Boston University (1077-AB-103)
- 9:00AM (2329) *Patterns of Oscillation in Network Systems.*  
**Martin Golubitsky**, Mathematical Biosciences Institute, Ohio State (1077-AB-557)
- ▶ 9:30AM (2330) *A Dynamical Systems Approach to Paleoclimate Models.* Preliminary report.  
**Richard McGehee**, University of Minnesota, Minneapolis, Minnesota (1077-AB-1019)
- ▶ 10:00AM (2331) *Lagrangian Dynamics and the incorporation of data into ocean models.*  
**Christopher K R T Jones**, University of North Carolina at Chapel Hill (1077-AB-2388)
- ▶ 10:30AM (2332) *Snakes and ladders.*  
**Bjorn Sandstede**, Brown University (1077-AB-1739)

**MAA General Contributed Paper Session: History and Philosophy of Mathematics**

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8:30 AM – 9:55 AM Room 309, Hynes

- Organizers: **Jennifer Beineke**, Western New England College  
**Lynette Boos**, Providence College  
**Aliza Steurer**, Dominican University

- ▶ 8:30AM (2333) *Raising Awareness of the History of Mathematics in High School Curriculum.*  
**Leslie Bolinger-Horton\***, Quinsigamond Community College, and **Regina M. Panasuk**, University of Massachusetts Lowell (1077-VF-375)
- ▶ 8:45AM (2334) *History of Computation as a Professional Development Course for Middle School Teachers.* Preliminary report.  
**Todd H. Moore**, **Andrew G. Bennett\*** and **Carlos W. Castillo-Garsow**, Kansas State University (1077-VF-2076)
- 9:00AM (2335) *Using the History of Women in Mathematics to Address Gender Equity and Prepare Future Teachers.*  
**Jacqueline M. Dewar\***, **Lily S. Khadjavi** and **Alissa S. Crans**, Loyola Marymount University (1077-VF-2181)
- ▶ 9:15AM (2336) *Mathematical Thinking: Can we ever agree on a definition? A conceptual meta-analysis.* Preliminary report.  
**Sean F Argyle**, Kent State University (1077-VF-1263)
- ▶ 9:30AM (2337) *Geometric constructions using a finite compass and a finite straightedge.*  
**David S Richeson**, Dickinson College (1077-VF-2530)
- ▶ 9:45AM (2338) *Best Web sites for the history of mathematics.* Preliminary report.  
**Paul R. Bialek**, Trinity International University (1077-VF-2626)

**AWM Workshop: Research Presentations by Recent Ph.D.s**

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8:30 AM – 10:20 AM Room 306, Hynes

- Organizers: **Alissa Crans**, Loyola Marymount University  
**Rachelle DeCoste**, Wheaton College  
**Kirsten Eisentraeger**, Pennsylvania State University  
**Susan Williams**, University of South Alabama
- 8:30AM (2339) *On Legendrian Graphs.*  
**Danielle O'Donnol**, Smith College, and **Elena Pavelescu\***, Occidental College (1077-57-263)
- 9:00AM (2340) *Springer's representation via  $sl(3)$  webs.*  
**Heather M. Russell\***, University of Southern California, **Julianna S. Tymoczko**, University of Iowa, and **Matthew Housley**, BYU (1077-57-240)
- 9:30AM (2341) *Categorification of the polynomial ring.*  
**Radmila Sazdanovic\***, University of Pennsylvania, and **Mikhail Khovanov**, Columbia University (1077-18-212)
- 10:00AM (2342) *Promotion and rowmotion.*  
**Jessica Striker\*** and **Nathan Williams**, University of Minnesota (1077-05-256)



**AMS Committee on Education Panel Discussion**

8:30 AM – 10:00 AM Room 208, Hynes

*Models for engaging undergraduate students in research.*

Organizers: **David Damiano**, College of the Holy Cross  
**Steven J. Miller**, Williams College

Moderator: **David Damiano**

Panelists: **Dean M. Evasius**, National Science Foundation

**Joe Gallian**, University of Minnesota Duluth

**Steven Miller**

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

**MAA Session on Motivating Statistical and Quantitative Learning through Social Engagement**

8:40 AM – 10:55 AM Room 203, Hynes

Organizers: **Brian Gill**, Seattle Pacific University  
**Eric Gaze**, Bowdoin College  
**Andrew Zieffler**, University of Minnesota  
**Stuart Boersma**, Central Washington University

8:40AM (2343) *Mathematics for a Just World: Teaching Quantitative Literacy Through Social Justice Issues and Service Learning.*  
**Bonnie J Shulman**, Bates College, Lewiston, ME (1077-J1-143)

9:00AM (2344) *Quantitative Literacy in a First-Year Seminar Course.* Preliminary report.  
**Maria G Fung**, Worcester State University (1077-J1-1973)

9:20AM (2345) *Service Learning Project in a First-Year Seminar.* Preliminary report.  
**Zeynep Teymuroglu**, Rollins College (1077-J1-768)

9:40AM (2346) *Service-Learning Projects and Activities that Engage Liberal Arts Mathematics Students: Implementation and Assessments.*  
**Morteza Shafii-Mousavi\*** and **Paul Kochanowski**, Indiana University South Bend (1077-J1-169)

10:00AM (2347) *Quantitative Reasoning and Informed Citizenship: Building Students' Awareness of Social Issues.*  
**Alicia Sevilla\*** and **Kay Somers**, Moravian College (1077-J1-2467)

10:20AM (2348) *Math Trails in Undergraduate Mathematics.*  
**Mike Daven** and **Lee Fothergill\***, Mount Saint Mary College (1077-J1-161)

10:40AM (2349) *How Does Acceptance of Lesbian and Gay Men Spread in a Social Network?*  
**Angela Vierling-Claassen\***, Lesley University, and **Dorea Vierling-Claassen**, Brown University (1077-J1-784)

**AMS Invited Address**

9:00 AM – 9:50 AM Ballrooms A/B, 3rd floor, Hynes

(2350) *Beyond  $q$ : Special functions on elliptic curves.*  
**Eric Rains**, California Institute of Technology (1077-33-9)

**ASL Invited Address**

9:00 AM – 9:50 AM Room 207, Hynes

(2351) *Set Theory and Infinitary Model Theory.*  
**John Baldwin**, University of Illinois at Chicago (1077-03-152)

**MAA Minicourse #4: Part B**

9:00 AM – 11:00 AM Salon AB, 4th Floor, Marriott

*Elementary mathematics in architecture.*  
Presenter: **Alexander J. Hahn**, University of Notre Dame

**MAA Minicourse #13: Part B**

9:00 AM – 11:00 AM Salon HI, 4th Floor, Marriott

*Interactive applets for calculus and differential equations.*  
Presenter: **Haynes Miller**, Massachusetts Institute of Technology

**MAA Minicourse #1: Part B**

9:00 AM – 11:00 AM Salon CD, 4th Floor, Marriott

*Mathematics and backgammon.*  
Presenters: **Arthur Benjamin**, Harvey Mudd College  
**Robert Koca**, Community College of Baltimore County

**SIGMAA on Math Circles Demonstration for JMM Participants, Teachers, and other Mathematical Enthusiasts**

9:00 AM – 9:50 AM Back Bay Ballroom B, 2nd Floor, Sheraton

*Come learn about and participate in this Math Circles experience.*  
Organizers: **James Tanton**, St. Mark's Institute of Mathematics  
**Tatiana Shubin**, San Jose State University

Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)

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**NAM Panel Discussion**

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9:00 AM – 9:50 AM Room 101, Hynes  
Title to be announced.

**Student Hospitality/Information Center**

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9:00 AM – 2:00 PM 2nd Floor Corridor by  
Veterans Auditorium, Hynes

**Exhibits and Book Sales**

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9:00 AM – NOON Exhibit Hall D, Hynes

**Employment Center**

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9:00 AM – NOON Exhibit Hall C, Hynes

**MAA General Contributed Paper Session:  
Assorted Topics, IV**

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10:00 AM – 10:40 AM Room 309, Hynes

Organizers: **Jennifer Beineke**, Western  
New England College  
**Lynette Boos**, Providence  
College  
**Aliza Steurer**, Dominican  
University

- ▶ 10:00AM (2352) *Matrices with Equal Power Property.*  
Preliminary report.  
**Wasin So**, San Jose State University  
(1077-VL-531)
- ▶ 10:15AM (2353) *What can a right triangle look like?*  
**Steven Schlicker**, Grand Valley State  
University (1077-VL-1348)
- ▶ 10:30AM (2354) *The Braikenridge-Maclaurin  
Construction.* Preliminary report.  
**Salvatore Giunta**, Adelphi University  
(1077-VL-2185)

**ASL Contributed Paper Session, II**

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10:00 AM – 10:45 AM Room 207, Hynes

- 10:00AM (2355) *Forking in VC-minimal theories.*  
**Sarah Cotter\*** and **Sergei Starchenko**,  
University of Notre Dame
- 10:25AM (2356) *Indiscernible sequences and simplicity.*  
**Donald Brower**, University of Notre  
Dame

**SIGMAA on Math Circles Demonstration for  
Undergraduate Students**

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10:00 AM – 11:00 AM Back Bay Ballroom  
B, 2nd Floor, Sheraton

Come learn about and participate in this  
Math Circles experience.

Organizers: **James Tanton**, St. Mark's  
Institute of Mathematics  
**Tatiana Shubin**, San Jose  
State University

**NAM Business Meeting**

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10:00 AM – 10:50 AM Room 101, Hynes

**MAA Invited Address**

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10:05 AM – 10:55 AM Ballrooms A/B,  
3rd floor, Hynes

- (2357) *Mathematical challenges in climate and  
sustainability.*  
**Mary Lou Zeeman**, Bowdoin College  
(1077-A0-7)

**AWM Workshop: Poster Session with  
Presentations from Women Graduate  
Students**

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10:30 AM – 11:00 AM Room 306, Hynes

- ▶ 10:30AM (2358) *An alternative approach to hyperbolic  
structures on link complements.*  
**Morwen Thistlethwaite** and **Anastasiia  
Tsvietkova\***, University of Tennessee,  
Knoxville (1077-57-134)
- 10:30AM (2359) *Hilbert Functions and Graded Betti  
Numbers of Arithmetically Gorenstein  
Points on General Surfaces in  $\mathbb{P}^3$ .*  
Preliminary report.  
**Megan Patnott**, University of Notre  
Dame (1077-14-197)
- 10:30AM (2360) *On the Unimodality of Pure O-Sequences.*  
Preliminary report.  
**Bernadette M Boyle**, University of Notre  
Dame (1077-13-205)
- ▶ 10:30AM (2361) *Reflection groups: Comparing length and  
codimension.*  
**Briana Foster-Greenwood**, University of  
North Texas (1077-05-211)
- 10:30AM (2362) *The von Kármán theory for  
incompressible elastic shells.*  
**Hui Li**, University of Minnesota  
(1077-74-230)
- 10:30AM (2363) *Sum-list-coloring and sc-greedy graphs.*  
Preliminary report.  
**Michelle A. Lastrina**, Iowa State  
University (1077-05-232)
- 10:30AM (2364) *Splittings of Non-Finitely Generated  
Groups.*  
**Robin M. Lassonde**, University of  
Michigan (1077-20-249)
- 10:30AM (2365) *Equivalence and Duality for Rank-Metric  
and Matrix Codes.*  
**Katherine Morrison**, University of  
Nebraska – Lincoln (1077-94-257)
- ▶ 10:30AM (2366) *Extending the analysis of the Blum  
medial axis to multiple regions.*  
**Ellen K Gasparovic**, University of North  
Carolina at Chapel Hill (1077-54-261)
- 10:30AM (2367) *Tracking Control and Robustness  
Analysis for PVTOL Aircraft under  
Bounded Feedbacks.*  
**Aleksandra Gruszka\***, **Michael  
Malisoff**, Louisiana State University, and  
**Frederic Mazenc**, Team INRIA DISCO,  
CNRS-Supelec (1077-93-306)

*Boston, MA, Saturday, January 7 – Program of the Sessions*

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10:30AM *Uniqueness and multiplicity results for classes of infinite positone problems.*  
(2368)  
**Eunkyung Ko**, Mississippi State University (1077-35-307)

10:30AM *The topology of restricted partition posets.*  
(2369)  
**Richard Ehrenborg** and **JiYoon Jung\***, University of Kentucky (1077-05-308)

**MAA Business Meeting**

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11:10 AM – 11:40 AM **Ballrooms A/B, 3rd floor, Hynes**

Chair: **Paul Zorn**, Saint Olaf College

**AMS Business Meeting**

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11:45 AM – 12:15 PM **Ballrooms A/B, 3rd floor, Hynes**

**NAM Claytor-Woodard Lecture**

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1:00 PM – 1:50 PM **Room 101, Hynes**

(2370) *Profinite (Continuous) Equivariant Higher Algebraic K-theory for the Action of Algebraic Groups.*  
**Aderemi Oluyomi Kuku**, Grambling State University (1077-19-884)

**AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates and Students in Post-Baccalaureate Programs, IV**

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1:00 PM – 5:50 PM **Back Bay Ballroom A, 2nd Floor, Sheraton**

Organizers: **Bernard Brooks**, Rochester Institute of Technology  
**Jobby Jacob**, Rochester Institute of Technology  
**Jacqueline Jensen**, Sam Houston State University  
**Darren A Narayan**, Rochester Institute of Technology

▶ 1:00PM *The Role of Dynamic Representations in Development of Algebraic Concepts.*  
(2371) Preliminary report.  
**Marie Nicole Ermete\***, **Natasha Dawn Brackett** and **Karli Nicole Powell**, Central Michigan University (1077-97-102)

▶ 1:30PM *Trigonometric Interpolation for Numerical Solution of Differential Equations.*  
(2372)  
**Oksana Bihun**, **Austin Bren\***, **Michael Dyrud** and **Kristin Heysse**, Concordia College, MN (1077-65-105)

▶ 2:00PM *Folded ribbon knots in the plane.*  
(2373) Preliminary report.  
**Eleanor Conley\***, **Emily Meehan**, **Elizabeth Denne** and **Rebecca Terry**, Smith College (1077-51-1889)

▶ 2:30PM *The Life and Death of a Geodesic.*  
(2374) Preliminary report.  
**Arielle McCoy\***, **Cal Hotchkiss**, **Alison Pryor**, **Kirin Khan** and **James Henle**, Smith College (1077-51-1891)

▶ 3:00PM *Mathematical Modeling and Analysis of a Nonlinear Large Deformation Plate Model with Applications to Micro Air Vehicles.*  
(2375) Preliminary report.  
**James Cameron\***, **Charles Daly** and **Padmanabhan Seshaiyer**, George Mason University (1077-35-1902)

▶ 3:30PM *Statistical functional equations in the plane.*  
(2376)  
**Mary Michael Forrester**, Sewanee: The University of the South (1077-39-1087)

▶ 4:00PM *Constructing the Moduli Space of 2|2-Dimensional Complex Associative Algebras.*  
(2377)  
**Josh Frinak**, University of Wisconsin-Eau Claire (1077-00-2734)

▶ 4:30PM *Optimal Harvesting Models for Fishery Populations.* Preliminary report.  
(2378)  
**Corinne Alexandra Wentworth\***, St. Mary's College of Maryland, **Jay Walton** and **Masami Fujiwara**, Texas A&M University (1077-92-348)

▶ 5:00PM *A Family of Multidimensional Continued Fraction Stern Sequences.* Preliminary report.  
(2379)  
**Krishna Dasaratha**, Harvard University, **Laure Flapan**, Yale University, **Chansoo Lee**, Williams College, **Cornelia Mihaila**, Wellesley College, **Nicholas Neumann-Chun**, Williams College, **Sarah Peluse**, University of Chicago, Lake Forest College, **Matthew Stoffregen\***, University of Pittsburgh, and **Thomas Garrity**, Williams College (1077-05-2543)

▶ 5:30PM *A Generalized Family of Multidimensional Continued Fractions and its Correspondence to Existing Algorithms.*  
(2380) Preliminary report.  
**Krishna Dasaratha**, Harvard University, **Laure Flapan**, Yale University, **Chansoo Lee\***, Williams College, **Cornelia Mihailia**, Wesley College, **Nicholas G Neumann-Chun**, Williams College, **Sarah Peluse**, Lake Forest College, **Matt Stoffregen**, University of Pittsburgh, and **Thomas A Garrity**, Williams College (1077-11-2469)

**AMS Special Session on Advanced Investigations on Applied Optimization and Multiple Fractional Programming**

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1:00 PM – 5:50 PM **Room 109, Hynes**

Organizers: **Ram U. Verma**, Texas A&M University  
**Alexander J. Zaslavski**, Technion, Israel

Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)

- 1:00PM (2381) *The  $\epsilon$ -Optimality conditions for Multiobjective Fractional Programming Problems.*  
**R. N. Mohapatra\***, University of Central Florida, Orlando, Florida, and **Ram U Verma**, Teaxs A & M University, Kingsville, Texas (1077-49-223)
- 1:30PM (2382) *Stochastic differential equations on Banach spaces and optimization of supports of measures induced.*  
**Nasir U. Ahmed**, University of Ottawa (1077-93-62)
- 2:00PM (2383) *Finding moment-matching cubature formulas using optimization techniques, with applications in stochastic optimization.*  
**Sanjay Mehrotra** and **David Papp\***, Northwestern University, Department of Industrial Engineering and Management Sciences (1077-65-1472)
- 2:30PM (2384) *Subdifferentials of Supremum Lipschitzian Functions and Its Applications to Nonsmooth Semi-infinite and Infinite Programs.*  
**Boris Mordukhovich** and **Nghia Tran\***, Wayne State University (1077-49-221)
- 3:00PM (2385) *Quantum Games & Quaternionic Strategies.*  
**Aden Omar Ahmed**, Texas A&M University - Kingsville (1077-49-323)
- 3:30PM (2386) *Higher-Order Necessary Conditions in Nonsmooth Set Constrained Optimization.*  
**Elena Constantin**, University of Pittsburgh-Johnstown (1077-49-178)
- 4:00PM (2387) *The Smallest Intersecting Ball Problem and the Smallest Enclosing Ball Problem: Numerical Implementation.*  
**Mau Nam Nguyen\*** and **Cristina Villalobos**, University of Texas-Pan American (1077-90-1718)
- ▶ 4:30PM (2388) *Metric subregularity for composite-convex generalized equations in Banach spaces.* Preliminary report.  
**Xiyin Zheng**, Yunnan University, P.R. China, and **Wei Ouyang\***, Wayne State University (1077-49-448)
- 5:00PM (2389) *Convergence of a proximal point method and of a projected subgradient method in the presence of computational errors in Hilbert spaces.*  
**Alexander J. Zaslavski**, The Technion - Israel Institute of Technology (1077-49-278)
- 5:30PM (2390) *The Weak Optimality Conditions for Multiple Objective Fractional Programming Based on Generalized Invexity of Higher Order.*  
**Ram U Verma**, Texas A&M University (1077-90-623)

**AMS Special Session on Algebraic and Geometric Aspects of Integrable Systems and Random Matrices, IV**

1:00 PM – 5:40 PM Room 107, Hynes

Organizers: **Anton Dzhamay**, University of Northern Colorado  
**Kenichi Maruno**, University of Texas, Pan American  
**Virgil Pierce**, University of Texas, Pan American

- 1:00PM (2391) *Asymptotics of rational Painleve II solutions.*  
**Robert J. Buckingham\***, University of Cincinnati, and **Peter D. Miller**, University of Michigan, Ann Arbor (1077-34-1262)
- 1:30PM (2392) *On the Modified Nonlinear Schrödinger Equation in the Semiclassical Limit.*  
**Peter D. Miller**, University of Michigan (1077-35-1187)
- 2:30PM (2393) *Prym-Tyurin classes and tau-functions.*  
**Dmitry Korotkin**, Concordia University (1077-51-315)
- 3:30PM (2394) *Higher genus Weierstrass sigma-function.*  
**Dmitry Korotkin**, Concordia University, and **Vasilisa Shramchenko\***, University of Sherbrooke (1077-33-1046)
- 4:00PM (2395) *Real Grassmannian and KP solitons.*  
**Yuji Kodama**, Ohio State University (1077-35-1458)
- 5:00PM (2396) *Sigma function and random matrices.*  
**Emma Previato**, Boston University (1077-33-1428)

**AMS Special Session on Control of Biological and Physical Systems, II**

1:00 PM – 5:50 PM Simmons, 3rd Floor, Marriott

Organizers: **Wandi Ding**, Middle Tennessee State University  
**Volodymyr Hryniv**, University of Houston-Downtown  
**Suzanne Lenhart**, University of Tennessee, Knoxville, and NIMBioS

- 1:00PM (2397) *Tracking and Robustness Analysis for UAVs with Bounded Feedbacks.*  
**Aleksandra Gruszka\***, **Michael Malisoff**, Louisiana State University, and **Frederic Mazenc**, Team INRIA DISCO (1077-93-1855)
- 1:30PM (2398) *Optimal Control of Advection Direction on Reaction-Diffusion Population Models.*  
**Heather Finotti**, **Suzanne Lenhart** and **Tuoc Van Phan\***, University of Tennessee (1077-35-987)

*Boston, MA, Saturday, January 7 – Program of the Sessions*

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| <p>2:00PM (2399) <i>Optimal control of a biharmonic obstacle problem.</i><br/> <b>David R. Adams</b>, University of Kentucky, <b>Volodymyr Hryniv*</b>, University of Houston-Downtown, and <b>Suzanne Lenhart</b>, University of Tennessee-Knoxville (1077-49-2081)</p> <p>▶ 2:30PM (2400) <i>Mosquito Management in the face of Natural Selection.</i> Preliminary report.<br/> <b>Folashade B. Augusto*</b>, Austin Peay State University, <b>Sharon Bewick</b>, National Institute for Mathematical and Biological Synthesis, and <b>Rana D Parshad</b>, Center for Turbulence Research, Stanford University, (1077-92-2287)</p> <p>▶ 3:00PM (2401) <i>Influence of Model Structure on Control of a Cholera Epidemic.</i> Preliminary report.<br/> <b>Elsa N Schaefer</b>, Marymount University (1077-93-2069)</p> <p>3:30PM (2402) <i>Optimal Control Applied to Native-Invasive Species Competition via a PDE Model.</i><br/> <b>Wandi Ding*</b>, Middle Tennessee State University, <b>Volodymyr Hryniv</b>, University of Houston - Downtown, and <b>Xiaoyu Mu</b>, University of Tennessee - Knoxville (1077-49-341)</p> <p>4:00PM (2403) <i>Modelling effective transmission strategies and control of the world's most successful parasite.</i><br/> <b>Matthew D Turner</b>, University of Tennessee Knoxville (1077-92-1919)</p> <p>▶ 4:30PM (2404) <i>Optimal Control of a Harvesting Problem Modeled by Integro-difference Equations.</i><br/> <b>Peng Zhong*</b>, Department of Ecology, Evolution, and Natural Resources, Rutgers University, and <b>Suzanne Lenhart</b>, University of Tennessee, Knoxville (1077-92-1781)</p> <p>▶ 5:00PM (2405) <i>A Vegetative Pattern Formation Aridity Classification Scheme Along a Rainfall Gradient: An Example of Desertification Control.</i><br/> <b>Bonni J Kealy*</b> and <b>David J Wollkind</b>, Washington State University (1077-92-146)</p> <p>5:30PM (2406) <i>Hopf and backward bifurcations in a new model for the dynamics of malaria transmission.</i><br/> <b>Calistus Ngeh Ngonghala</b>, National Institute for Mathematical and Biological Synthesis (NIMBioS) (1077-92-2663)</p> | <p style="text-align: right;"><b>Machiel van Frankenhuysen</b>, Utah Valley University</p> <p>1:00PM (2407) <i>Derivatives on Fractals.</i> Preliminary report.<br/> <b>Alexander Teplyaev</b>, University of Connecticut (1077-58-2822)</p> <p>▶ 1:30PM (2408) <i>Vector equations on fractals.</i><br/> <b>Michael Hinz*</b>, University of Connecticut and FSU Jena, and <b>Alexander Teplyaev</b>, University of Connecticut (1077-35-1885)</p> <p>2:00PM (2409) <i>Factorization of the spectral zeta function of differential operators on fractals.</i><br/> <b>Nishu Lal*</b> and <b>Michel Lapidus</b>, University of California, Riverside (1077-28-2420)</p> <p>▶ 2:30PM (2410) <i>Casimir effect on higher dimensional Laakso spaces.</i> Preliminary report.<br/> <b>Robert Kesler</b> and <b>Benjamin Steinhurst*</b>, Cornell University (1077-81-1963)</p> <p>▶ 3:00PM (2411) <i>Constructing invariant Laplacians on Julia sets.</i> Preliminary report.<br/> <b>Robert S. Strichartz</b>, Cornell University (1077-28-1531)</p> <p>▶ 3:30PM (2412) <i>Buried Points in Rational Julia Sets Have Full Geometric and Dynamical Measure.</i><br/> <b>Clinton P Curry</b>, Huntingdon College, <b>John C Mayer*</b>, University of Alabama at Birmingham, and <b>E. D. Tymchatyn</b>, University of Saskatchewan (1077-37-2675)</p> <p>4:00PM (2413) <i>Statistical mechanics and quantum field theory on fractal structures.</i><br/> <b>Eric Akkermans</b>, Physics Department, Technion Israel Institute of Technology (1077-81-785)</p> <p>4:30PM (2414) <i>Number Theoretic Solutions to a Certain Nonlinear Cauchy Problem with Optimized Constraints.</i><br/> <b>Michael Anthony Maroun</b>, University of California, Riverside (1077-33-2768)</p> <p>5:00PM (2415) <i>Spectral zeta function and quantum statistical mechanics on Sierpinski carpets.</i><br/> <b>Joe P Chen</b>, Cornell University (1077-82-708)</p> <p>5:30PM (2416) <i>Properties of compatible sequences of periodic orbits of prefractal approximations of the Koch snowflake fractal billiard.</i><br/> <b>Robert G. Niemeyer*</b> and <b>Michel L. Lapidus</b>, University of California, Riverside (1077-37-1115)</p> |
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**AMS Special Session on Fractal Geometry in Pure and Applied Mathematics (in memory of Benoit Mandelbrot), V**

1:00 PM – 5:50 PM Room 200, Hynes

Organizers: **Michael L. Lapidus**, University of California, Riverside  
**Erin Pearse**, University of Oklahoma

**AMS Special Session on Frontiers in Geomathematics, IV**

1:00 PM – 5:50 PM Suffolk, 3rd Floor, Marriott

Organizers: **Willi Freeden**, University of Kaiserslautern  
**Volker Michel**, University of Siegen

**Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)**

- M. Zuhair Nashed**, University of Central Florida  
**Thomas Sonar**, Technical University of Braunschweig
- 1:00PM *Multiscale data sampling and function extension for data analysis and processing of large high dimensional data.* (2417)  
**Amit Bernanis**, Tel Aviv University, **Amir Averbuch\***, School of Computer Science, Tel Aviv University, and **Ronald Raphel Coifman**, Yale University (1077-42-1602)
- 1:30PM *Mathematical challenges arising from earth-space observation: mixed integer linear model, measurement-based perturbation theory and data assimilation for ill-posed problems.* (2418)  
**Peiliang Xu**, Kyoto University (1077-86-1504)
- 2:30PM *Fast Multipole Accelerated Solution of the Oblique Boundary Value Problem.* (2419)  
**Martin Gutting**, University of Kaiserslautern, Germany (1077-31-1921)
- 3:00PM *Real Earth Based Geopotential Determination.* Preliminary report. (2420)  
**Elena Kotevska**, University St. Kliment Ohridski-Bitola (1077-31-2427)
- 3:30PM *Differentiation Tools in Geoscience Computation.* (2421)  
**A A Abokhodair**, King Fahd University of Petroleum and Minerals (1077-86-2435)
- 4:00PM *Data Assimilation for Dynamical Systems.* (2422)  
**Humberto C. Godinez**, Los Alamos National Laboratory (1077-93-2730)
- 4:30PM *Inverse and Moment Problems in Geosciences - Revisited.* (2423)  
**M. Zuhair Nashed**, University of Central Florida (1077-86-2871)
- 5:30PM Discussion
- 2:00PM *Systems of rational difference equations from population dynamics and global dynamics on the boundary of the positive cone.* Preliminary report. (2426)  
**Jim M. Cushing**, University of Arizona (1077-39-1925)
- 2:30PM *Constant Proportion Harvest Policy, Predator Saturation and Mating Limitation Induced Allee Effects In Pacific Halibut and Atlantic Cod Fisheries.* (2427)  
**Abdul-Aziz Yakubu\*** and **Nianpeng Li**, Howard University (1077-92-2159)
- 3:00PM *Chaos in expansive rank-type equations.* Preliminary report. (2428)  
**Timothy Sauer**, George Mason University (1077-39-1999)
- 3:30PM *Attractivity and Global Stability for Linearizable Difference Equations.* (2429)  
**M. R. S. Kulenovic\*** and **Ed Janowski**, University of Rhode Island (1077-39-1161)
- 4:00PM *When does local stability imply global stability in planar competition models?* (2430)  
**Saber N Elaydi\***, Trinity University, and **Rafael Luis**, Tecnical University of Lisbon (1077-39-1237)
- 4:30PM *On the Dynamics of some Competitive Rational Systems in the Plane.* (2431)  
**Gabriel Lugo** and **Frank J. Palladino\***, University of Rhode Island (1077-39-975)
- 5:00PM *Spectral parameter power series for Sturm-Liouville problems on time scales.* Preliminary report. (2432)  
**Lynn Erbe**, **Raziye Mert** and **Allan Peterson\***, University of Nebraska-Lincoln (1077-39-788)
- 5:30PM *Representations and Ostrowski type inequalities on Time scales.* Preliminary report. (2433)  
**George A Anastassiou**, University of Memphis (1077-39-360)

**AMS Special Session on Global Dynamics of Rational Difference Equations with Applications**

1:00 PM – 5:50 PM **Fairfield, 3rd Floor, Marriott**

- Organizers: **Mustafa R. S. Kulenovic**, University of Rhode Island  
**Gerasimos Ladas**, University of Rhode Island  
**Orlando Merino**, University of Rhode Island
- 1:00PM *Number Theoretic Properties of Difference Equations Associated to Hénon Maps.* Preliminary report. (2424)  
**Joseph H. Silverman**, Brown University (1077-37-174)
- 1:30PM *Patterns of boundedness for systems of rational difference equations.* (2425)  
**Gerry Ladas**, University of Rhode Island (1077-39-1633)

**AMS Special Session on Homotopy Theory, III**

1:00 PM – 5:50 PM **Provincetown, 4th Floor, Marriott**

- Organizers: **Mark Behrens**, Massachusetts Institute of Technology  
**Mark W. Johnson**, Pennsylvania State University, Altoona  
**Haynes R. Miller**, Massachusetts Institute of Technology  
**James Turner**, Calvin College  
**Donald Yau**, Ohio State University
- 1:00PM *A general bar-cobar duality.* Preliminary report. (2434)  
**André Joyal\*** and **Matthieu Anel**, UQAM, Montréal (1077-18-2785)

*Boston, MA, Saturday, January 7 – Program of the Sessions*

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- 1:30PM *Localization and completion with respect to topological Quillen homology.*  
(2435) **John E Harper**, University of Western Ontario (1077-55-1672)
- 2:00PM *Cell complexes and inductive definitions.*  
(2436) **Michael A Shulman**, University of California, San Diego (1077-55-875)
- 2:30PM *Non-realizable 2-stage  $\Pi$ -algebras.*  
(2437) **Martin Frankland**, University of Illinois at Urbana-Champaign (1077-55-1731)
- 3:00PM *Stable homotopy 1-types and symmetric Picard groups.* Preliminary report.  
(2438) **Angelica M. Osorno\***, University of Chicago, and **Niles Johnson**, University of Georgia (1077-55-2644)
- 3:30PM *Obstruction theory for  $E_\infty$  maps.* Preliminary report.  
(2439) **Niles Johnson\***, University of Georgia, and **Justin Noel**, Max Planck Institute and University of Bonn (1077-55-2103)
- 4:00PM *Truncated Brown-Peterson spectra.*  
(2440) **Tyler Lawson\***, University of Minnesota, and **Niko Naumann**, Universität Regensburg (1077-55-1363)
- 4:30PM *Higher Geometry and Algebraic K-theory.*  
(2441) **John A. Lind**, The Johns Hopkins University (1077-55-1371)
- 5:00PM *K-homology and index theory : Beyond ellipticity.*  
(2442) **Paul Frank Baum**, Penn State University (1077-19-403)
- 5:30PM Discussion

**AMS Special Session on Mathematical Principles and Theories of Integrable Systems**

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1:00 PM – 5:50 PM **Constitution Ballroom A, 2nd Floor, Sheraton**

Organizers: **Wen-Xiu Ma**, University of South Florida  
**Syed Tauseef Mohyud-Din**, HITEC University  
**Zhijun Qiao**, University of Texas-Pan American

- 1:00PM *On the Maxwell-Bloch equations with non-zero boundary conditions.*  
(2443) **Gino Biondini\***, State University of New York at Buffalo, and **Gregor Kovacic**, Rensselaer Polytechnic Institute (1077-35-1093)
- ▶ 1:30PM *Multipeakons in the Degasperis-Procesi Equation I.* Preliminary report.  
(2444) **Jacek Szmigielski**, University of Saskatchewan, Saskatoon, SK, Canada (1077-35-1160)
- 2:00PM *Wronskian and Pfaffian solutions to nonlinear partial differential equations.*  
(2445) **Alrazi M Abdeljabbar**, University of South Florida (1077-35-1055)

- 2:30PM *Constructing Integrable Systems From Graded Classical  $r$ -Matrices.* Preliminary report.  
(2446) **Peter Fedak**, Harvey Mudd College, **Gizem Karaali\***, **Keith McHugh**, Pomona College, **Aaron Pribadi**, Harvey Mudd College, and **Sundeep Sampath**, Claremont Graduate University (1077-17-120)
- ▶ 3:00PM *Painleve integrability of coupled variable coefficient higher-order nonlinear Schrödinger equations with free parameters.* Preliminary report.  
(2447) **Zhenyun Qin\***, Fudan University, **Wenxiu Ma**, University of South Florida, and **Hong Cai Ma**, Donghua University (1077-03-1219)
- ▶ 3:30PM *Hirota Bilinear Equations and their Connection with Linear Superposition Principle.* Preliminary report.  
(2448) **Magaji Y Adamu\***, **Dauda G Yakubu** and **Enoch Suleiman**, Abubakar Tafawa Balewa University, Bauchi, Nigeria (1077-35-504)
- 4:00PM *Integrability of geometric evolution equations using Hasimoto variables.* Preliminary report.  
(2449) **Stephen C. Anco**, Brock University (1077-35-2787)
- 4:30PM *On the long-time stability of a semi-implicit Euler scheme for the 2d thermohydraulics equations.*  
(2450) **Florentina Tone\***, University of West Florida, and **Xiaoming Wang**, Florida State University (1077-35-791)
- 5:00PM *Standing wave solutions of nonlinear Schrödinger equation with saturable nonlinearity.* Preliminary report.  
(2451) **Guoping Zhang**, Morgan State University (1077-35-912)
- 5:30PM *The Grammian and Pfaffian solutions to the (3+1)-dimensional non-linear partial differential equations.*  
(2452) **Magdy G. Asaad**, Tampa (1077-35-1442)

**AMS Special Session on Mathematical Theory of Control of Quantum Systems, II**

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1:00 PM – 5:50 PM **Clarendon, 3rd Floor, Marriott**

Organizers: **Francesca Albertini**, University of Padua  
**Domenico D'Alessandro**, Iowa State University  
**Raffaele Romano**, University of Trieste  
**Francesco Ticozzi**, University of Padua

- 1:00PM *Are traps lurking on quantum control landscapes to impede reaching the objective?*  
(2453) **Herschel Rabitz**, Princeton University (1077-81-1511)

**Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)**

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| <p>1:30PM (2454) ▶ <i>Gradient flow in quantum control problems and the role of singular controls.</i><br/><b>Ruixing Long</b>, Department of Chemistry, Princeton University (1077-49-680)</p> <p>2:00PM (2455) <i>Indirect controllability of quantum systems; General Lie algebraic conditions and some special cases.</i><br/><b>Domenico D'Alessandro*</b>, Iowa State University, and <b>Raffaele Romano</b>, Department of Physics, Università di Trieste, Italy (1077-93-624)</p> <p>2:30PM (2456) <i>Symmetry Principles in Quantum Systems Theory with Applications in Simulation and Control.</i><br/><b>Thomas Schulte-Herbrueggen</b>, TU-Munich (TUM) (1077-49-349)</p> <p>3:00PM (2457) <i>Controllability with Periodic Pulsing.</i><br/><b>Philip Owrutsky*</b> and <b>Navin Khaneja</b>, Harvard University (1077-93-1992)</p> <p>3:30PM (2458) <i>Adiabatic control of the Schrodinger equation via conical intersections of the eigenvalues.</i><br/><b>Ugo Boscain*</b>, CMAP, Ecole Polytechnique, CNRS, and INRIA team GECO, <b>Mario Sigalotti</b>, INRIA team GECO, CMAP, Ecole Polytechnique, <b>Paolo Mason</b>, LSS-Supelec, CNRS, and <b>Francesca Chittaro</b>, DIGITEO, CMAP, Ecole Polytechnique (1077-81-1512)</p> <p>4:00PM (2459) <i>Weakly coupled bilinear quantum systems.</i><br/><b>Thomas Chambrion</b>, IECN, INRIA, Nancy University (1077-93-37)</p> <p>4:30PM (2460) ▶ <i>Control by quantum dynamics on graphs.</i><br/><b>Chris Godsil</b>, University of Waterloo, and <b>Simone Severini*</b>, University College London (1077-05-1906)</p> <p>5:00PM (2461) <i>On efficiency of Hamiltonian-based quantum computation for low-rank matrices.</i><br/><b>Zhenwei Cao*</b> and <b>Alexander Elgart</b>, Virginia Tech (1077-81-2783)</p> <p>5:30PM Discussion</p> | <p>1:30PM (2463) <i>Combining simplified Markov random fields with simulated evolution improves remote homology detection for beta-structural proteins into the twilight zone.</i> Preliminary report.<br/><b>Noah M. Daniels</b>, <b>Lenore J. Cowen*</b>, Tufts University, <b>Raghavendra Hosur</b> and <b>Bonnie Berger</b>, Massachusetts Institute of Technology (1077-92-835)</p> <p>2:00PM (2464) <i>RNAG: A New Gibbs Sampler for Predicting RNA Secondary Structural Ensembles of Unaligned Sequences.</i><br/><b>Charles (Chip) E. Lawrence*</b>, Brown University, <b>Donglai Wei</b>, Department of Computer Science, MIT, and <b>Lauren Alpert</b>, Brown University (1077-92-673)</p> <p>2:30PM (2465) <i>Inferring transcriptional and microRNA-mediated regulatory programs in glioblastoma.</i><br/><b>Christina S Leslie</b>, Memorial Sloan-Kettering Cancer Center (1077-92-2283)</p> <p>3:00PM (2466) ▶ <i>Branching Process Models of Ovarian Cancer Progression.</i> Preliminary report.<br/><b>Richard Durrett*</b>, Math Dept. Duke U, <b>Kaveh Danesh</b>, Duke U., <b>Laura Havrilesky</b> and <b>Evan Myers</b>, Ob/Gyn Duke Medical Center (1077-60-555)</p> <p>3:30PM (2467) ▶ <i>Machine Learning Approaches for Genomic Medicine.</i><br/><b>Jill P. Mesirov</b>, Broad Institute of MIT and Harvard (1077-92-1697)</p> <p>4:00PM (2468) <i>Noise Attenuation in Biological Systems.</i><br/><b>Qing Nie</b>, University of California, Irvine (1077-92-335)</p> <p>4:30PM (2469) ▶ <i>Darwin, Development and Dysplasia: Signalling Games that Cells Play.</i> Preliminary report.<br/><b>Bud Mishra</b>, Courant Institute (1077-92-1975)</p> <p>5:00PM (2470) <i>Theory and experiments in molecular systems biology.</i><br/><b>Eduardo Sontag</b>, Rutgers University (1077-92-484)</p> <p>5:30PM (2471) <i>Siphons in Chemical Reaction Networks.</i><br/><b>Anne Shiu</b>, University of Chicago, and <b>Bernd Sturmfels*</b>, UC Berkeley (1077-92-36)</p> |
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**AMS Special Session on Mathematics and Statistics in Computational Biology**

1:00 PM – 5:50 PM Room 204, Hynes

Organizer: **Mark A. Kon**, Boston University

1:00PM (2462) *RNA folding prediction: the continued need for interaction between biologists and mathematicians.*

**Christine E Heitsch**, School of Mathematics, Georgia Institute of Technology (1077-92-1452)

**AMS Special Session on Matrices and Graphs, II**

1:00 PM – 5:50 PM Berkeley, 3rd Floor, Marriott

Organizers: **Leslie Hogben**, Iowa State University and American Institute of Mathematics  
**Bryan L. Shader**, University of Wyoming

1:00PM (2472) *Applications and limitations of the normalized Laplacian matrix for graphs.* Preliminary report.

**Steve Butler**, Iowa State University (1077-05-2452)



- 1:30PM (2473) ▶ *Bipartiteness and the Signless Laplacian Matrix of a Graph.*  
**Shaun M Fallat**, University of Regina (1077-15-950)
- 2:00PM (2474) *On the Extremal Energy of Integral Weighted Graphs.*  
**Richard A Brualdi\***, University of Wisconsin, Madison, **Jia-yu Shao**, Tongji University, Shanghai, **Shi-Cai Gong**, **Chang-Qing Xu** and **Guang-Hui Xu**, Zhejiang A & F University, Lin'An, Hangzhou (1077-15-493)
- 2:30PM (2475) *Eventually  $r$ -cyclic matrices.*  
**Ulrica Wilson\***, Morehouse College, and **Leslie Hogben**, Iowa State University (1077-15-2574)
- 3:00PM (2476) ▶ *Drazin and Group Inverses of Matrices with Bipartite Digraphs.*  
**Minerva Catral\***, Xavier University, Cincinnati OH, **Dale Olesky**, Department of Computer Science, University of Victoria, British Columbia, Canada, and **Pauline van den Driessche**, University of Victoria, British Columbia, Canada (1077-15-1048)
- 3:30PM (2477) *Nilpotent and spectrally arbitrary matrix patterns over  $\mathbb{C}$ .*  
**Natalie Campbell**, **Kevin N. Vander Meulen\***, Redeemer University College, and **Adam van Tuyl**, Lakehead University (1077-15-137)
- 4:00PM (2478) *Partition Regular Matrices from a Linear Algebraic Perspective.*  
**Leslie Hogben**, Iowa State University, and **Jillian McLeod\***, U.S. Coast Guard Academy (1077-15-2213)
- 4:30PM (2479) *2-Matching covered loopy graphs.* Preliminary report.  
**Adam H. Berliner\***, St. Olaf College, and **Richard A. Brualdi**, University of Wisconsin - Madison (1077-05-1429)
- 5:00PM (2480) *Average mixing on graphs.* Preliminary report.  
**Chris Godsil**, University of Waterloo (1077-05-737)
- 5:30PM (2481) ▶ *An open problem concerned with the combinatorial structure of unitary matrices.*  
**Simone Severini**, University College London (1077-05-2642)

**AMS Special Session on My Favorite Graph Theory Conjectures, II**

1:00 PM – 5:50 PM Room 102, Hynes

- Organizers: **Raluca Gera**, Naval Postgraduate School  
**Craig Larson**, Virginia Commonwealth University
- 1:00PM (2482) *Chvátal's  $t_0$ -tough conjecture.* Preliminary report.  
**Linda M. Lesniak**, Drew University/Western Michigan University (1077-05-417)

- 1:30PM (2483) *The Many Forms of the Matthews - Sumner Conjecture.*  
**Ronald J. Gould**, Emory University (1077-05-854)
- 2:00PM (2484) ▶ *Favorite Graph Conjectures.*  
**Daniel J. Kleitman**, M.I. T. (1077-05-953)
- 2:30PM (2485) *Chromatic symmetric functions of certain graphs.*  
**Richard P. Stanley**, M.I.T. (1077-05-457)
- 3:00PM (2486) ▶ *"Nature is tricky, but she is not nasty." - Uncle Paul.*  
**Peter John Slater**, University of Alabama in Huntsville (1077-05-514)
- 3:30PM (2487) *Ringel and Kotzig after fifty years.*  
**Alexander Rosa**, McMaster University, Hamilton, Ontario, Canada (1077-05-923)
- 4:00PM (2488) ▶ *The Binding Number of a Graph.*  
**Wayne D. Goddard**, Clemson University (1077-05-869)
- 4:30PM (2489) ▶ *Graph Theory Problems Arising from Partially Ordered Sets.*  
**William T. Trotter**, Georgia Institute of Technology (1077-05-1166)
- 5:00PM (2490) *Conjectures reaching from groups and graphs to graphs and groups.*  
**Wilfried Imrich**, Montan University of Leoben, Austria (1077-05-1931)
- 5:30PM (2491) ▶ *Some of My Unsolved Problems in Graph Theory.* Preliminary report.  
**Nathaniel Dean**, Texas State University-San Marcos (1077-05-1937)

**AMS Special Session on Noncommutative Birational Geometry and Cluster Algebras, III**

1:00 PM – 5:40 PM Dartmouth, 3rd Floor, Marriott

- Organizers: **Arkady Berenstein**, University of Oregon  
**Vladimir Retakh**, Rutgers University
- 1:00PM (2492) *Stasheff polytopes and the coordinate ring of the cluster  $X$ -variety of type  $A_n$ .*  
**Linhui Shen**, Yale University (1077-14-1735)
- 1:30PM (2493) *Non-abelian quadratic Poisson brackets: From noncommutative ODE to noncommutative Algebraic Geometry and back.* Preliminary report.  
**Alexander V. Odesskii**, Brock University, **Vladimir N. Rubtsov\***, University of Angers, France, and **Sokolov V. Vladimir**, Landau Istitut of Theoretical Physics, Russian Academy of Sciences, Moscow (1077-16-1502)
- 2:00PM (2494) ▶ *Semi-invariants and the representation type of Artin algebras.* Preliminary report.  
**Calin Chindris**, University of Missouri, **Piotr Dowbor**, N. Copernicus University, Torun, Poland, **Ryan Kinser** and **Jerzy Weyman\***, Northeastern University (1077-16-2742)

**Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)**

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- 3:00PM *Topological Hall algebras and exponentials in categories.* Preliminary report.  
**Arkady Berenstein**, University of Oregon, Eugene, and **Jacob Greenstein\***, University of California Riverside (1077-16-2733)
- 4:00PM *Noncommutative reflections.*  
 (2496) **Yuri Bazlov\***, University of Manchester, United Kingdom, and **Arkady Berenstein**, University of Oregon (1077-20-2261)
- 5:00PM *Littlewood-Richardson coefficients for reflection groups.*  
 (2497) **Edward Richmond\***, University of British Columbia, and **Arkady Berenstein**, University of Oregon (1077-16-2764)

**Katherine C. Heller**, North Central College  
**Matthew A. Pons**, North Central College

- 1:00PM *Invariant Subspaces for Composition Operators.*  
 (2504) **Carl C. Cowen**, IUPUI (1077-47-264)
- 2:00PM *Restrictions to Invariant Subspaces of Composition Operators.* Preliminary report.  
 (2505) **Derek Allen Thompson**, Indiana University-Purdue University Indianapolis (1077-47-1097)
- 2:30PM *Invertible weighted composition operators.*  
 (2506) **Paul S. Bourdon**, Washington and Lee University (1077-47-779)
- 3:00PM *On the Point Spectrum of the Adjoints of Some Composition Operators and Weighted Composition Operators.*  
 (2507) **Maria Neophytou**, Belmont University (1077-47-1746)
- 3:30PM *Numerical Ranges of Some Cubic Operators.* Preliminary report.  
 (2508) **Linda J. Patton**, Cal Poly San Luis Obispo (1077-47-1979)
- 4:00PM *Complex Symmetric Composition Operators.* Preliminary report.  
 (2509) **Christopher Hammond**, Connecticut College (1077-47-2318)
- 4:30PM *Commutants of Composition Operators on the Hardy Hilbert Space.* Preliminary report.  
 (2510) **James M Carter**, IUPUI (1077-47-2228)
- 5:00PM *Generalization of Schur's test and its application.*  
 (2511) **Ruhan Zhao**, SUNY Brockport (1077-47-1497)
- 5:30PM *Algebraic and Operator-theoretic properties of Hardy-Hilbert space PTOs.*  
 (2512) **Mehdi Nikpour**, The University of Toledo (1077-47-1159)

**AMS Special Session on Nonlinear Analysis of Partial Differential Equation Models in Biology and Chemical Physics, II**

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1:00 PM – 3:50 PM **Room 300, Hynes**

Organizers: **Zhonlhai Ding**, University of Nevada, Las Vegas  
**Zhaosheng Feng**, University of Texas-Pan American

- 1:00PM *Boundary Control of the Korteweg-de Vries Equation.*  
 (2498) **Bingyu Zhang\*** and **Ivonne Rivas**, University of Cincinnati (1077-93-631)
- 1:30PM *On one dimensional nonlinear equations with negative exponents.*  
 (2499) **Jingbo Dou**, University of Oklahoma, and Xi'an University of Finance and Economy, and **Meijun Zhu\***, University of Oklahoma (1077-35-1327)
- 2:00PM *Remarks on Computing the Williamson Normal Form.*  
 (2500) **Viswanath Ramakrishna**, University of Texas at Dallas (1077-81-870)
- 2:30PM *Stripes Versus Spots in Reaction-Diffusion Systems: Comparison of Vegetative and Chemical Turing Pattern Formation.*  
 (2501) **Bonni J Kealy\*** and **David J Wollkind**, Washington State University (1077-92-431)
- 3:00PM *Approximation techniques for traveling waves of a single species delay diffusive model with age-structure and nonlocality.* Preliminary report.  
 (2502) **Majid Bani-Yaghoub**, Texas A & M University (1077-41-1427)
- 3:30PM *Lie symmetries to the parabolic system.*  
 (2503) **Zhaosheng Feng**, University of Texas-Pan American (1077-35-1713)

**AMS Special Session on Operator Theory on Analytic Function Spaces, II**

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1:00 PM – 5:50 PM **Room 108, Hynes**

Organizers: **Robert F. Allen**, University of Wisconsin, La Crosse

**AMS Special Session on Radon Transforms and Geometric Analysis (in honor of Sigurdur Helgason's 85th birthday), IV**

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1:00 PM – 5:50 PM **Room 104, Hynes**

Organizers: **Jens Christensen**, University of Maryland  
**Fulton Gonzalez**, Tufts University  
**Todd Quinto**, Tufts University

- 1:00PM *Decomposition of spaces of distributions using Gårding vectors.*  
 (2513) **Jens Gerlach Christensen**, Tufts University (1077-43-1820)
- 1:30PM *Penrose transforms between symmetric spaces.* Preliminary report.  
 (2514) **Hideko Sekiguchi**, The University of Tokyo (1077-22-2432)

*Boston, MA, Saturday, January 7 – Program of the Sessions*

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- 2:00PM (2515) *Cusp forms for semisimple symmetric spaces*. Preliminary report.  
**Erik P. van den Ban**, Utrecht University (1077-22-1515)
- 3:00PM (2516) *On multilinear generalized Radon transforms*.  
**Allan Greenleaf, Alex Iosevich and Eyvindur Ari Palsson\***, University of Rochester (1077-42-1441)
- 3:30PM (2517) *On the associated cycle of  $(\mathfrak{g}, K)$ -modules for  $\mathfrak{g}_{\mathbb{R}} = \mathfrak{sp}(p, q)$  or  $\mathfrak{so}^*(2n)$* .  
**Leticia I Barchini**, Oklahoma State University (1077-22-1640)
- 4:00PM (2518) *Segal-Bargmann transforms: Old and new*. Preliminary report.  
**Bent Orsted**, Aarhus University, Denmark (1077-22-1388)
- 5:00PM (2519) *Cusp Forms on hyperbolic spaces*.  
**Nils Byrial Andersen**, Aarhus University, Denmark. (1077-44-1319)
- 5:30PM Discussion

- 4:00PM (2526) *A remark on the entire solutions for a class of elliptic system with linear gradient terms*. Preliminary report.  
**Jaffar Ali\*** and **Peng Feng**, Florida Gulf Coast University (1077-35-2446)
- 4:30PM (2527) *Advance of Advantageous Genes in a Three-Allele Population Genetics Model*. Preliminary report.  
**Linlin Su\*** and **Roger Lui**, Worcester Polytechnic Institute (1077-35-1996)
- 5:00PM (2528) *Abstract analytical bifurcation theory and its applications*.  
**Ping Liu\***, Harbin Normal University, **Junping Shi**, College of William and Mary, and **Yuwen Wang**, Harbin Normal University (1077-35-1084)
- 5:30PM (2529) *Three solutions theorem for  $p$ -Laplacian boundary value problems*.  
**Chan-Gyun Kim**, College of William and Mary (1077-34-1096)

**AMS Special Session on Reaction Diffusion Equations and Applications, III**

1:00 PM – 5:50 PM Wellesley, 3rd Floor, Marriott

Organizers: **Jerome Goddard II**, Auburn University Montgomery  
**Junping Shi**, College of William and Mary  
**Ratnasingham Shivaji**, University of North Carolina Greensboro

- 1:00PM (2520) *Multiple Solitary Wave Solutions of Nonlinear Schrödinger Systems*.  
**Rushun Tian\*** and **Zhi-Qiang Wang**, Utah State University (1077-35-1771)
- 1:30PM (2521) *Effective Boundary Conditions Resulting from Anisotropic and Optimally Aligned Coatings: the Two Dimensional Case*.  
**Xinfu Chen**, University of Pittsburgh, **Cody Pond** and **Xuefeng Wang\***, Tulane University (1077-35-538)
- 2:00PM (2522)  *$R_0$  analysis of a spatiotemporal model for a stream population*. Preliminary report.  
**Jon Jacobsen\***, Harvey Mudd College, **Yu Jin**, Mark Lewis and **Hannah McKenzie**, University of Alberta (1077-35-321)
- 2:30PM (2523) *Steklov-Fucik Spectrum and Nonlinear Elliptic Equations with Nonlinear Boundary Conditions*. Preliminary report.  
**N. Mavinga\***, Swarthmore College, **M. N. Nkashama**, University of Alabama at Birmingham, and **S. Robinson**, Wake Forest University (1077-35-2245)
- 3:00PM (2524) *Upper and lower estimates for positive solutions of the higher order Lidstone boundary value problem*.  
**Bo Yang**, Kennesaw State University (1077-34-2227)
- 3:30PM (2525) *On Radial Solutions of certain Nonlinear Elliptic PDE's*.  
**Florin Catrina**, St. John's University (1077-35-502)

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

1:00 PM – 5:50 PM Arlington, 3rd Floor, Marriott

Organizers: **Sophia R. Jang**, Texas Tech University  
**Andrew L. Nevai**, University of Central Florida  
**Lih-Ing W. Roeger**, Texas Tech University

- 1:00PM (2530) *Efficacy of infection control interventions in reducing the spread of multidrug-resistant organisms in the hospital*.  
**Joanna R Wares\***, University of Richmond, **Erika M. C. D'Agata**, Harvard Medical School, **Mary Ann Horn**, NSF, **Shigui Ruan**, University of Miami, and **Glenn F Webb**, Vanderbilt University (1077-92-2079)
- 1:30PM (2531) *Analysis of a Predator-Prey Model*.  
**Ronald E. Mickens**, Clark Atlanta University (1077-92-1551)
- 2:00PM (2532) *Applications of Reaction Diffusion Systems Defined on Evolving Surfaces*.  
**Necibe Tuncer**, University of Tulsa (1077-92-773)
- 2:30PM (2533) *Basic Stochastic Models for Viral Infection Within a Host*. Preliminary report.  
**Linda J.S. Allen** and **Sukhitha W Vidurupola\***, Texas Tech University, Lubbock, Texas (1077-60-168)
- 3:00PM (2534) *High dimensional semelparous Leslie models*.  
**Jim M. Cushing\***, University of Arizona, and **Shandelle M. Henson**, Andrews University (1077-92-1912)
- 3:30PM (2535) *Analyzing Cholera Dynamics and Controls*. Preliminary report.  
**Jin Wang**, Old Dominion University (1077-92-88)

**Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)**

- 4:00PM (2536) *The community level effects of phenotypic variation within a predator population.*  
**Sebastian Schreiber\***, University of California, Davis, **Reinhard Bürger**, University of Vienna, and **Dan Bolnick**, University of Texas, Austin (1077-92-2147)
- 4:30PM (2537) *Stability and Stabilization for Chemostat Models: A Survey.*  
**Michael Malisoff**, Louisiana State University (1077-92-145)
- 5:00PM (2538) *Initial exponential growth rates in compartmental models.*  
**Fred Brauer**, University of British Columbia (1077-92-1463)
- 5:30PM (2539) *The influence of a resource subsidy on predator-prey interactions.*  
**Andrew Nevai\***, University of Central Florida, and **Robert Van Gorder**, University of Central Florida (1077-92-1466)
- 3:30PM (2545) *On some fusion subcategories of the modular category of representations of a semisimple Drinfeld double.*  
**Sebastian Marius Burciu**, Institute of Mathematics "Simion Stoilow" of Romanian Academy (1077-81-1550)
- 4:00PM (2546) *Congruence property and Galois symmetry of modular categories.*  
**Siu-Hung Ng**, Iowa State University (1077-16-1787)
- 4:30PM (2547) *Conductors and Exponents.*  
**Yorck Sommerhäuser**, University of South Alabama (1077-16-2707)
- 5:00PM (2548) *A fibration controlling G-graded extensions of fusion categories.* Preliminary report.  
**Pinhas Grossman**, Instituto Nacional de Matematica Pura e Aplicada, **David A Jordan\***, The University of Texas at Austin, and **Noah Snyder**, Columbia University (1077-18-1570)
- 5:30PM (2549) *Tensor categories and the classification of subfactors.*  
**Emily Peters**, MIT (1077-18-2423)

**AMS Special Session on Tensor Categories and Representation Theory, II**

1:00 PM – 5:50 PM Room 103, Hynes

- Organizers: **Deepak Naidu**, Northern Illinois University  
**Dmitri Nikshych**, University of New Hampshire
- 1:00PM (2540) *Brauer characters and Frobenius-Schur indicators for bismash products.* Preliminary report.  
**Andrea Jedwab** and **M. Susan Montgomery\***, University of Southern California (1077-16-576)
- 1:30PM (2541) *Frobenius Schur indicators of Symmetric Tensor Categories and Doubles of Groups.* Preliminary report.  
**Miodrag Cristian Iovanov\***, University of Southern California and University of Bucharest, **Geoffrey Mason**, University of California, Santa Cruz, and **Susan Montgomery**, University of Southern California (1077-20-1493)
- 2:00PM (2542) *Twisted Frobenius-Schur Indicators for Hopf Algebras.*  
**Maria D. Vega\*** and **Daniel S. Sage**, Louisiana State University (1077-20-966)
- 2:30PM (2543) *Localization of Braid Group Representations.*  
**Eric C Rowell\***, Texas A&M University, **Cesar Galindo**, Universidad de los Andes, and **Seung-Moon Hong**, University of Toledo (1077-20-704)
- 3:00PM (2544) *Classification of braided near-group categories.*  
**Josiah E. Thornton**, University of Oregon (1077-81-1634)

**MAA Invited Paper Session on Climate Change and Sustainability**

1:00 PM – 4:50 PM Room 302, Hynes

- Organizers: **Mary Lou Zeeman**, Bowdoin College  
**Chris Danforth**, University of Vermont
- 1:00PM (2550) *A Toy Climate Laboratory for Chaos and Differential Equations.*  
**Chris Danforth**, Complex Systems Center, University of Vermont (1077-AE-1780)
- 1:30PM (2551) *Teaching with 'Weather in a Tank'.*  
**John Marshall**, Massachusetts Institute of Technology (1077-AE-1777)
- 2:00PM (2552) *A Model Hierarchy for Undergraduate Education in Radiative and Convective Heat Transfer.*  
**Kerry A Emanuel**, Massachusetts Institute of Technology (1077-AE-1828)
- 2:30PM (2553) *Exploring Sustainability in a Developmental-Level Mathematics Course.*  
**Rikki B. Wagstrom**, Metropolitan State University (1077-AE-1867)
- 3:00PM (2554) *Sustainability in pre-calculus: leveraging biofuels data to write novel conceptual problems on function behavior and other concepts.*  
**Guadalupe I. Lozano**, The University of Arizona (1077-AE-2788)
- 3:30PM (2555) *Environmental Mathematics in a First Year Program.* Preliminary report.  
**John B Little**, College of the Holy Cross (1077-AE-1825)

*Boston, MA, Saturday, January 7 – Program of the Sessions*

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- 4:00PM *Mathematical Modeling and Public Policy Decisions Aimed at Mitigating Climate Change.*  
 ▶ (2556) **Frank Wattenberg**, United States Military Academy (1077-AE-1822)
- 4:30PM *Short Term (Non-Asymptotic) Linear Stability of Ecosystems: The Role of Non-Self-Adjointness in Homogeneous and Heterogeneous Agricultural Systems.*  
 (2557) **Gidon Eshel\***, Bard College, **Andrew Ma**, Univ. of Wisconsin, and **Olivia Romeo**, Bates College (1077-AE-703)

- 1:45PM *Reflection diagrams and mixed-sign Coxeter Systems.* Preliminary report.  
 ▶ (2561) **Johnathon Kyle Armstrong**, Florida State University (1077-55-2958)
- 2:00PM *Homological stability properties of spaces of rational J-holomorphic curves in  $\mathbb{C}P^2$ .*  
 (2562) **Jeremy Kenneth Miller**, Stanford University (1077-55-1775)
- 2:15PM *Embedding, sectioning and compression of thickenings.*  
 (2563) **Mokhtar Aouina**, Jackson State University (1077-55-2294)

**MAA Minicourse #2: Part B**

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- 1:00 PM – 3:00 PM **Salon AB, 4th Floor, Marriott**
- A dynamical systems approach to the differential equations course.*
- Presenters: **Paul Blanchard**, Boston University  
**Robert Devaney**, Boston University

- 2:30PM *The Anodyne Theorem in Model Category Theory.*  
 (2564) **David T Oury**, Saint Louis University (1077-55-2376)
- 2:45PM *Applications of computational homology and cohomology theory.* Preliminary report.  
 ▶ (2565) **Pawel Dlotko**, Institute of Computer Science, Jagiellonian University in Krakow, Poland (1077-55-2362)

**MAA Minicourse #10: Part B**

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- 1:00 PM – 3:00 PM **Salon HI, 4th Floor, Marriott**
- Geometry and art: A liberal arts mathematics course.*
- Presenter: **Anneke Bart**, Saint Louis University

- 3:00PM Break.
- 3:15PM *Structured Orientations of Thom Spectra.*  
 (2566) **Greg Chadwick**, Indiana University (1077-55-416)
- 3:30PM *An Algebraic Proof of the Equivalence of Two Quantum 3-Manifold Invariants: The Hennings Invariant and the Kuperberg Invariant.*  
 (2567) **Matt Sequin**, The Ohio State University (1077-55-2594)

**MAA Minicourse #9: Part B**

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- 1:00 PM – 3:00 PM **Salon CD, 4th Floor, Marriott**
- Reading original sources in Latin for the historian and mathematician.*
- Organizers: **Amy Shell-Gellasch**, Beloit College  
**Dominic Klyve**, Central Washington University
- Presenters: **Kim Plofker**, Union College  
**Stacy Langton**, University of San Diego

- 3:45PM *Generalizing Penner's Asymptotics For Minimal Dilatation Pseudo-Anosov Mapping Classes.*  
 ▶ (2568) **Aaron David Valdivia**, Florida State University (1077-55-1412)
- 4:00PM *The Milnor fiber associated to parallel connections of hyperplane arrangements.* Preliminary report.  
 (2569) **Kristopher Williams**, Doane College (1077-55-1321)

**AMS Session on Algebraic Topology**

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- 1:00 PM – 5:10 PM **Room 303, Hynes**
- 1:00PM *Some relations in the cohomology of classifying spaces of manifold bundles.*  
 (2558) **Ilya Grigoriev**, Stanford University (1077-55-2916)
- 1:15PM *Homotopy Kac-Moody groups and infinite pseudoreflexion groups.* Preliminary report.  
 (2559) **John D. Foley**, University of California-San Diego (1077-55-2649)
- 1:30PM *What is the algebraic structure of topological manifolds?* Preliminary report.  
 (2560) **Nathaniel Rounds**, Indiana University (1077-55-2465)

- 4:15PM *Proof of Edwards-Walsh resolution theorem without Edwards-Walsh complexes.*  
 (2570) **Vera Tonic**, Nipissing University, North Bay, ON, Canada (1077-55-675)
- 4:30PM *On Kawachi's 4-moves Question.*  
 ▶ (2571) **Noureen Khan**, University of North Texas at Dallas (1077-55-313)
- 4:45PM *The homotopy limit problem in stable representation theory.*  
 (2572) **Daniel A. Ramras**, New Mexico State University (1077-55-215)
- 5:00PM *A new algorithm for the Multivariable Alexander Polynomial of a Link.*  
 (2573) **K. Grace Kennedy**, University of California, Santa Barbara (1077-54-1433)

Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)

**AMS Session on Classical and Abstract Harmonic Analysis: Topological and Lie Groups**

1:00 PM – 4:40 PM Room 105, Hynes

- 1:00PM (2574) *Some characterizations of local bmo and  $h^1$  on metric measure spaces.*  
**Galia Dafni**, Concordia University, Canada, and **Hong Yue\***, Trine University, USA (1077-42-2086)
- 1:15PM (2575) *Finite Biorthogonal Transforms and Multiresolution Analyses on Intervals.* Preliminary report.  
**David Ferrone**, University of Connecticut (1077-42-1727)
- 1:30PM (2576) *On the WAT conjecture on the Torus.*  
**Faruk F. Abi-Khuzam**, American University of Beirut (1077-42-1308)
- 1:45PM (2577) *Some Weak Convergence Theorems on Topological Semihypergroups.*  
**Norbert N Youmbi**, Saint Francis University (1077-43-2331)
- 2:00PM (2578) *Multitemporal Wave Equations on Symmetric Spaces: Mean Value Solutions.* Preliminary report.  
**Fulton Gonzalez**, Tufts University (1077-43-2549)
- 2:15PM (2579) *Existence of  $p$ -Flows in  $\mathbb{Z}^n$  and  $T_d$ .*  
**Lucio M-G Prado**, BMCC-The City University of New York (1077-31-2160)
- 2:30PM (2580) *Structure of shift-invariant subspaces for the Heisenberg group.* Preliminary report.  
**Azita Mayeli**, Queensborough College, City University of New York (CUNY) (1077-43-1236)
- 2:45PM Break.
- 3:00PM (2581) *Explicit Construction of Normalized Tight Frames and Wavelets for a Class of 2-step Nilpotent Lie Groups.* Preliminary report.  
**Vignon S Oussa**, Saint Louis University (1077-43-693)
- 3:15PM (2582) *On the Fourier inversion formula for  $SL_3$ .* Preliminary report.  
**Keith Ouellette**, UCLA Extension (1077-22-2489)
- 3:30PM (2583) *Convergence of Aluthge Iteration in Semisimple Lie Groups.* Preliminary report.  
**Mary Clair Thompson\*** and **T.Y. Tam**, Auburn University (1077-22-840)
- 3:45PM (2584) *On representations and L-functions for the classical groups in positive characteristic.* Preliminary report.  
**Luis Alberto Lomeli**, Purdue University (1077-22-135)
- 4:00PM (2585) *Self-dual representations with vectors fixed under an Iwahori subgroup.* Preliminary report.  
**Kumar Balasubramanian**, University of Oklahoma (1077-22-1600)
- 4:15PM (2586) *Gradient Flows for the Minimum Distance to the Sum of Adjoint Orbits.*  
**Xuhua Liu\*** and **Tin-Yau Tam**, Auburn University (1077-22-568)

- 4:30PM (2587) *Global  $SL(2, R)$  representations of the Schrodinger equation with time-dependent potentials.* Preliminary report.  
**Jose A Franco**, Baylor University (1077-22-1220)

**AMS Session on Combinatorics and Graph Theory, VIII**

1:00 PM – 5:40 PM Room 111, Hynes

- 1:00PM (2588) *Total embedding distributions for some types of graphs.* Preliminary report.  
**Chen Yichao**, Hunan University (1077-05-594)
- 1:15PM (2589) *Generating All de Bruijn Sequences Using Preference Functions of Different Spans.* Preliminary report.  
**Abbas Mahdi Alhakim**, American University of Beirut (1077-05-1851)
- 1:30PM (2590) *Minor monotone floor and ceiling of certain graph parameters.* Preliminary report.  
**Thomas Milligan\***, University of Central Oklahoma, and **Xander Rudelis**, University of Central Oklahoma / California Institute of Technology (1077-05-1926)
- 1:45PM (2591) *Performance of covert networks. (Preliminary report).* Preliminary report.  
**Chris Caragianis**, University of Louisville (1077-05-752)
- 2:00PM (2592) *The Metamorphosis of Maximum Packings of  $2K_n$  with Triples into Maximum Packings of  $2K_n$  with 4-cycles.*  
**P. J. Couch**, Auburn University (1077-05-725)
- 2:15PM (2593) *Hamiltonian Cycles and Symmetric Chain Partitions of Boolean Lattices.*  
**Noah Streib**, Georgia Institute of Technology (1077-05-694)
- 2:30PM (2594) *Symmetric subgroup orbit closures on the flag variety, Richardson varieties, and Schubert structure constants for  $(p, q)$ -pairs.*  
**Benjamin J. Wyser**, University of Georgia (1077-05-686)
- 2:45PM (2595) *On tree rotations and common parse words.*  
**Rik Sengupta**, Princeton University (1077-05-682)
- 3:00PM (2596) *Central sets and C-sets – similarities and differences.* Preliminary report.  
**Neil Hindman**, Howard University (1077-05-663)
- 3:15PM Break.
- 3:30PM (2597) *Acyclic List Edge Coloring of Planar Graphs.*  
**Hsin-Hao Lai\***, National Kaohsiung Normal University, and **Ko-Wei Lih**, Academia Sinica (1077-05-519)

*Boston, MA, Saturday, January 7 – Program of the Sessions*

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| <p>3:45PM (2598) <i>Quantum codes from finite geometry designs.</i><br/> <b>David C Clark*</b> and <b>Vladimir D Tonchev</b>, Michigan Technological University (1077-05-482)</p> <p>▶ 4:00PM (2599) <i>Nim on wheel graphs.</i> Preliminary report.<br/> <b>Risto Atanasov</b>, <b>Mark Budden</b>, Western Carolina University, <b>Joseph DiNatale</b>, Armstrong Atlantic State University, <b>Lindsay Erickson</b>, North Dakota State University, <b>Robert Fenney</b>, <b>William Nathan Hack</b>, <b>Maxwell Hostetter*</b>, <b>Joshua Lambert</b>, Armstrong Atlantic State University, and <b>Warren Shreve</b>, North Dakota State University (1077-05-445)</p> <p>4:15PM (2600) <i>Automorphisms of Random Trees.</i> Preliminary report.<br/> <b>Eric Schmutz</b> and <b>Le Yu*</b>, Drexel University (1077-05-483)</p> <p>4:30PM (2601) <i>Distinguishing Chromatic Numbers of Planar Maps.</i><br/> <b>Jeffrey Manning</b>, California Institute of Technology (1077-05-387)</p> <p>▶ 4:45PM (2602) <i>An oriented hypergraphic approach to algebraic graph theory.</i><br/> <b>Lucas J Rusnak*</b>, Texas State University, and <b>Nathan Reff</b>, Binghamton University (1077-05-491)</p> <p>▶ 5:00PM (2603) <i>On the strong chromatic index of cubic Halin graphs.</i><br/> <b>Ko-Wei Lih*</b>, Academia Sinica, Taipei, and <b>Daphne Der-Fen Liu</b>, California State University, Los Angeles (1077-05-209)</p> <p>▶ 5:15PM (2604) <i>On Minimax Excluded Type Algorithm, Golden Ratio, Beatty and Sturmian Sequences.</i><br/> <b>Geremias Polanco Encarnacion</b>, University of Illinois at Urbana-Champaign (1077-05-208)</p> <p>▶ 5:30PM (2605) <i>Geometric triangulation of interior polytope number sequences.</i> Preliminary report.<br/> <b>Michael A Jackson</b>, Grove City College (1077-05-70)</p> | <p>1:15PM (2607) <i>Ambiguous shifts: symbolic dynamics from open covers.</i><br/> <b>David Richeson</b>, Dickinson College, and <b>Jim Wiseman*</b>, Agnes Scott College (1077-37-2518)</p> <p>1:30PM (2608) <i>Kleinian Limit Sets in Hilbert Space.</i><br/> <b>Tushar Das</b>, University of North Texas (UNT) (1077-37-2302)</p> <p>1:45PM (2609) <i>Gibbs states for non-irreducible countable Markov shifts.</i> Preliminary report.<br/> <b>Eugen Andrei Ghenciu*</b>, East Central University, and <b>Mario Roy</b>, York University (1077-37-2029)</p> <p>2:00PM (2610) <i>Uncovering the Lagrangian from observations of trajectories.</i> Preliminary report.<br/> <b>Yakov I Berchenko-Kogan</b>, Massachusetts Institute of Technology (1077-37-2183)</p> <p>2:15PM (2611) <i>Speedups of ergodic <math>\mathbb{Z}^d</math> actions.</i><br/> <b>Aimee S.A. Johnson</b> and <b>David M. McClendon*</b>, Swarthmore College (1077-37-2936)</p> <p>2:30PM (2612) <i>Perturbations in the Quadratic Family with Multiple Poles.</i><br/> <b>Elizabeth D Russell</b>, US Military Academy (West Point) (1077-37-1964)</p> <p>2:45PM Break.</p> <p>▶ 3:00PM (2613) <i>A Mathematical Model of the Unfolded Protein Response to Stress in the Endoplasmic Reticulum of Mammalian Cells.</i><br/> <b>Danilo Diedrichs</b>, University of Iowa (1077-37-2010)</p> <p>▶ 3:15PM (2614) <i>Predicting Catastrophes In Dynamical Systems Using Machine Learning.</i><br/> <b>Jesse Berwald*</b>, College of William and Mary, <b>Tomas Gedeon</b> and <b>John Sheppard</b>, Montana State University (1077-37-1905)</p> <p>3:30PM (2615) <i>Dynamics of random selfmaps of surfaces with boundary and graphs.</i><br/> <b>P. Christopher Staecker</b>, Fairfield University (1077-37-1598)</p> <p>3:45PM (2616) <i>Global Asymptotic Stability in a Model of Biological Networks.</i><br/> <b>Hassan M Fathallah-Shaykh*</b> and <b>Abraham Freiji</b>, The University of Alabama at Birmingham (1077-37-1549)</p> <p>▶ 4:00PM (2617) <i>Reinventing the Wheel: The Chaotic Sandwheel.</i> Preliminary report.<br/> <b>Anthony Tongen*</b>, <b>Roger J. Thelwell</b>, James Madison University, and <b>David Becerra-Alonso</b>, ETEA - University of Cordoba (1077-37-2527)</p> <p>4:15PM (2618) <i>Limit Cycles, Bistability, and Global Stability by Two-Element Negative Loops in Biological Networks.</i><br/> <b>Abraham Freiji*</b> and <b>Hassan M Fathallah-Shaykh</b>, The University of Alabama at Birmingham (1077-37-1545)</p> |
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**AMS Session on Dynamic Systems and Ergodic Theory**

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1:00 PM – 4:40 PM **Republic Ballroom A, 2nd Floor, Sheraton**

- ▶ 1:00PM (2606) *A dynamical systems analysis of afferent control in a neuromechanical model of locomotion.*  
**Lucy E. Spardy\***, University of Pittsburgh, **Sergey N. Markin**, **Natalia A. Shevtsova**, Drexel University College of Medicine, **Boris I. Prilutsky**, Georgia Institute of Technology, **Ilya A. Rybak**, Drexel University College of Medicine, and **Jonathan E. Rubin**, University of Pittsburgh (1077-37-2905)

**Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)**

4:30PM *On  $\mu$ -Compatible Metrics and Measurable Sensitivity.*  
 ▶ (2619) **Ilya Grigoriev**, Catalin Cătălin Lubin, Stanford University, **Amos Lubin**, University of California, Berkeley, **Nathaniel Ince**, Boston, MA, and **Cesar E. Silva\***, Williams College (1077-37-2417)

3:45PM  *$p$ -operator spaces and approximation properties.*  
 (2630) **Guimei An**, Nankai University, **Jung-Jin Lee\***, Mount Holyoke College, and **Zhong-Jin Ruan**, University of Illinois at Urbana-Champaign (1077-46-1743)

4:00PM *E-theory for Continuous Fields of  $C^*$  algebras.* Preliminary report.  
 (2631) **Prahlad Vaidyanathan**, Purdue University, West Lafayette, IN (1077-46-2092)

**AMS Session on Functional Analysis and Operator Theory, III**

1:00 PM – 4:10 PM Room 208, Hynes

1:00PM *Cyclicity of vectors inducing an orbit with a non-zero limit point.*  
 (2620) **Irina Seceleanu**, Bridgewater State University (1077-47-393)

1:15PM *Similarity of Operators in the Bergman Space Setting.*  
 (2621) **Hyun Kwon\***, Seoul National University, **Ronald Douglas**, Texas A & M University, and **Sergei Treil**, Brown University (1077-47-2356)

1:30PM *Algebraic Elements and Invariant Subspaces.*  
 (2622) **Yun-Su Kim**, Toledo, OH (1077-47-2234)

1:45PM *On Random Fields and Their Wavelet Transforms.*  
 (2623) **George K. Yang**, Tennessee State University (1077-44-1933)

2:00PM *Compact Weighted Composition Operators on Bergman Spaces.*  
 (2624) **Waleed K. Al-Rawashdeh**, Montana Tech of The university of Montana (1077-47-1648)

2:15PM *The many faces of linear chaos.*  
 (2625) Preliminary report.  
**Gabriel T Prajitura**, SUNY Brockport (1077-47-1434)

2:30PM *Convergence of the spherical averages for Markov semigroups on operator algebras.*  
 (2626) **Genady Ya. Grabarnik\***, St Johns University, and **Alexander A. Katz**, St. John's University (1077-46-2260)

2:45PM Break.

3:00PM *Feynman's Operational Calculi: Using Cauchy's Integral Formula.*  
 (2627) **Lance Nielsen**, Creighton University (1077-44-1773)

3:15PM *Rank one unitary perturbations via the theory of dilations.*  
 (2628) **Constanze Liaw\*** and **Ronald G. Douglas**, Texas A&M University (1077-47-495)

3:30PM *Equations involving pseudomonotone mappings with respect to two Banach spaces.*  
 (2629) **Dan D. Pascali**, Courant Institute, New York University (1077-47-436)

**AMS Session on Number Theory, Field Theory, and Polynomials, IV**

1:00 PM – 4:55 PM Room 305, Hynes

1:00PM *Generalizations of V.I. Arnold's version of Euler's Theorem for matrices.*  
 (2632) **Bogdan Petrenko\***, SUNY Brockport, and **Marcin Mazur**, Binghamton University (1077-11-1453)

1:15PM *On the behaviour of the Liouville function on polynomials with integer coefficients.*  
 ▶ (2633) **Himadri Ganguli**, Simon Fraser University (1077-11-131)

1:30PM *A New Approach to Multiplicative Arithmetic Function Number Theory Through Isobaric Polynomials.*  
 (2634) **Huilan Li**, Drexel University, and **Trueman MacHenry\***, York University (1077-11-458)

1:45PM *A Note on the Three-pile problem.*  
 ▶ (2635) Preliminary report.  
**Roy O. Quintero**, Universidad de Los Andes (1077-11-454)

2:00PM *Bounds for dimensions of degree 2 newforms.* Preliminary report.  
 (2636) **Jeffery Breeding**, Saint Louis University (1077-11-2635)

2:15PM *Recovering the sequence of approximation coefficients from a pair of successive pairs.*  
 ▶ (2637) **Avraham Bourla**, Trinity College (1077-11-1915)

2:30PM *On the number of positive integers not representable by a linear form in three variables.*  
 ▶ (2638) **Amitabha Tripathi**, Indian Institute of Technology Delhi (1077-11-140)

2:45PM *Some identities involving Bernoulli and Euler numbers.*  
 (2639) **Dae San Kim**, Sogang University (1077-11-2298)

3:00PM Break.

3:15PM *A note on Artin's primitive root conjecture.*  
 ▶ (2640) **Maosheng Xiong**, Hong Kong University of Science and Technology (1077-11-472)

3:30PM *Generalizing Kovacic's algorithm to second order homogeneous linear differential equations with parameters.* Preliminary report.  
 (2641) **Carlos E Arreche**, CUNY - Graduate Center (1077-12-2676)



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- 3:45PM (2642) *A Class of Multidimensional Repeated-root Cyclic Codes.*  
**Edgar Martinez-Moro**, Universidad de Valladolid, Soria, Spain, **Hakan Özadam**, Ohio University, **Ferruh Özbudak**, Universiteler Mah. Dumlupinar, Ankara, Turkey, and **Steve Szabo\***, Eastern Kentucky University (1077-12-1073)
- 4:00PM (2643) *Linear Algebraic Groups as Paramterized Picard-Vessiot Galois Groups.*  
**Michael F. Singer**, North Carolina State University (1077-12-833)
- 4:15PM (2644) *Relations between class numbers of binary cubic forms with different splitting types over a place in an imaginary quadratic field.*  
**Jorge Dioses**, Oklahoma State University (1077-11-2923)
- 4:30PM (2645) *Number of solutions in nonnegative integers  $x$  and  $y$  to the generalized Pillai equation  $\pm ra^x \pm sb^y = c$ .* Preliminary report.  
**Robert A Styer**, Villanova University (1077-11-1786)
- 4:45PM (2646) *Measuring Security.*  
**Daniel C Smith**, National Institute of Standards and Technology (1077-12-289)

- 2:30PM (2653) *Varying Iteration Accuracy Using Inexact Conjugate Gradients in Control Problems governed by PDE's.*  
**Xiuhong Du\***, Alfred University, and **Daniel B Szyld**, Temple University (1077-65-2038)
- 2:45PM (2654) *On the Numerical Solution of One Nonlinear Parabolic Equation.*  
**Mikheil Tutberidze**, Ilia State University (1077-65-480)
- 3:00PM Break.
- 3:15PM (2655) *Time-splitting scheme for nonhydrostatic atmospheric model.*  
**Andrei Bourchtein\*** and **Ludmila Bourchtein**, Pelotas State University, Brazil (1077-65-1814)
- 3:30PM (2656) *Matrix Multiplication Approximation Using Orthogonalized Outer Products.* Preliminary report.  
**Daniel Peach\***, Bates College, **Ilse Ipsen**, **Thomas Wentworth**, North Carolina State University, and **Colin Gray**, University of Evansville (1077-65-2124)
- 3:45PM (2657) *Robust rational interpolation and least-squares.*  
**Lloyd N. Trefethen**, Oxford University Mathematical Institute (1077-65-2441)
- 4:00PM (2658) *Spectral Methods For The Nonlinear Hamiltonian Systems.*  
**Nairat Kanyamee**, Silpakorn University (1077-65-2595)
- 4:15PM (2659) *A mixed finite element method for Helmholtz transmission eigenvalues.*  
**Tiara D. Turner\***, **Jiguang Sun**, Delaware State University, and **Xia Ji**, Chinese Academy of Science (1077-65-1112)
- 4:30PM (2660) *Immersed Finite Element Spaces with an Interior Penalty Method For Elliptic Interface Problems.*  
**Mohamed Ben Romdhane\***, **Slimane Adjerid** and **Tao Lin**, Virginia Polytechnic Institute and State University (1077-65-1210)
- 4:45PM (2661) *An analytic function without radial boundary values.*  
**J. Marshall Ash**, DePaul University (1077-30-1942)

**AMS Session on Numerical Analysis, II**

1:00 PM – 4:55 PM Room 209, Hynes

- 1:00PM (2647) *A nonoverlapping domain decomposition preconditioner for a symmetric interior penalty Galerkin method.*  
**Susanne C. Brenner**, **Eun-Hee Park\*** and **Li-yeng Sung**, Louisiana State University (1077-65-1029)
- 1:15PM (2648) *Solution of Time-Dependent PDE Through Component-Wise Approximation of Matrix Functions.* Preliminary report.  
**James V Lambers**, University of Southern Mississippi (1077-65-956)
- 1:30PM (2649) *A Projective Method for Numerical Solution of Differential Equations.*  
**Oksana Bihun**, Concordia College (1077-65-996)
- 1:45PM (2650) *Bi-direction Projected PDHG based Multi-phase Soft Segmentation.*  
**Fuhua Chen\***, **Yunmei Chen**, University of Florida, and **Xiaojing ye**, University of Geogia Technology (1077-65-432)
- 2:00PM (2651) *A Field Expansions Method for Acoustic Scattering by a Doubly Crossed Multilayered Media.*  
**David P. Nicholls** and **Jun Niu\***, University of Illinois at Chicago (1077-65-17)
- 2:15PM (2652) *A Preconditioned LSQR Algorithm.*  
**James Baglama** and **Daniel Richmond\***, University of Rhode Island (1077-65-1355)

**AMS Session on Undergraduate Research, VI**

1:00 PM – 3:55 PM Room 308, Hynes

- 1:00PM (2662) *Metapopulation Modeling and Analysis with Demographic Stochasticity.* Preliminary report.  
**Eric Eager**, University of Nebraska, Lincoln, **Mary Hebert**, Northwestern State University, **Elise Hellwig\***, Colorado College, **Francisco Hernandez-Cruz**, Occidental College, **Richard Rebarber**, **Brigitte Tenhumberg**, University of Nebraska, Lincoln, and **Bryan Wigianto**, Rice University (1077-92-1995)

Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)

- 1:15PM *Finger Motion Modeling for Bionic Fingers*. Preliminary report.  
▶ (2663) **Myrielle N Allen-Prince\***, Bennett College, and **Jay Walton**, Texas A&M University (1077-92-1324)
- 1:30PM *A Reservoir Model of Chagas Disease*.  
▶ (2664) **Sara Anne Krueger\***, Bethany Lutheran College, **May Boggess** and **Jay Walton**, Texas A&M University (1077-92-362)
- 1:45PM *Eradicating Invasive Species through Sex Reversal*. Preliminary report.  
▶ (2665) **Katie Storey\***, Carleton College, **May Boggess** and **Jay Walton**, Texas A&M University (1077-92-356)
- 2:00PM *An Analysis of the Coexistence of Three Competing Species with a Shared Pathogen*.  
▶ (2666) **Vrushali A. Bokil** and **Margaret-Rose W. Leung\***, Oregon State University (1077-92-1758)
- 2:15PM *Periodic Rigidity of Protein Crystal Structures*. Preliminary report.  
▶ (2667) **Samantha Monastra\***, **Pamela Clark**, **Jessica Grant** and **Ileana Streinu**, Smith College (1077-92-1946)
- 2:30PM Break.
- 2:45PM *3D Numerical Simulation of Microscopic Flagellar Movement With Prescribed Motion at Low Reynolds Number*.  
▶ (2668) **Olga Stulov\***, State University of New York at New Paltz, and **Xingzhou Yang**, Mississippi State University (1077-92-1890)
- 3:00PM *How does the effort a mother bird expends on her offspring depend on the attractiveness of her mate?* Preliminary report.  
▶ (2669) **Tucker Gilman**, **Tony Jhwieng**, National Institute of Mathematical and Biological Synthesis (NIMBioS), **Dana Botesteanu\***, Mount Holyoke College, **Frances Goglio**, University of Wisconsin at Madison, and **Yicong Yong**, University of Florida (1077-92-196)
- 3:15PM *Topological Obstructions to Consensus on  $SO(3)$* .  
▶ (2670) **Eric B Auld**, Arizona State University (1077-93-2922)
- 3:30PM *An Extension of the Fundamental Theorem of Calculus*. Preliminary report.  
▶ (2671) **Zengxiang Tong\*** and **Zhen Huang**, Otterbein University (1077-97-1080)
- 3:45PM *Teacher Change in the Context of a Proof-Centered Professional Development*.  
(2672) **Oswaldo Daniel Soto**, University of California at San Diego (1077-97-2781)

**MAA Session on Innovations in Teaching Statistics in the New Decade, II**

1:00 PM – 4:55 PM **Back Bay Ballroom C, 2nd Floor, Sheraton**

- Organizers: **Andrew Zieffler**, University of Minnesota  
**Brian Gill**, Seattle Pacific University  
**Nancy Boynton**, SUNY Fredonia
- 1:00PM *Introducing Statistical Inference using Randomization Methods*. Preliminary report.  
▶ (2673) **Todd Swanson\*** and **Jill VanderStoep**, Hope College (1077-E5-2338)
- 1:20PM *From Tactile to Computer Simulation: An Intermediate Activity to Increase Understanding of Sampling Distributions*. Preliminary report.  
(2674) **Sean D Simpson\***, Westchester Community College, **Stacey Hancock**, Clark University, **Jennifer Noll**, Portland State University, and **Aaron Weinberg**, Ithaca College (1077-E5-2468)
- 1:40PM *Using Alternative Forced Choice Models to Introduce the Concepts of Statistical Inference*.  
▶ (2675) **Christopher John Malone\***, **Tisha Hooks** and **April Kerby**, Winona State University (1077-E5-2007)
- 2:00PM *Engaging Students in Reasoning About the Logic of Hypothesis Testing*.  
▶ (2676) **Christina Erbacher\*** and **Hollylynne Stohl Lee**, North Carolina State University (1077-E5-1353)
- 2:20PM *Engaging Adult Learners in the Application of Statistical Processes to Solve Real World Problems*.  
▶ (2677) **Michael D. Miner**, American Public University (1077-E5-2567)
- 2:40PM *Teaching by the Test*.  
▶ (2678) **John D. McKenzie**, Babson College (1077-E5-2763)
- 3:00PM *Statistics and the (Post-) Millennial Student*.  
▶ (2679) **Patricia B Humphrey**, Georgia Southern University (1077-E5-2317)
- 3:20PM *New Trends in Teaching an Introductory Biostatistics Course*.  
▶ (2680) **Magdalena Luca**, Massachusetts College of Pharmacy and Health Sciences (1077-E5-2074)
- 3:40PM *Teaching an effective multi-section elementary statistics course*. Preliminary report.  
▶ (2681) **Katarzyna Kowal**, Ramapo College of New Jersey (1077-E5-1234)
- 4:00PM *Introducing Sampling Distributions and Hypothesis Testing using Hands-On Simulations and Student Response Technology*.  
▶ (2682) **Chris Oehrlein**, Oklahoma City Community College (1077-E5-2429)

*Boston, MA, Saturday, January 7 – Program of the Sessions*

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- ▶ 4:20PM *Teaching Statistical Literacy Entirely Online: 2011*. Preliminary report.  
**Milo Schield**, Statistical Literacy Project (1077-E5-2503)
- ▶ 4:40PM *A Statistical Odyssey: Modernizing the Discussion Board to Enhance Student Engagement*. Preliminary report.  
**Kimberly J Presser**, Shippensburg University (1077-E5-1341)

- ▶ 4:20PM *A new kind of online homework: Flash enabled WeBWork homework problems*.  
**Barbara Margolius\***, Cleveland State University, **Daniel Gries**, Hopkins School, **L Felipe Martins** and **Yuping Wu**, Cleveland State University (1077-O5-2498)
- ▶ 4:40PM *Distributome—An Interactive Web-based Resource for Probability Distributions*. Preliminary report.  
**Kyle Siegrist\***, University of Alabama in Huntsville, **Ivo Dinov**, University of California, Los Angeles, and **Dennis Pearl**, The Ohio State University (1077-O5-2544)

**MAA Session on Trends in Teaching Mathematics Online, II**

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1:00 PM – 5:55 PM Room 311, Hynes

- Organizer: **Michael B. Scott**, California State University, Monterey Bay
- ▶ 1:00PM *WIRIS collection, a repository of ready-made online exercises for self-assessment*.  
**Carles Aguilo\*** and **Ramon Eixarch**, WIRIS team at Maths for More (1077-O5-201)
  - ▶ 1:20PM *Using SmartPens to Facilitate Math Communication Online*.  
**Katrina M Palmer**, Appalachian State University (1077-O5-210)
  - ▶ 1:40PM *Increasing interaction in online courses*. (2687)  
**Revathi Narasimhan**, Kean University (1077-O5-404)
  - ▶ 2:00PM *Providing Intelligent Step-by-Step Help in Solving Practice Problems Online*. Preliminary report.  
**John C. Miller**, The City College of C.U.N.Y. (1077-O5-396)
  - ▶ 2:20PM *Connecting Students with Mathematics: The Power of Combining ALEKS and Wimba*.  
**Cheryll E Crowe**, Eastern Kentucky University (1077-O5-577)
  - ▶ 2:40PM *Gluing together Blackboard, Facebook, and Twitter*. (2690)  
**Matthew Leingang**, New York University (1077-O5-841)
  - ▶ 3:00PM *Improving Pedagogy Through Adaptive Problem Selection in Online Tutors*. (2691)  
**Douglas B. Meade\***, University of South Carolina, and **Philip B. Yasskin**, Texas A&M University (1077-O5-1158)
  - ▶ 3:20PM *“Illuminate-ing” Online Course Meetings*. (2692)  
**Sarah L Mabrouk**, Framingham State University (1077-O5-2912)
  - ▶ 3:40PM *Designing, Developing and Assessing an Online Mathematics Course*. Preliminary report. (2693)  
**Ahlam E.H Tannouri**, Morgan State University (1077-O5-2887)
  - ▶ 4:00PM *High Touch to High Tech: Distance Learning in a Small Liberal Arts College*. (2694)  
**Ellen Cunningham**, Saint Mary-of-the-Woods College (1077-O5-2536)

- ▶ 5:00PM *The Instructor’s Perspective: How to Make Learning Mathematics an Interactive Experience in an Online Environment*. (2697)  
**Aimee J Ellington**, Virginia Commonwealth University (1077-O5-2472)
- ▶ 5:20PM *Teaching Python In One Browser Window*. (2698)  
**Graeme Kemkes**, Ryerson University, and **David Pritchard\***, University of Waterloo (1077-O5-2391)
- ▶ 5:40PM *Teaching an Online Sophomore-Level Differential Equations Course*. Preliminary report. (2699)  
**William M. Kinney**, Bethel University (1077-O5-2333)

**MAA Session on the Mathematical Preparation of Teachers: The Impact of the Common Core State Standards Initiative, II**

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1:00 PM – 2:35 PM Room 310, Hynes

- Organizers: **Kenneth C. Millett**, University of California, Santa Barbara  
**Elizabeth Burroughs**, Montana State University  
**Holly Peters Hirst**, Appalachian State University  
**William McCallum**, The University of Arizona
- ▶ 1:00PM *Designing Professional Development around the CCSS Standards for Mathematical Practice: A Mathematician-Teacher Collaboration*. (2700)  
**Juliana V. Belding**, Harvard University (1077-F5-2746)
  - ▶ 1:20PM *The Standards for Mathematical Practice: Principles Guiding Pre-service Preparation and In-service Professional Development*. Preliminary report. (2701)  
**Bernadette Mullins\***, Birmingham-Southern College, **Faye Clark**, **Ann Dominick** and **Sherry Parrish**, University of Alabama at Birmingham (1077-F5-2581)

**Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)**

- ▶ 1:40PM (2702) *Integrating content, pedagogy, and cognitive coaching: a professional development model.* Preliminary report. **Barbara Henriques** and **Ekaterina Lioutikova\***, Saint Joseph College (CT) (1077-F5-1533)
- ▶ 2:00PM (2703) *Professional Development for Grades K-8 Mathematics Coaches.* **Elizabeth A. Burroughs**, Montana State University (1077-F5-1012)
- 2:20PM (2704) *Early Implementation of CCSS via Standards for Mathematical Practice.* **Dauida D Fischman**, CSU San Bernardino (1077-F5-795)

- ▶ 4:30PM (2712) *Coherent Interferometry Algorithms for Photoacoustic Imaging.* **Vincent Jugnon\***, Massachusetts Institute of Technology, **Habib Ammari**, **Josselin Garnier**, Ecole Normale Supérieure Paris, and **Elie Bretin**, Ecole Polytechnique (1077-35-1850)
- 5:00PM (2713) *A Computational Method for Measure Matching Using Metamorphosis.* **Casey L Richardson\***, Center for Imaging Science, Johns Hopkins University, and **Laurent Younes**, Johns Hopkins University (1077-49-2477)
- 5:30PM (2714) *Conductivity imaging from one interior measurement in the presence of perfectly conducting and insulating inclusions.* **Amir Moradifam\***, **Adrian Nachman**, University of Toronto, and **Alexandru Tamasan**, University of Central Florida (1077-35-1895)

**SIAM Minisymposium on Variational and PDE Methods in Imaging Science**

1:00 PM – 5:55 PM Room 206, Hynes

Organizers: **Otmar Scherzer**, University of Vienna  
**Alexandru Tamasan**, University of Central Florida  
**Luminita Vese**, University of California Los Angeles

- 1:00PM (2705) *Consistency Conditions for Cone-Beam CT Data Acquired with a Linear Source Trajectory.* **Margo S Levine\***, Harvard University, School of Engineering and Applied Sciences, **Emil Y Sidky** and **Xiaochuan Pan**, Department of Radiology, The University of Chicago (1077-35-2558)
- 1:30PM (2706) *Thermoacoustic and Photoacoustic Tomography with a variable continuous or discontinuous sound speed.* **Plamen Stefanov**, Purdue University (1077-35-1240)
- 2:00PM (2707) *Characterization of Sobolev and BV spaces.* **Giovanni Leoni**, Carnegie Mellon University, and **Daniel Spector\***, Zhejiang University (1077-46-1815)
- 2:30PM (2708) *Reconstruction Formulas for Photoacoustic Sectional Imaging.* **Peter Elbau**, Johann Radon Institute for Computational and Applied Mathematics (RICAM) (1077-35-2146)
- 3:00PM (2709) *Regularization of Optical Methods for Computing Flow Dynamics.* Preliminary report. **Aaron Luttmann\***, **Erik Bollt**, **Ranil Basnayake** and **Sean Kramer**, Clarkson University (1077-49-2055)
- 3:30PM (2710) *Acousto-Optic Tomography and Related Inverse Problems.* **John C. Schotland**, University of Michigan (1077-78-1311)
- 4:00PM (2711) *Multiobjective Optimization Methods for Shape-Based Joint Inversion.* **Alireza Aghasi\*** and **Eric Miller**, Tufts University (1077-35-2380)

**SIGMAA on Math Circles for Students and Teachers Poster and Activity Sessions**

1:00 PM – 4:00 PM Salon E, 4th Floor, Marriott

*Presentations on the Circle activities listed below will be given at the indicated times; complete programs will be available in the session room.*

Organizers: **Philip B. Yasskin**, Texas A&M University  
**James Tanton**, St. Mark's School  
**Tatiana Shubin**, San Jose State University  
**Sam Vandervelde**, St. Lawrence University

- 1:00PM *Rolling Dice; Slide Rules Rule; Tiling Torment; Six Choose Three.*
- 1:30PM *Math Education Perspective on Math Circles; Drawing Pictures: How Projective Geometry Was Discovered; Symmetries of the Trihexaflexagon; Making Change for a Dollar.*
- 2:00PM *Math Education Perspective on Math Circles; Excel vs. Fibonacci; Slide Rules Rule; 3x3 Magic Squares.*
- 2:30PM *Rolling Dice; Peering Through Tubes; Symmetries of the Trihexaflexagon; The Handshake Problem.*
- 3:00PM *Excel vs. Fibonacci; Tiling Torment; The Handshake Problem; Making Change for a Dollar.*
- 3:30PM *Peering Through Tubes; Drawing Pictures: How Projective Geometry Was Discovered; 3x3 Magic Squares; Six Choose Three.*

**AWM Workshop Panel Discussion**

1:00 PM – 2:15 PM Room 306, Hynes

*Career options: Industry, government, and academia*

Moderator: **Alissa Crans**, Loyola Marymount University

Panelists: **Jennifer Chayes**, Microsoft Research

**Melissa Choi**, Massachusetts Institute of Technology Lincoln Laboratory

**Navah Langmeyer**, National Security Agency

**Peter March**, The Ohio State University

**AMS Session on Linear and Multilinear Algebra: Matrix Theory**

1:15 PM – 4:55 PM Independence East,  
2nd Floor, Sheraton

1:15PM (2715) *A fast iterative Toeplitz solver.* Preliminary report.

**Joseph Kolibal\*** and **Eowyn Cenek**, The University of Southern Mississippi (1077-15-2225)

1:30PM (2716) *Clustering edges and vertices using fuzzy logic, case study: news documents.*

**Walid Sharabati**, Purdue University (1077-15-2926)

1:45PM (2717) *Variations of orbit reflexivity for matrices.*

**Ileana Ionascu**, Philadelphia University (1077-15-2917)

▶ 2:00PM (2718) *Enumerating Invariant Subspaces of  $\mathbb{R}^n$ .* **Joshua Ide\*** and **Lenny Jones**, Shippensburg University (1077-15-2250)

2:15PM (2719) *Identifying a Basis in a Frame.* **Dominic Kramer**, Iowa State University (1077-15-2067)

2:30PM (2720) *Lower Rank Approximation: A Generalization of Schmidt-Mirsky Theorem and Algorithms.* **Yang Liu**, College of William & Mary (1077-15-1806)

2:45PM (2721) *A characterization of Leonard pairs using the parameters  $\{a_i\}_{i=0}^d$ .* **Edward D. Hanson**, University of Wisconsin-Madison (1077-15-2602)

3:00PM Break.

3:15PM (2722) *The algebraic connectivity of graphs as a function of genus.*

**Jason J Moliterno**, Sacred Heart University (1077-15-1548)

▶ 3:30PM (2723) *Positive Semidefinite Zero Forcing.* Preliminary report.

**Travis A. Peters**, Iowa State University (1077-15-1387)

▶ 3:45PM (2724) *On the eigenvalues and eigenvectors of the adjacency matrices of the complete graphs and complete bipartite graphs.* Preliminary report.

**Nasser Dastrange**, Buena Vista University (1077-15-1076)

▶ 4:00PM (2725) *Lower Bounds for Minimum Semi-definite Rank from Orthogonal Removal and Chordal Supergraphs.*

**Sivaram K. Narayan**, Central Michigan University (1077-15-100)

4:15PM (2726) *Lehmer's conjecture for Hermitian matrices over the Eisenstein and Gaussian integers.* Preliminary report.

**Gary Greaves**, Royal Holloway, University of London., and **Graeme Taylor\***, University of Bristol (1077-15-66)

▶ 4:30PM (2727) *Dense 2-generator subsemigroups of  $2 \times 2$  matrices.*

**Mohammad Javaheri**, Siena College (1077-15-368)

4:45PM (2728) *On the structure of certain class of Toeplitz-like Kernels.*

**Troy V Banks**, Salisbury University (1077-15-2873)

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

1:15 PM – 4:10 PM Room 110, Hynes

1:15PM (2729) *Global Attractors for Damped Semilinear Wave Equations with a Robin-Acoustic Boundary Perturbation.* Preliminary report.

**Joseph L. Shomberg\***, Providence College, and **Sergio Frigeri**, University of Pavia (1077-35-853)

1:30PM (2730) *Explicit Flow Equations and Recursion Operator of the nKP hierarchy.*

**Jingsong He**, Ningbo University, **Junyi Tu\***, U of South Florida, **Xiaodong Li**, China, and **Lihong Wang**, Ningbo University (1077-35-586)

1:45PM (2731) *Dynamics of single species influenced by age-dependent dispersal and maturation time delay.* Preliminary report.

**Majid Bani-Yaghoub**, Texas A & M University (1077-35-465)

▶ 2:00PM (2732) *An inverse electromagnetic scattering problem for cavity.*

**Fang Zeng\***, **Jiguang Sun**, Delaware State University, and **Fioralba Cakoni**, University of Delaware (1077-35-1111)

2:15PM (2733) *Sign-changing solutions of the semilinear hyperbolic equations.*

**Karen Yagdjian**, University of Texas-Pan American (1077-35-2443)

2:30PM Break.

▶ 2:45PM (2734) *Implementation of a Direct D-bar Reconstruction Algorithm for Recovering a Complex Admittivity Distribution from Electrical Impedance Tomography Data.* Preliminary report.

**Sarah Jane Hamilton**, Colorado State University (1077-35-220)

**Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)**

- 3:00PM *Multipeakons in the Degasperis-Procesi Equation II.*  
(2735) **Lingjun Zhou**, Tongji University (1077-35-1303)
- 3:15PM *Frechet Sensitivity Analysis for the Convection-Diffusion Equation.*  
(2736) **Vitor Leite Nunes**, Virginia Polytechnic Institute & State University (1077-35-287)
- 3:30PM *Well-Posedness of Liquid Crystal Flow in  $L^3_{uloc}$ .* Preliminary report.  
(2737) **Jay Lawrence Hineman**, University of Kentucky (1077-35-2819)
- 3:45PM *The Nonlinear Schrödinger equation via fixed point principles.*  
(2738) **Mihaela Manole\***, Timpson ISD, Texas, and **Radu Precup**, Babes Bolyai University (1077-35-41)
- 4:00PM *Standing-waves solutions to a system of non-linear Klein-Gordon equations with a sub-critical growth non-linearity.* Preliminary report.  
▶ (2739) **Daniele Garrisi**, POSTECH (1077-35-713)

**MAA Session on Early Assessment: Find Out What Your Students Understand (and Don't Understand) before They Take the Test**

1:20 PM – 3:35 PM Room 313, Hynes

- Organizers: **Miriam Harris-Botzum**, Lehigh Carbon Community College  
**Bonnie Gold**, Monmouth University
- 1:20PM *Making sure the students understand a concept by watching them working with it.*  
▶ (2740) **Rodica Cazacu**, Georgia College (1077-D1-1615)
- 1:40PM *Using Online Pretests and Try It Quizzes for Early Assessment and Remediation.* Preliminary report.  
▶ (2741) **Brenda Burns-Williams\*** and **Megan Sawyer**, North Carolina State University, Raleigh (1077-D1-2735)
- 2:00PM *Voting your way to good discussions.* Preliminary report.  
▶ (2742) **Christopher K Storm**, Adelphi University (1077-D1-2177)
- 2:20PM *Formative Assessments in Upper Division Mathematics.*  
▶ (2743) **Brian P Kelly**, Bryant University (1077-D1-2915)
- 2:40PM *Formative assessment and learning trajectories in first semester calculus.* Preliminary report.  
▶ (2744) **Rebecca Anne Dibbs**, University of Northern Colorado (1077-D1-1184)

- 3:00PM *An Enhanced Implementation of the WeBWork Online Homework System as a Formative Assessment Instrument.* Preliminary report.  
▶ (2745) **Gulden Karakok\***, University of Northern Colorado, **Aaron Wangberg**, Winona State University, and **Nicole Engelke**, California State University Fullerton (1077-D1-2634)
- 3:20PM *MathLynx: the Online and CAS-based Mathematics Pedagogy Environment - Tools for Learning and Practice.*  
▶ (2746) **John A. Velling**, Brooklyn College (1077-D1-2484)

**AMS Special Session on Geometric Invariants of Groups and Related Topics, II**

1:30 PM – 4:50 PM Exeter, 3rd Floor, Marriott

- Organizers: **Nic Koban**, University of Maine, Farmington  
**Peter N. Wong**, Bates College
- 1:30PM *Sigma invariants of some self-similar groups.*  
(2747) **Susan Hermiller**, University of Nebraska, and **Zoran Sunic\***, Texas A&M University (1077-20-2773)
- 2:00PM *Sigma invariants for Thompson and generalised Thompson groups.* Preliminary report.  
(2748) **Dessislava Hristova Kochloukova\***, State University of Campinas (UNICAMP), Campinas, SP, Brazil, **Robert Bieri** and **Ross Geoghegan**, University of Binghamton, SUNY (1077-20-429)
- 2:30PM *The BNS-invariant of pure braid groups.* Preliminary report.  
(2749) **John Meier**, Lafayette College (1077-20-1838)
- 3:00PM *The  $\Omega$ -invariant of a semi-direct product of groups.* Preliminary report.  
(2750) **Nic Koban\***, University of Maine Farmington, and **Peter Wong**, Bates College (1077-20-1666)
- 3:30PM *Sigma theory and twisted conjugacy classes.*  
(2751) **Daciberg Lima Goncalves\***, IME-University of São Paulo, and **Dessislava H. Kouchloukova**, University of Campinas (1077-20-729)
- 4:00PM  *$\Omega^n$  invariants and twisted conjugacy classes.*  
(2752) **Nic Koban**, University of Maine, Farmington, and **Peter Wong\***, Bates College (1077-20-2323)
- 4:30PM Discussion

Boston, MA, Saturday, January 7 – Program of the Sessions

**Math Wrangle**

2:00 PM – 3:00 PM **Back Bay Ballroom B, 2nd Floor, Sheraton**

*Come watch this demonstration wrangle as local math club teams compete to solve great math problems.*

**ASL Invited Address**

2:15 PM – 3:05 PM **Room 207, Hynes**

(2753) *Twenty Questions.*  
**Roman Kossak**, CUNY Graduate Center (1077-03-156)

**AMS Session on Mathematics Education**

2:15 PM – 5:10 PM **Room 101, Hynes**

- 2:15PM (2754) *Using Dynamic Web Tools Across the Early Undergraduate Mathematics Curriculum.*  
**Michael E Martin**, Johnson County Community College (1077-97-317)
- ▶ 2:30PM (2755) *Self paced mathematics in college and high school.*  
**Jay P Belanger**, Truman State University (1077-97-2943)
- ▶ 2:45PM (2756) *Exhibit Designs for the Museum of Mathematics.*  
**George W. Hart**, Museum of Mathematics (1077-97-2889)
- ▶ 3:00PM (2757) *On Doing Mathematics: Why We Should Not Encourage Feeling, Believing or Interpreting Mathematics..*  
**Padraig M. McLoughlin**, Kutztown University of Pennsylvania (1077-97-1254)
- ▶ 3:15PM (2758) *Developing a Protocol for Analyzing the Quality of Classroom Interactions in an Undergraduate Calculus Course.* Preliminary report.  
**Matthew Thomas\***, **Guadalupe Lozano**, **Cody Patterson** and **Jennifer Eli**, University of Arizona (1077-97-2342)
- 3:30PM Break
- ▶ 3:45PM (2759) *Learning Math by Making Math.*  
**Bruce Carpenter\*** and **Debra Woods**, University of Illinois (1077-97-2506)
- ▶ 4:00PM (2760) *Playing with Multivariable Calculus Concepts Wearing 3D Glasses.* Preliminary report.  
**Paul E Seeburger**, Monroe Community College (1077-97-2080)
- ▶ 4:15PM (2761) *Two for One: Combining Developmental and Intermediate Algebra into a Four-Credit Course Using Youtube and ALEKS.* Preliminary report.  
**Shubhangi Sadanand Stalder\***, University of Wisconsin Waukesha, and **Paul Arthur Martin**, University of Wisconsin Marathon (1077-97-2656)

- ▶ 4:30PM (2762) *Understanding Representations and Manipulatives through the Eyes of Preservice Teachers.* Preliminary report.  
**James R. Valles, Jr.\***, Saint Mary-of-the-Woods College, **Rebecca Ortiz** and **Xiaobo She**, Texas Tech University (1077-97-2913)
- ▶ 4:45PM (2763) *Assessing the impact of a computer-based college algebra course.*  
**Ningjun Ye**, University of Southern Mississippi (1077-97-676)
- ▶ 5:00PM (2764) *The Mathematics of Proofs in Number Theory and Algebra for High Achieving High School Students.* Preliminary report.  
**Richard Millman\***, **Daniel Connelly** and **Cher Hendricks**, Georgia Institute of Technology (1077-97-521)

**AWM Workshop: Research Presentations by Recent Ph.D.s**

2:30 PM – 4:20 PM **Room 306, Hynes**

- Organizers: **Alissa Crans**, Loyola Marymount University  
**Rachelle DeCoste**, Wheaton College  
**Kirsten Eisentraeger**, Pennsylvania State University  
**Susan Williams**, University of South Alabama
- ▶ 2:30PM (2765) *Algebraic theory for discrete models in systems biology.*  
**Franziska Hinkelmann\***, Mathematical Biosciences Institute, Ohio State University, and **Reinhard Laubenbacher**, Virginia Bioinformatics Institute, Virginia Tech (1077-92-203)
  - 3:00PM (2766) *Theories without the independence property.*  
**Lynn C. Scow**, University of Illinois at Chicago (1077-03-246)
  - 3:30PM (2767) *A Functional Central Limit Theorem for Empirical Processes.*  
**Cristina Tone**, University of Louisville (1077-60-247)
  - 4:00PM (2768) *A fluid-structure interaction problem for a supercavitating elastic curvilinear foil.*  
**Anna Zemlyanova**, Texas A&M University (1077-76-253)

**AMS-MAA-SIAM Gerald and Judith Porter Public Lecture**

3:00 PM – 4:00 PM **Ballrooms A/B, 3rd floor, Hynes**

- (2769) *Geometric puzzles: Algorithms and complexity.*  
**Erik D. Demaine**, Massachusetts Institute of Technology (1077-51-15)

## Program of the Sessions – Boston, MA, Saturday, January 7 (cont'd.)

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### **MAA Session on Writing the History of the MAA, II**

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3:00 PM – 4:55 PM Room 203, Hynes

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

**Janet Beery**, University of Redlands

**Amy Shell-Gellasch**, Beloit College

3:00PM *Digging up the History of a Capital Section*. Preliminary report.

(2770) **Betty Mayfield\***, Hood College, and **Jon Scott**, Montgomery College (1077-Q1-771)

3:20PM *The Kentucky Section*. Preliminary report.

► (2771) **Daniel J. Curtin**, Northern Kentucky University (1077-Q1-661)

3:40PM *Dean Meder and the Origins of the MAA - New Jersey Section*. Preliminary report.

► (2772) **Lawrence A. D'Antonio**, Ramapo College of New Jersey (1077-Q1-742)

4:00PM *Women Welcome in the Metro New York Section!* Preliminary report.

► (2773) **Agnes M. Kalemaris**, Farmingdale State College (1077-Q1-2249)

4:20PM *Writing a History of an MAA Section*.

► (2774) Preliminary report. **James R Choike**, Oklahoma State University (1077-Q1-1275)

4:40PM *Know Your Wisconsin Mathematician: The Oral History of an MAA Section*.

► (2775) **Benjamin V.C. Collins\***, University of Wisconsin-Platteville, and **Jeganathan Sriskandarajah**, Madison College (1077-Q1-374)

5:30PM *The decision problem of T...*

(2780) **Katalin Bimbó\***, University of Alberta, and **J.Michael Dunn**, Indiana University

5:55PM *An Umbrella Formalism for Examining Self-Justifying Systems*.

(2781) **Dan E. Willard**, University at Albany

### **AMS Banquet Reception**

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6:30 PM – 7:30 PM Salon F, 4th Floor, Marriott

### **AMS Banquet**

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7:30 PM – 10:00 PM Salon F, 4th Floor, Marriott

**Michel L. Lapidus**  
AMS Associate Secretary  
Riverside, California

**Gerard A. Venema**  
MAA Associate Secretary  
Grand Rapids, Michigan

### **ASL Invited Address**

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3:15 PM – 4:05 PM Room 207, Hynes

(2776) *Continuous first order logic and Gurarii's universal homogeneous separable Banach Space*.

**C. Ward Henson**, University of Illinois at Urbana-Champaign (1077-03-154)

### **ASL Contributed Paper Session, III**

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4:15 PM – 6:15 PM Room 207, Hynes

4:15PM *Superstable generic graphs with rich geometries*.

(2777) **Justin Brody**, Franklin and Marshall College

4:40PM *Classical consequences of continuous choice principles from intuitionistic analysis*.

(2778) **François G. Dorais**, Appalachian State University

5:05PM *Computing boundary extensions of conformal maps*.

(2779) **Timothy H. McNicholl**, Lamar University